

Chapter 2. Patterns of Tobacco Use Among Women and Girls

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Introduction

This chapter summarizes trends and patterns of cigarette smoking and use of other tobacco products among women and girls and updates and expands the information in previous reports of the Surgeon General, particularly the 1980 report titled, *The Health Consequences of Smoking for Women* (U.S. Department of Health and Human Services [USDHHS] 1980). This report primarily uses U.S. national survey data, but where these data are sparse, particularly for racial and ethnic groups, regional surveys or other large surveys are used. In the case of international smoking patterns, data are provided by the World Health Organization (WHO) and international surveys. Gender-specific differences are discussed to the extent that data exist.

Sections of this chapter cover the prevalence of cigarette smoking among women and girls of different age groups; smoking during pregnancy; smoking initiation; nicotine dependence; smoking cessation; other tobacco use; exposure to environmental tobacco smoke; the relationship of smoking to body weight, other drug use, and mental health; and international trends in smoking prevalence. Young women and pregnant women are included in the estimates of smoking prevalence and cessation among women overall, but separate sections address smoking prevalence and cessation among these groups of women because they represent important populations for specific interventions.

National data from several sources were analyzed for this report. The data analyzed to assess smoking behavior among adults were obtained from the National Health Interview Surveys (NHIS) of 1965–1998, the 1992–1998 National Household Surveys on Drug Abuse (NHSDA), the 1999 Behavioral Risk Factor Survey (BRFS), the National Health and Nutrition Examination Survey III (NHANES III) (1988–1994),

and the 1986 Adult Use of Tobacco Survey (AUTS). The sources used for analysis of data on children and adolescents were the Monitoring the Future (MTF) Surveys of 1976–1998, the NHSDA surveys of 1974–1998, the 1999 national Youth Risk Behavior Survey (YRBS), the Teenage Attitudes and Practices Survey I of 1989 (TAPS I), and the Teenage Attitudes and Practices Survey II of 1993 (TAPS II). Other sources were the National Teenage Tobacco Surveys (NTTS) of 1968, 1970, 1972, 1974, and 1979; the 1964, 1966, 1970, and 1975 AUTS; the Behavioral Risk Factor Surveillance System (BRFSS) for 1988–1997; the 1998 and 1999 MTF Surveys; and the 1999 National Youth Tobacco Survey (NYTS). Only published data from these surveys were used. These surveys use self-reported smoking status. Self-report is generally considered to be reliable except in certain situations, such as pregnancy or intensive treatment programs (see Appendix 3). Table 2.1 and Appendix 1 describe all years of data available for these data sources, but only selected years are used for this report. Appendix 2 defines the survey terms used in this report.

The following definitions and conventions are used in this chapter: “women” refers to females 18 years of age or older, and “girls” refers to females younger than 18 years of age. “Female” is used if the age range includes both women and girls. The terms “increase” and “decrease” are used to describe changes in an estimate only if the change is statistically significant at the 95 percent confidence interval (CI). If two estimates are not identical but have overlapping 95 percent CIs, the estimate is said to be “unchanged.” For more precise estimates, combined years are used when sample sizes are small. The text or tables explicitly note the use of combined data.

Cigarette Smoking Among Women

Historical Trends in Smoking

Data on women's smoking before 1935 are anecdotal. *Fortune* magazine (*Fortune* 1935) conducted a

national public opinion and consumer preference survey in the 1930s and a national Current Population Survey (Haenszel et al. 1956) was performed in 1955, but systematic surveillance of smoking behavior did

Table 2.1. Sources of national survey data on tobacco use, United States

Survey	Years	Age or school grade of respondents	Type of survey
Adult Use of Tobacco Survey (AUTS)	1964, 1966, 1970, 1975, 1986	21 years in 1964–1975 17 years in 1986	Cross-sectional
Behavioral Risk Factor Surveillance System (BRFSS)	1984–1999	18 years	Cross-sectional State-specific estimates
Current Population Survey	1955, 1966, 1967, 1985, 1989, 1992–1993, 1995–1996	15 years	Cross-sectional Estimates by state and nation
Monitoring the Future (MTF) Survey	1976–2000	Grade 12 Grades 8 and 10 since 1991	Cross-sectional with longitudinal component
National Health and Nutrition Examination Survey III (NHANES III)	1988–1994	2 months	Cross-sectional
National Health Interview Survey (NHIS)	1965, 1966, 1970, 1974, 1976, 1977, 1978, 1979, 1980, 1983, 1985, 1987, 1988, 1990, 1991, 1992, 1993, 1994, 1995, 1997, 1998	18 years	Cross-sectional
National Household Survey on Drug Abuse (NHSDA)	1974, 1976, 1977, 1979, 1982, 1985, 1988, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998	12 years	Cross-sectional
National Teenage Tobacco Survey (NTTS)	1968, 1970, 1972, 1974, 1979	12–18 years	Cross-sectional with longitudinal component
National Youth Tobacco Survey (NYTS)	1999	Grades 6–12	Cross-sectional
Teenage Attitudes and Practices Surveys (TAPS I, TAPS II)	1989, 1993	12–18 years in 1989 10–22 years in 1993	Cross-sectional with longitudinal component
Youth Risk Behavior Surveillance System (YRBSS)	1991, 1993, 1995, 1997, 1999	Grades 9–12	Cross-sectional

*Response rate, as defined by Council of American Survey Research Organizations, includes all calls made, even those that resulted in no answer or busy signal; does not include nonoperating or out-of-service numbers.

Sources: **AUTS:** U.S. Department of Health, Education, and Welfare (USDHEW) 1969, 1973, 1976; U.S. Department of Health and Human Services (USDHHS), public use data tape, 1986; USDHHS 1990a. **BRFSS:** Gentry et al. 1985; Remington et al. 1985; Frazier et al. 1992; Powell-Griner et al. 1997; Nelson et al. 1998; Centers for Disease Control and Prevention (CDC), Division of Adult and Community Health, public use data tape, 1999. **Current Population Survey:** U.S. Bureau of the Census 1995, 1996a,b; U.S. Bureau of the Census, National Cancer Institute supplement, public use data tape, 1995–1996. **MTF Survey:** University of Michigan, Institute for Social Research, public use data tapes, 1975–1998; Bachman et al. 1980a,b, 1981, 1984, 1985, 1987, 1991a, 1993a,b; Johnston et al. 1980a,b, 1982, 1984, 1986, 1991, 1992, 1993, 1994a,b, 1995a,b, 1996, 1997, 1999, 2000a;

Mode of survey administration	Sample size	Response rate
Household interview in 1964 and 1966 Telephone interview in 1970 and later	13,031 in 1986	74.3% in 1986
Telephone interview	1,248–7,543/state in 1999	Median in 1999, 55.2%* Range, 36.2–80.8%
Self-reported and proxy-reported household interview	416,208 in 1995–1996	85.5% in 1995–1996
Self-administered, school-based survey	15,419–18,667/grade in 1998	Students' rate, 86% in 1998 Range, 86–87% in 1991–1998 79–86% in 1977–1990 Schools' rate, 51% in 1998 Range, 51–60% in 1991–1998 59–72% in 1977–1990
Household interview and physical examination	30,100	74% (interview and physical examination)
In-person household and telephone interviews	32,440 in 1998	73.9% in 1998 Average across survey years, 88%
In-person household interview Beginning in 1994-B, self-administered answer sheet for responses to sensitive questions	25,500 in 1998	77.0% in 1998 Average across survey years, 80%
Telephone interview in all surveys In-person interview was also included in 1968	2,553–4,414	Not available
Self-administered, school-based survey	15,061 in 1999	84.2% in 1999
Telephone interview, in-person interview, and mailed questionnaire	9,965 in 1989 4,992 in 1993 7,960 in longitudinal component	82.4% in 1989 89.3% in 1993 87.1% in longitudinal component
Self-administered, school-based survey	15,349 in 1999	66% in 1999

University of Michigan 1999b, 2000. **NHANES III**: National Center for Health Statistics (NCHS), public use data tapes, 1988–1994; NCHS 1994b. **NHIS**: NCHS, public use data tapes, 1965–1998; NCHS 1975; Kovar and Poe 1985; Schoenborn 1988; Schoenborn and Marano 1988; Massey et al. 1989; USDHHS 1999a. **NHSDA**: Alcohol, Drug Abuse, and Mental Health Administration, public use data tapes, 1974–1991; Abelson and Atkinson 1975; Abelson and Fishburne 1976; Abelson et al. 1977; Miller et al. 1983; USDHHS 1988a, 1990b, 1991; Substance Abuse and Mental Health Services Administration (SAMHSA), public use data tapes, 1992–1998; SAMHSA 1993, 1995a,b, 1996, 1997, 1998a,b; 2000. **NTTS**: USDHEW 1972, 1979b. **NYTS**: CDC 2000b. **TAPS**: CDC, Office on Smoking and Health, public use data tapes, 1989, 1993; Allen et al. 1991, 1993; Moss et al. 1992; CDC 1994a,d. **YRBSS**: Kolbe 1990; CDC 1992; Kann et al. 1993, 1995, 1996, 1998, 2000; Kolbe et al. 1993; CDC, Division of Adolescent and School Health, public use data tape, 1999.

not begin in the United States until 1965. Other surveys before 1965 were often done for commercial purposes (Schuman 1977). For example, an annual marketing survey in Milwaukee, Wisconsin, was conducted by the *Milwaukee Journal*; the first survey of women was performed in 1935 (Burbank 1972; Howe 1984). Because smoking was more prevalent in urban areas than in rural areas, estimates of smoking prevalence among women in the Milwaukee surveys were higher than estimates that would have been obtained from a national population-based survey (*Fortune* 1935; Haenszel et al. 1956). This urban population was also probably younger, and younger women were more likely than older women to smoke during this period (Burbank 1972).

Women and girls in colonial New England and the wives of Presidents Andrew Jackson and Zachary Taylor reportedly smoked pipes (Gottsegen 1940; Robert 1952; Heimann 1960). Chewing tobacco, the primary form of tobacco used in the early 1800s, was used predominantly by men; women, however, did use snuff (Lander 1885; Gottsegen 1940; Robert 1952). Pipe use among women decreased before the Civil War (Heimann 1960). Cigarettes were introduced in the 1840s, and some use was reported among urban women (Brooks 1952; Robert 1952; Tennant 1971; Sobel 1978). Between the Civil War and World War I, men were the primary users of tobacco, but mountain women reportedly smoked pipes, factory women used snuff, Bohemian women smoked small cigars, and refined women smoked cigarettes (Robert 1952; Sobel 1978). In the 1800s, snuff was used by all classes in the South and by sophisticated New York women (Lander 1885). Many other women probably used tobacco secretly (e.g., in clandestine women's smoking clubs) (Lander 1885). The use of chewing tobacco declined in the United States after 1890 when strict laws were enacted that prohibited spitting. The introduction of blended and flue-cured cigarettes and the invention of an automated machine to produce cigarettes set the stage for widespread adoption of cigarette smoking (Wagner 1971).

In New York, a law was passed in 1908 making it illegal for women to smoke in public (Sullivan 1930; Sobel 1978). However, smoking among women began to increase, and some women smoked openly in the 1920s, as social and cultural changes lessened the taboos discouraging tobacco use by women (Sullivan 1930; Brooks 1952; Tennant 1971; Wagner 1971; Sobel 1978; Gritz 1980; USDHHS 1980; Ernster 1985; Waldron 1991). *Printers' Ink* noted in 1924 that World War I advanced the custom of smoking among women

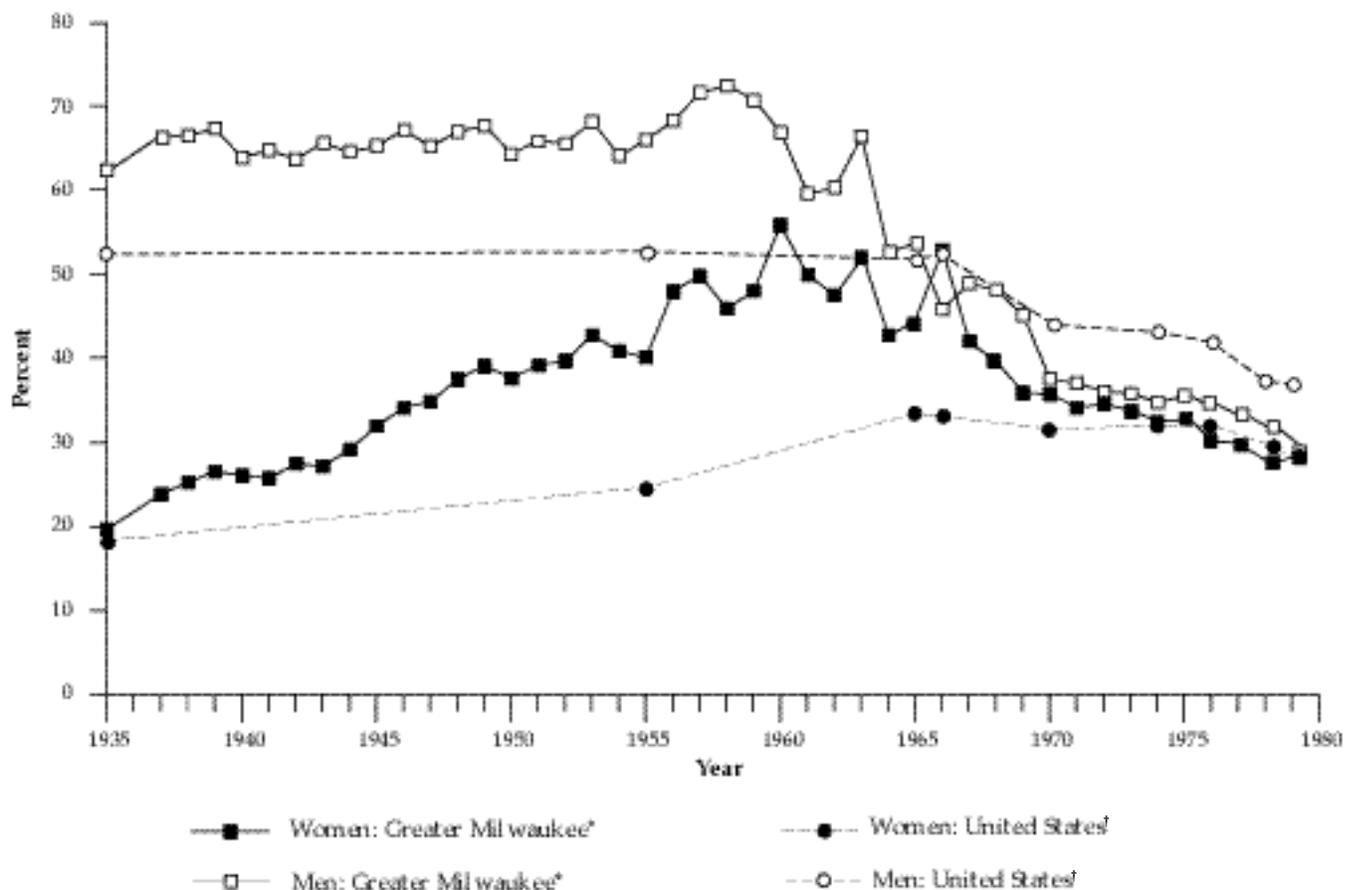
(Wessel 1924). Although Grace Coolidge is believed to have been the first First Lady to smoke cigarettes, Eleanor Roosevelt was the first to smoke publicly (Hoover 1934).

Estimates suggested that in 1924, women smoked about 5 percent of all cigarettes produced. By 1929, this proportion increased to 12 percent (Wills and Wills 1932). These data were used to derive estimates of smoking prevalence for women: 6 percent in 1924 and 16 percent in 1929 (USDHHS 1980). Burbank (1972) used data from the 1955 Current Population Survey to retrospectively determine smoking prevalence among women in 1930 and reported a considerably lower estimate (2 percent). The *Fortune* survey of 1935 (*Fortune* 1935) reported a national smoking prevalence of 26 percent among women younger than 40 years of age and 9 percent among women older than 40 years of age (18 percent overall). For women, the Milwaukee surveys showed a smoking prevalence of 20 percent in 1935 and 26 percent in 1940 (Figure 2.1) (*Milwaukee Journal* 1935, 1940). Other data also suggested that about 20 percent of women smoked between 1930 and 1945 (Burbank 1972).

During and after World War II, more women began smoking cigarettes (Schuman 1977). The Gallup Poll reported that 36 percent of women smoked in 1944 and 33 percent in 1949 (Gallup 1972a,b). According to the Milwaukee surveys, prevalence of current smoking among women was 38 percent in 1948 (Figure 2.1). Similarly, in the 1948 Framingham study, 40 percent of women were smokers (Gordon et al. 1975). Trade journal surveys in the late 1940s also estimated smoking prevalence among women to be 40 to 45 percent (Conover 1950). Early data are scarce for racial and ethnic groups, but data from the Mills and Porter (1953) 1947 household survey in Columbus, Ohio, indicated that 28 percent of white women and 36 percent of black women aged 20 years or older smoked cigarettes. A survey of 1,783 nonhospitalized persons in Texas in the early 1950s reported that 31 percent of both white women and black women smoked cigarettes (Kirchoff and Rigdon 1956).

The 1955 Current Population Survey was the first nationally representative survey of smoking prevalence; 32 percent of the women had ever smoked, and 24 percent were current smokers. The 1959 Cancer Prevention Study I (CPS-I), conducted by the American Cancer Society (ACS), was a survey of more than one million, primarily white, middle-class, well-educated adults aged 30 years or older from 25 states; 27 percent of the women were current smokers (Hammond and Garfinkel 1961; Stellman et al. 1988;

Figure 2.1. Prevalence (%) of current smoking among adults aged 18 years or older in the greater Milwaukee area and in the general U.S. population, by gender, 1935–1979



*Adapted from Howe 1984: *Milwaukee Journal*, Consumer analysis of the Greater Milwaukee market, 1924–1979. Before 1941, the wording of questions eliciting information on cigarette use and type of respondent are not recorded. In 1941–1954, men were asked, “Do you smoke cigarettes?” In 1955–1959, respondents were asked, “Do any men [women] in your household smoke cigarettes with [without] a filter tip?” In 1960–1965 and 1967, women and men were asked, “Have you bought, for your own use, cigarettes with [without] a filter tip in the past 30 days?” In 1966 and 1968–1979, women and men were asked, “Have you bought, for your own use, cigarettes with [without] a filter tip in the past 7 days?” Data since 1955 are based on the sum of the percentage of smokers who bought filter-tipped cigarettes and the percentage who bought nonfilter-tipped cigarettes in the past 30 days. Results overestimate smoking prevalence because respondents could answer “yes” to both questions. Data for women in 1976–1979 include only the percentage buying filter-tipped cigarettes; the question on the use of nonfilter-tipped cigarettes was dropped because of low response.

†Absence of data points from national surveys from 1935–1965 means these lines should not be interpreted as trends. The 1935 data are from the 1935 *Fortune* Survey III (*Fortune Magazine* 1935), the 1955 data are from the 1955 Current Population Survey (Haenszel et al. 1956), and the 1965–1979 data are from the National Health Interview Survey (Giovino et al. 1994).

Garfinkel and Silverberg 1990). Data from the Current Population Survey showed that prevalence of current smoking increased among women from 1955 through 1966 (National Center for Health Statistics [NCHS] 1970; Schuman 1977). In the Milwaukee surveys, smoking prevalence among women peaked in the early 1960s (Howe 1984). The 1964 AUTS, a nationally representative survey, reported that the prevalence of smoking was 31.5 percent among women 21 years of age or older (Centers for Disease Control [CDC] 1987b). Data from NHIS, first conducted in 1965, indicated that smoking prevalence among women was 33.9 percent in 1965 (Giovino et al. 1994). Prevalence decreased to 22.0 percent among women from 1965 through 1998. Most of this decline occurred from 1974 through 1990, but prevalence continued to decline from 1992 through 1998 (CDC 2000a).

Despite the variation in estimates of smoking prevalence across surveys, these data sources showed that the prevalence of smoking was consistently lower among women than among men. Prevalence was 18 percent among women and 52 percent among men in the *Fortune* survey (1935), 25 percent among women and 53 percent among men in the 1955 Current Population Survey (Haenszel et al. 1956), and 27 percent among women and 48 percent among men in the 1959 CPS-I (Garfinkel and Silverberg 1990).

Smoking by Birth Cohort

Analyzing the smoking behavior of persons born during the same 5- to 10-year period (birth cohorts) provides an opportunity to examine when persons take up smoking and how smoking diffuses through a population over time. However, such analyses can underestimate smoking prevalence in early birth cohorts because smokers older than 40 years of age are more likely than nonsmokers to die (differential mortality). According to the 1959 CPS-I data for women aged 30 through 89 years, the estimated prevalence of current smoking among women increased from 1 percent in the 1870–1874 birth cohort to 43 percent in the 1925–1929 birth cohort (Hammond and Garfinkel 1968). On the basis of data from the 1965 follow-up survey of the same participants, the prevalence estimates for these cohorts of women were the same.

Using data from the 1978–1980 NHIS on the age at which regular cigarette use began and the age at complete smoking cessation, Harris (1983) reconstructed prevalence estimates for women and men born in 1880–1950. When he adjusted for differential mortality, he found that the effect was smaller for

women than for men because the mortality differences between female smokers and nonsmokers in the earliest cohorts were small. Tolley and colleagues (1991) used NHIS data from 1970, 1978, 1979, 1980, and 1987 to reconstruct the prevalence of smoking in birth cohorts of whites and blacks by gender. They analyzed data on the age at which the respondent began smoking cigarettes fairly regularly, current smoking status, and time since the respondent last smoked regularly if the smoker had quit smoking. Although no adjustment was made for differential mortality, its effect was estimated at less than 1 percentage point for the earliest birth cohorts of women. Burns and others (1997) conducted the most recent analysis by birth cohort. They used NHIS data from 1970, 1978, 1979, 1980, 1987, and 1988 and adjusted the estimates for differential mortality. Current smoking prevalence was estimated for 5-year birth cohorts from 1885–1889 through 1965–1969. Results from all three of these analyses were consistent, and the estimates from Burns and coworkers are given here for white women and black women separately. To produce similar estimates for Hispanic women, NHIS data were used (NCHS, public use data tapes, 1978–1980, 1987, 1988), but no adjustment was made for differential mortality. Because of the smaller sample sizes, the estimates for Hispanic women are less precise than those for white women or black women, and because of the small sample sizes in earlier years, data are shown for blacks starting with the 1900–1904 cohort and for Hispanics starting with the 1910–1914 cohort.

According to NHIS data for white women, a dramatic increase in smoking prevalence occurred in the 1910–1914 birth cohort; for black women, a large increase occurred in the 1920–1924 birth cohort (Figure 2.2). For Hispanic women, the increase in smoking prevalence by cohort was gradual over time. For all three racial and ethnic groups, NHIS data showed a pattern of increased cigarette smoking among women in each successive birth cohort through the 1940–1944 birth cohort (Figure 2.2). The prevalence was low in the 1900–1904 birth cohort: a maximum prevalence of 24 percent among white women and 16 percent among black women. The sample size for Hispanic women was too small to assess the prevalence in this cohort. The highest prevalence among white women occurred in the 1925–1929 through 1940–1944 birth cohorts (49 percent) (Burns et al. 1997). Among black women, prevalence peaked in the 1935–1939 and 1940–1944 birth cohorts (51 percent) (Burns et al. 1997). Among Hispanic women, prevalence was

highest in the 1920–1924 (31 percent) and 1940–1944 (29 percent) birth cohorts.

The Hispanic Health and Nutrition Examination Survey (HHANES) data showed that the pattern of smoking differed among subgroups of Hispanic women over time (Escobedo and Remington 1989). For example, among Mexican American women, prevalence peaked in the 1931–1940 birth cohort, but prevalence peaked among Puerto Rican American women in the most recent cohort studied, the 1951–1960 birth cohort.

Among whites, blacks, and Hispanics, smoking prevalence and the proportion of women who had ever smoked declined in cohorts of women born after 1944 (Figure 2.2). Escobedo and Peddicord (1996) suggested that this decline largely reflects smoking patterns among women with 12 or more years of education. Peak smoking among women with less than a high school education continued to increase for white women and for black women and remained stable for Hispanic women through the 1958–1967 birth cohort.

In all cohorts, smoking prevalence was lower among Hispanic women than among white women or black women (Figure 2.2). In the 1940–1944 birth cohort, smoking prevalence was comparable among white women and black women. In the last birth cohort presented in Figure 2.2 (1960–1964), the prevalence of smoking was higher among white women (40 percent) than among black women (37 percent). This cohort comprised women aged 19 through 23 years in 1988. In the last cohort studied (1965–1969) by Burns and coworkers (1997) (data not shown), the prevalence of smoking was higher among white women (34 percent) than among black women (26 percent). This finding is consistent with recent racial and ethnic trends in smoking prevalence among high school senior girls and young women (aged 18 through 24 years) (see “Cigarette Smoking Among Young Women” and “Cigarette Smoking Among Girls” later in this chapter).

The analyses by birth cohort showed that smoking became prevalent among men before it diffused to women (Figure 2.2). Among white men and black men, the dramatic increase in smoking prevalence occurred in the 1900–1904 birth cohort, and the prevalence of smoking was dramatically higher among men than among women in the earlier birth cohorts. For example, in the 1900–1904 birth cohort the peak prevalence of current smoking was 24 percent among white women and 75 percent among white men, and in the 1920–1924 birth cohort the peak prevalence was 46 percent among white women and 79 percent

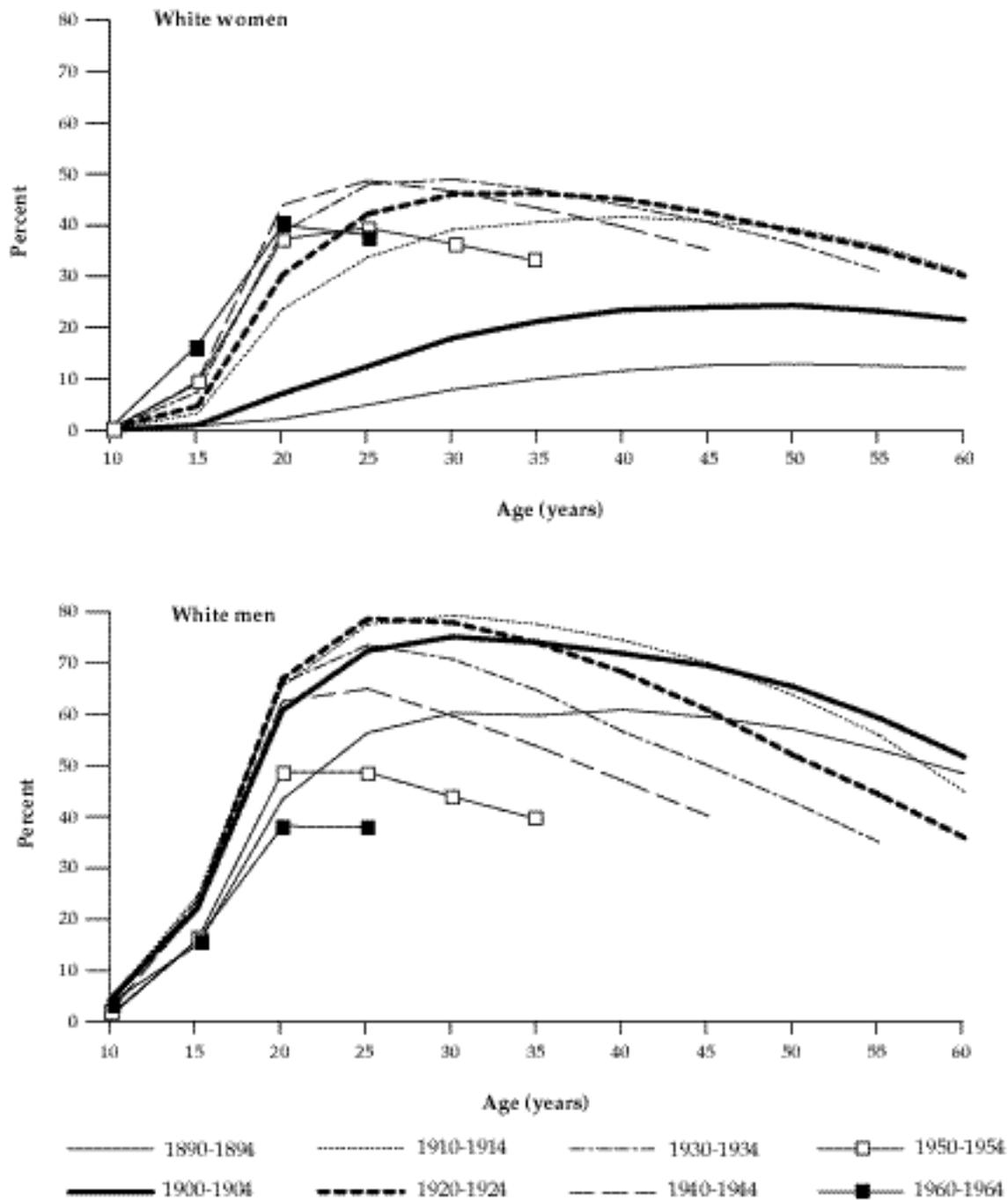
among white men. In Hispanic cohorts, smoking also became prevalent among men before it diffused to women (Escobedo and Remington 1989; Tolley et al. 1991; Burns et al. 1997). With each successive birth cohort, however, the patterns of cigarette smoking among women and men became increasingly similar. In the 1960–1969 cohorts of white adults, the peak smoking prevalence was comparable among women and men (McGinnis et al. 1987; Pierce et al. 1991b; Burns et al. 1997). This similarity by gender was also true for blacks (Burns et al. 1997), but for Hispanics, smoking prevalence remained lower among women than among men (Escobedo and Remington 1989; Escobedo et al. 1989).

Warner and Murt (1982) conducted a cohort analysis of the effect of the antismoking campaign on the prevalence of smoking from 1964 through the late 1970s. The investigators, assuming that well-established smoking patterns or trends would have persisted in the absence of the campaign, suggested that the prevalence among men had already been declining and that the campaign accelerated this trend. Among women, however, the prevalence of smoking was rising rapidly in the 1950s and 1960s and would have continued to rise into the 1970s were it not for the campaign. The antismoking campaign interrupted the diffusion of smoking among women, which caused the prevalence of current smoking to stabilize and then decline. The effect was substantial in all cohorts of women born between 1901 and 1960 but was greatest among women born between 1941 and 1950.

Trends in Ever Smoking Among Women

Ever smoking is a measure of smoking during a person’s lifetime. Table 2.2 presents NHIS data on trends in ever smoking among women, by intervals of approximately five years for 1965–1990, as determined by availability of data, and for 1992, 1995, and 1998. Ever smoking among women (18 years of age) is defined here as having smoked at least 100 cigarettes in one’s lifetime. In 1965, the prevalence of ever smoking among women was 41.9 percent; it increased to 46.2 percent in 1985 and declined to 42.3 percent in 1990 (Table 2.2). The prevalence of ever smoking declined during 1990–1998 to 40.7 percent, but this decline was of borderline statistical significance. These data are consistent with AUSTS data, which reported that the prevalence of ever smoking among women was 39 percent in 1964 and 43 percent in 1966 (U. S. Department of Health, Education, and Welfare [USDHEW] 1969).

Figure 2.2. Prevalence (%) of current smoking for 5-year cohorts, by race and ethnicity, gender, and age, United States, 1890–1964



Note: Curves for prevalence of ever smoking, after adjusting for differential mortality, were used to estimate prevalence of current smoking for whites and blacks. No adjustment for differential mortality was used for Hispanics. Prevalence of current smoking is the percentage of the population that has initiated smoking by a given age, multiplied by the fraction of persons the same age who ever smoked who had stopped smoking. Data based on recalled age at initiation and recalled age at cessation from National Health Interview Surveys for 1978–1988.

Sources: National Center for Health Statistics, public use data tapes, 1978–1980, 1987, 1988; Burns et al. 1997.

Figure 2.2. (Continued)

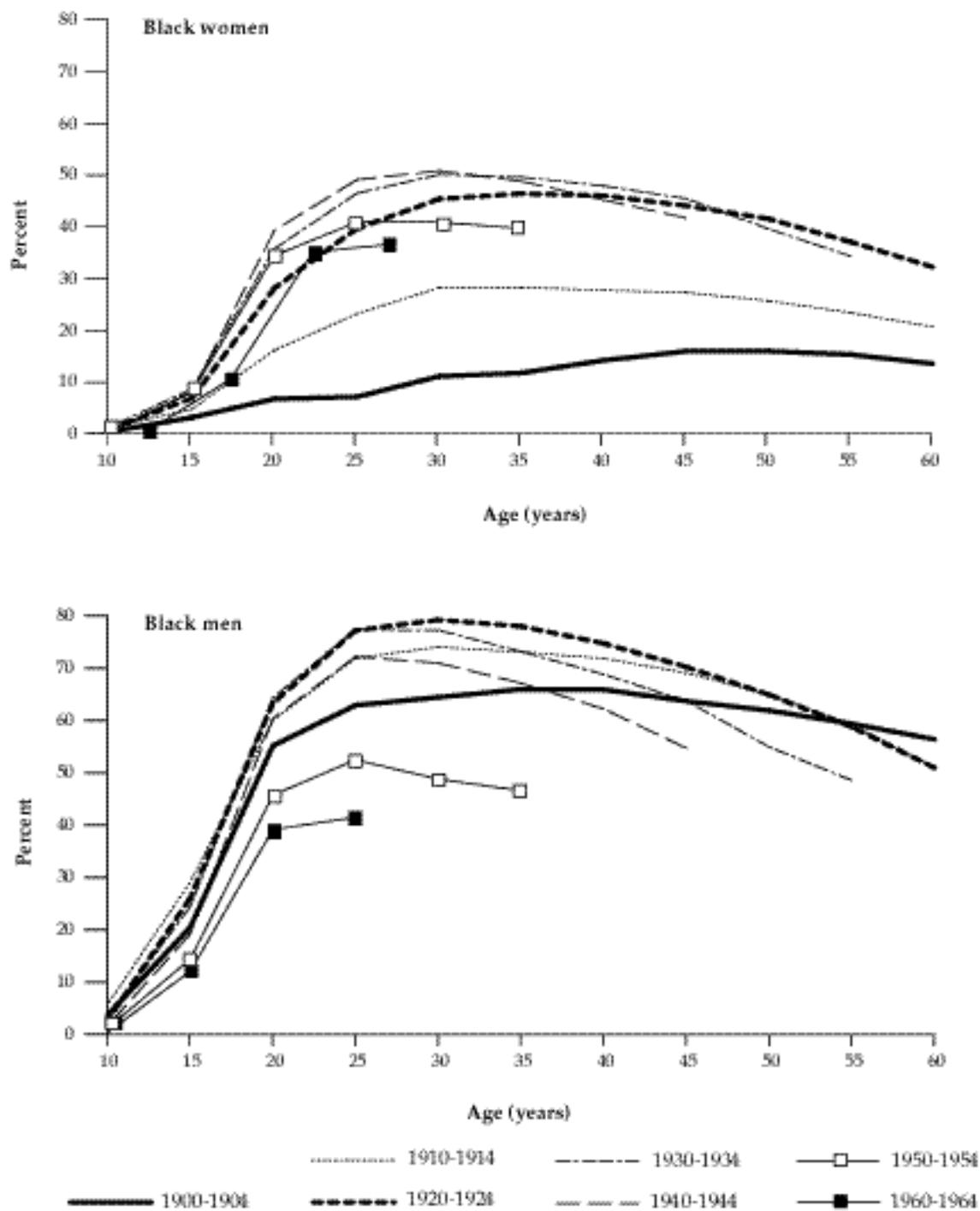
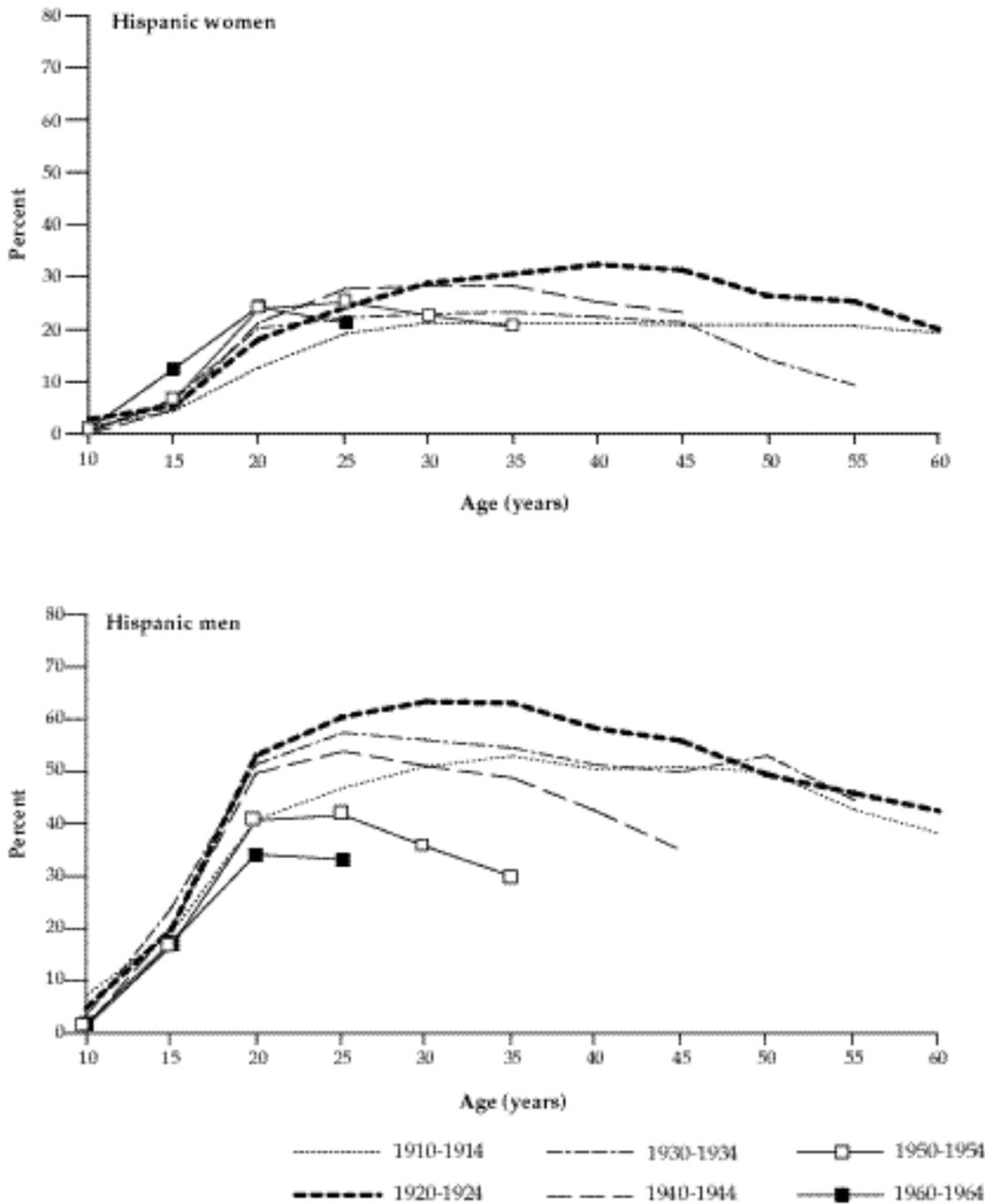


Figure 2.2. (Continued)



In 1965, the proportion of women who had ever smoked was highest among women aged 25 through 44 years; in 1998, it was highest among women aged 45 through 64 years (Table 2.2). This pattern reflects the aging of the cohorts of women born in the 1920s through 1940s, for whom the prevalence of smoking was the highest in this century (Tolley et al. 1991; Burns et al. 1997).

Ever smoking among white women increased significantly during 1965–1985 (Table 2.2). The prevalence was lower in 1990 but then remained unchanged through 1998; the prevalence in 1998 was essentially the same as that in 1965. Among black women, the prevalence of ever smoking also increased during 1965–1985. Although the increase was not statistically significant, the subsequent decrease during 1985–1998 was significant. Over time, a greater proportion of white women than black women has ever smoked. This difference was 1 percentage point (not statistically significant) in 1974 and 12.2 (95 percent CI for the difference, ± 2.5) percentage points in 1998 (Table 2.2). Ever smoking among Hispanic women, which decreased steadily from 1979 through 1998, was significantly lower than ever smoking among white women or black women for nearly all years. This finding is consistent with findings from other studies (Rogers and Crank 1988; Rogers 1991). Rogers (1991), for example, found that Mexican American women were more than twice as likely as white women or black women to have never smoked. During 1979–1998, inconsistent, nonsignificant fluctuations occurred in the prevalence of ever smoking for American Indian or Alaska Native women, probably because of small sample sizes (Table 2.2). For all years from 1965 through 1995, Asian or Pacific Islander women had the lowest prevalence of ever smoking among all racial and ethnic groups. Although a pattern of increasing prevalence of ever smoking was noted among Asian or Pacific Islander women from 1992 through 1998, this increase was not statistically significant.

In 1970, the prevalence of ever smoking was lower among women with 8 or fewer years of education and was comparable among women in other educational categories (Table 2.2). During 1970–1998, the decline in the prevalence of ever smoking was significant among women with 16 or more years of education but not among women with less education. Among women with fewer than 12 years of education, the prevalence of ever smoking increased significantly during 1970–1985 and then was unchanged from 1985 through 1998. Among women with 12 to 15 years of education, smoking prevalence was

unchanged from 1970 through 1985, but then declined between 1985 and 1998. During 1985–1998, the prevalence of ever smoking decreased among women who lived at or above the poverty level but not among women who lived below the poverty level or who had unknown poverty status. The definition of poverty status, however, was different in 1998 than in previous years, making comparisons difficult. (See definition for “socioeconomic status” in Appendix 2.)

The prevalence of ever smoking peaked in 1985 for women (46.2 percent) and in 1965 for men (71.7 percent). For all years, the proportion of persons who had ever smoked was lower for women than for men, a finding noted by other researchers (Novotny et al. 1988; Covey et al. 1992).

Ever Smoking Among Women by Demographic Characteristics

Ever smoking among women varies by age, race and ethnicity, and socioeconomic measures such as level of education and income (Table 2.2). In the 1998 NHIS data, the prevalence of ever smoking for women aged 18 years or older was 40.7 percent. The proportion of women who had ever smoked was significantly higher among women aged 45 through 64 years than among those in other age groups. The prevalence was lowest among Asian or Pacific Islander women and Hispanic women and highest among American Indian or Alaska Native women and white women. The prevalence of ever smoking was lowest among women having 8 or fewer, or 16 or more, years of education. The lower prevalence among women with 8 or fewer years of education is consistent with other reports: Zhu and colleagues (1996) found that this pattern held even after adjustment for age and other demographic variables. Similar patterns were seen in the 1997–1998 NHSDA (Substance Abuse and Mental Health Services Administration [SAMHSA], public use data tapes, 1997, 1998). Prevalence of ever smoking did not differ by poverty status (categorized as below the poverty level or at or above the poverty level). However, results from the 1990 NHIS suggested that the prevalence of ever smoking decreased for each category of annual income from \$10,000 or more and that women in professional or technical occupations were less likely to have ever smoked (Metropolitan Insurance Companies 1992).

In the 1998 NHIS data, the prevalence of ever smoking was significantly lower among women (40.7 percent) than among men (53.8 percent) (Table 2.2). In all racial and ethnic groups except American Indians

Table 2.2. Prevalence (% and 95% confidence interval) of ever smoking among women aged 18 years or older, by selected characteristics, National Health Interview Survey, United States, 1965–1998

Characteristic	1965	1970	1974
Women	41.9 (±0.7)	43.1 (±1.1)	44.8 (±0.8)
Age (years)			
18–24	44.3 (±1.9)	40.7 (±1.5)	41.8 (±2.1)
25–44	53.4 (±1.3)	53.4 (±1.4)	53.4 (±1.3)
45–64	40.6 (±1.2)	45.2 (±1.7)	48.4 (±1.5)
65	14.1 (±1.4)	18.6 (±1.4)	22.6 (±1.6)
Race/ethnicity*			
White, non-Hispanic	42.3 (±0.7)	43.7 (±1.2)	45.0 (±0.9)
Black, non-Hispanic	39.4 (±2.2)	39.5 (±2.4)	44.0 (±3.0)
Hispanic	NA [†]	NA	NA
American Indian or Alaska Native	NA	NA	NA
Asian or Pacific Islander	NA	NA	NA
Education (number of years) [§]			
8	NA	30.3 (±1.1)	31.9 (±2.1)
9–11	NA	50.0 (±1.6)	52.3 (±2.3)
12	NA	47.9 (±1.5)	48.9 (±1.4)
13–15	NA	48.8 (±2.8)	48.6 (±2.8)
16	NA	46.7 (±2.6)	48.1 (±3.2)
Socioeconomic status			
Below poverty level	NA	NA	NA
At or above poverty level	NA	NA	NA
Unknown	NA	NA	NA
Men	71.7 (±0.7)	70.4 (±0.6)	70.8 (±1.0)

Note: Prevalence of ever smoking is prevalence of all persons in each demographic category who reported smoking 100 cigarettes in their lifetime.

*Ethnicity was not determined in 1965, 1970, or 1974. Thus, estimates for whites and for blacks during these years likely include data for some persons of Hispanic origin.

[†]NA = Not available.

or Alaska Natives, women were less likely than men to have ever smoked (data not shown), a finding also noted by Rogers (1991).

Trends in Current Smoking Among Women

Current smoking status is the most common measure used to assess trends in tobacco use. Data from the 1965–1998 NHIS on trends in current smoking among women are presented here. Current smoking is defined here as having ever smoked at least 100 cigarettes and smoking at the time of the survey. Since 1992, the definition of current smoking has

explicitly included persons who smoke both every day or only on some days. The inclusion of these non-daily smokers increased the prevalence of current smoking among women aged 18 years or older by 0.9 percentage points, similar to the increase among adults overall (CDC 1994b). In NHIS data, the prevalence of current smoking among women decreased from 33.9 percent in 1965 to 22.0 percent in 1998 (Table 2.3). Most of this decline occurred during 1974–1990, but prevalence continued to decline from 1992 through 1998 (Giovino et al. 1994; CDC, 1994c, 1996, 1997c, 1999b, 2000a).

1979	1985	1990	1992	1995	1998
45.1 (±1.2)	46.2 (±0.9)	42.3 (±0.8)	43.1 (±1.1)	42.2 (±1.2)	40.7 (±0.9)
44.0 (±2.1)	40.2 (±2.3)	32.4 (±2.2)	30.4 (±2.9)	30.8 (±3.3)	32.8 (±2.8)
51.2 (±1.6)	49.9 (±1.3)	44.5 (±1.1)	45.5 (±1.5)	43.8 (±1.8)	40.5 (±1.3)
48.6 (±1.7)	51.6 (±1.8)	49.3 (±1.4)	50.1 (±2.0)	47.6 (±2.2)	46.2 (±1.6)
27.3 (±1.7)	34.8 (±2.0)	34.7 (±1.5)	36.4 (±2.2)	38.4 (±2.4)	38.2 (±1.8)
46.7 (±1.2)	48.0 (±1.1)	45.4 (±0.9)	46.6 (±1.2)	46.0 (±1.4)	44.8 (±1.1)
42.3 (±2.6)	43.5 (±2.6)	34.3 (±1.9)	35.5 (±2.5)	36.9 (±3.4)	32.6 (±2.2)
35.4 (±3.5)	33.8 (±3.3)	30.5 (±2.7)	29.2 (±3.0)	26.5 (±2.8)	25.6 (±1.9)
56.6 (±11.8) [‡]	47.8 (±13.8)	54.6 (±11.4)	56.0 (±12.5)	53.0 (±14.7)	57.7 (±11.3)
24.3 (±8.1)	20.0 (±6.5)	13.9 (±3.9)	12.0 (±4.2)	13.8 (±4.1)	16.8 (±4.6)
33.1 (±2.3)	36.4 (±2.7)	32.2 (±2.4)	33.5 (±3.0)	34.2 (±3.8)	33.0 (±2.9)
52.2 (±2.5)	54.9 (±2.3)	53.0 (±2.2)	52.7 (±3.0)	54.4 (±3.5)	51.5 (±2.6)
47.4 (±1.9)	49.3 (±1.6)	47.4 (±1.2)	48.6 (±1.7)	47.6 (±2.0)	45.0 (±1.6)
50.5 (±2.8)	49.6 (±2.2)	44.7 (±1.7)	47.3 (±2.3)	45.9 (±2.8)	45.7 (±1.8)
43.8 (±2.0)	41.7 (±2.2)	35.8 (±1.7)	35.9 (±2.2)	34.1 (±2.6)	31.3 (±1.7)
NA	45.3 (±2.2)	43.8 (±2.3)	43.3 (±3.0)	42.0 (±3.1)	41.3 (±2.3)
NA	46.9 (±1.0)	42.5 (±0.9)	43.5 (±1.1)	42.8 (±1.4)	41.2 (±1.1)
NA	42.9 (±2.7)	38.7 (±2.5)	39.3 (±2.9)	35.3 (±3.9)	39.0 (±1.9)
66.2 (±1.0)	63.7 (±1.0)	58.7 (±0.9)	57.5 (±1.1)	54.6 (±1.4)	53.8 (±1.0)

[‡]Estimate should be interpreted with caution because of the small number of respondents.

[§]For women aged ≥ 25 years. Data for five education categories not available for 1965.

Definition of poverty status changed in 1997. (See Appendix 2 for definitions.)

Sources: National Center for Health Statistics, public use data tapes, 1965, 1970, 1974, 1979, 1985, 1990, 1992, 1995, 1998.

During 1965–1998, the prevalence of current smoking was lowest among women aged 65 years or older (Table 2.3). The finding that, after age 25 years, the prevalence of smoking decreased as age increased was also seen in earlier studies: in the 1959 CPS-I, 41.7 percent of women aged 30 through 39 years, 26 percent of women aged 50 through 59 years, and 1 to 2 percent of women aged 80 years or older were current smokers (Hammond and Garfinkel 1961). Over time, smoking prevalence declined most among women of reproductive age (18 through 44 years): 13.6 (± 3.1) percentage points among women aged 18 through 24 years and 18.1 (± 1.7) percentage points among women aged 25 through 44 years (Table 2.3). Nevertheless, nearly 14 million women of reproductive age

were smokers in 1998, and smoking prevalence in this group was higher (25.3 percent) than in the overall population of women aged 18 years or older (22.0 percent) (NCHS, public use data tape, 1998; CDC 1999b). Smoking prevalence was the same in 1965 and 1998 among women aged 65 years or older (Table 2.3), a finding noted in earlier studies (Novotny et al. 1990; CDC 2000a; Giovino et al. 1994).

In the NHIS data, smoking prevalence decreased among both white women and black women during 1965–1998 (Table 2.3). The prevalence of current smoking was generally comparable, but it was higher, and occasionally significantly so, among black women from 1970 through 1985 and higher among white women in 1990. Similar patterns were noted

Table 2.3. Prevalence (% and 95% confidence interval) of current smoking among women aged 18 years or older, by selected characteristics, National Health Interview Survey, United States, 1965–1998

Characteristic	1965	1970	1974
Women	33.9 (±0.6)	31.5 (±0.8)	32.1 (±0.8)
Age (years)			
18–24	38.1 (±1.7)	32.7 (±1.4)	34.1 (±2.0)
25–44	43.7 (±1.1)	38.8 (±1.0)	39.2 (±1.3)
45–64	32.0 (±1.1)	33.0 (±1.4)	33.4 (±1.6)
65	9.6 (±1.0)	11.0 (±1.1)	12.0 (±1.2)
Race/ethnicity*			
White, non-Hispanic	34.0 (±0.7)	31.6 (±0.9)	31.7 (±0.8)
Black, non-Hispanic	33.7 (±2.1)	32.2 (±2.2)	36.4 (±2.7)
Hispanic	NA [†]	NA	NA
American Indian or Alaska Native	NA	NA	NA
Asian or Pacific Islander	NA	NA	NA
Education (number of years) [§]			
8	NA	22.3 (±1.0)	22.5 (±1.8)
9–11	NA	38.7 (±1.5)	41.2 (±2.2)
12	NA	34.2 (±1.3)	34.5 (±1.4)
13–15	NA	33.7 (±2.6)	30.9 (±2.8)
16	NA	26.7 (±1.9)	26.6 (±2.8)
Socioeconomic status			
Below poverty level	NA	NA	NA
At or above poverty level	NA	NA	NA
Unknown	NA	NA	NA
Men	51.9 (±0.6)	44.1 (±0.7)	43.1 (±1.0)

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

*Ethnicity was not determined in 1965, 1970, or 1974. Thus, estimates for whites and for blacks during these years likely include data for some persons of Hispanic origin.

among women of reproductive age, except that a significantly higher prevalence among white women was consistently noted since 1990 (data not shown). This pattern is probably due to recent racial and ethnic trends among young women (see “Cigarette Smoking Among Young Women” later in this chapter). These findings were also noted in other studies (McGinnis et al. 1987; Fiore et al. 1989; Hahn et al. 1990; USDHHS 1990b; Resnicow et al. 1991; CDC 2000a). Among Hispanic women, a decline in prevalence was noted during 1979–1998 (Table 2.3). Prevalence was also significantly lower among Hispanic women than among white women or black women during this period, and this finding is supported by

other data (Holck et al. 1982; Marcus and Crane 1984, 1985; Markides et al. 1987; Fiore 1992). Using data from the Stanford Five-City Project, Winkleby and associates (1995) found that the difference in smoking prevalence between white women and Hispanic women decreased as education increased and that smoking prevalence was the same among white women and Hispanic women who were college graduates. The prevalence changed little during 1979–1998 among American Indian or Alaska Native women (Table 2.3). Among Asian or Pacific Islander women, prevalence decreased during 1979–1992 but then doubled from 1995 through 1998. However, the number of respondents in these racial and ethnic groups was

1979	1985	1990	1992	1995	1998
29.9 (±0.9)	27.9 (±0.8)	22.8 (±0.7)	24.6 (±0.9)	22.6 (±1.1)	22.0 (±0.8)
33.8 (±2.1)	30.4 (±2.3)	22.5 (±1.9)	24.9 (±2.8)	21.8 (±3.0)	24.5 (±2.6)
35.1 (±1.4)	31.8 (±1.2)	26.6 (±1.0)	28.8 (±1.4)	26.8 (±1.6)	25.6 (±1.2)
30.7 (±1.6)	29.9 (±1.5)	24.8 (±1.3)	26.1 (±1.8)	24.0 (±2.0)	22.5 (±1.3)
13.2 (±1.3)	13.5 (±1.3)	11.5 (±0.9)	12.4 (±1.3)	11.5 (±1.5)	11.2 (±1.2)
30.6 (±1.0)	28.2 (±0.9)	24.1 (±0.8)	25.9 (±1.1)	24.1 (±1.3)	23.6 (±0.9)
31.6 (±2.5)	31.2 (±2.3)	21.1 (±1.6)	24.1 (±2.2)	23.5 (±3.1)	21.3 (±2.0)
22.2 (±3.1)	20.8 (±2.4)	16.3 (±2.2)	18.0 (±2.5)	14.9 (±2.1)	13.3 (±1.4)
34.9 (±12.9) [‡]	28.4 (±10.0)	37.8 (±11.9)	39.8 (±12.4)	35.4 (±13.9) [‡]	38.1 (±11.9)
15.9 (±8.0) [‡]	11.0 (±4.9)	5.9 (±2.3)	4.0 (±2.3) [‡]	4.3 (±3.1) [‡]	9.9 (±4.2)
21.1 (±1.7)	21.1 (±1.9)	16.6 (±1.9)	18.7 (±2.6)	17.8 (±2.8)	16.7 (±2.4)
38.0 (±2.2)	37.2 (±2.5)	33.9 (±2.2)	32.2 (±2.7)	33.7 (±3.5)	32.9 (±2.5)
31.1 (±1.5)	30.4 (±1.3)	26.6 (±1.1)	28.7 (±1.5)	26.2 (±1.8)	25.2 (±1.4)
30.9 (±2.3)	27.0 (±1.8)	21.6 (±1.3)	24.1 (±1.9)	22.5 (±2.2)	22.8 (±1.5)
22.2 (±1.9)	16.6 (±1.6)	12.7 (±1.1)	14.5 (±1.6)	13.7 (±1.8)	11.2 (±1.2)
NA	32.7 (±1.9)	31.7 (±2.1)	31.7 (±3.0)	29.3 (±2.9)	29.3 (±2.1)
NA	27.4 (±0.9)	21.7 (±0.7)	23.8 (±1.0)	21.8 (±1.1)	21.3 (±0.9)
NA	25.8 (±2.1)	22.1 (±2.0)	22.1 (±2.5)	21.0 (±3.5)	20.2 (±1.6)
37.5 (±1.1)	32.6 (±1.0)	28.4 (±0.8)	28.6 (±1.0)	27.0 (±1.2)	26.4 (±0.9)

[†]NA= Not available.

[‡]Estimate should be interpreted with caution because of the small number of respondents.

[§]For women aged 25 years. Data for five education categories not available for 1965.

Definition of poverty status changed in 1997. (See Appendix 2 for definitions.)

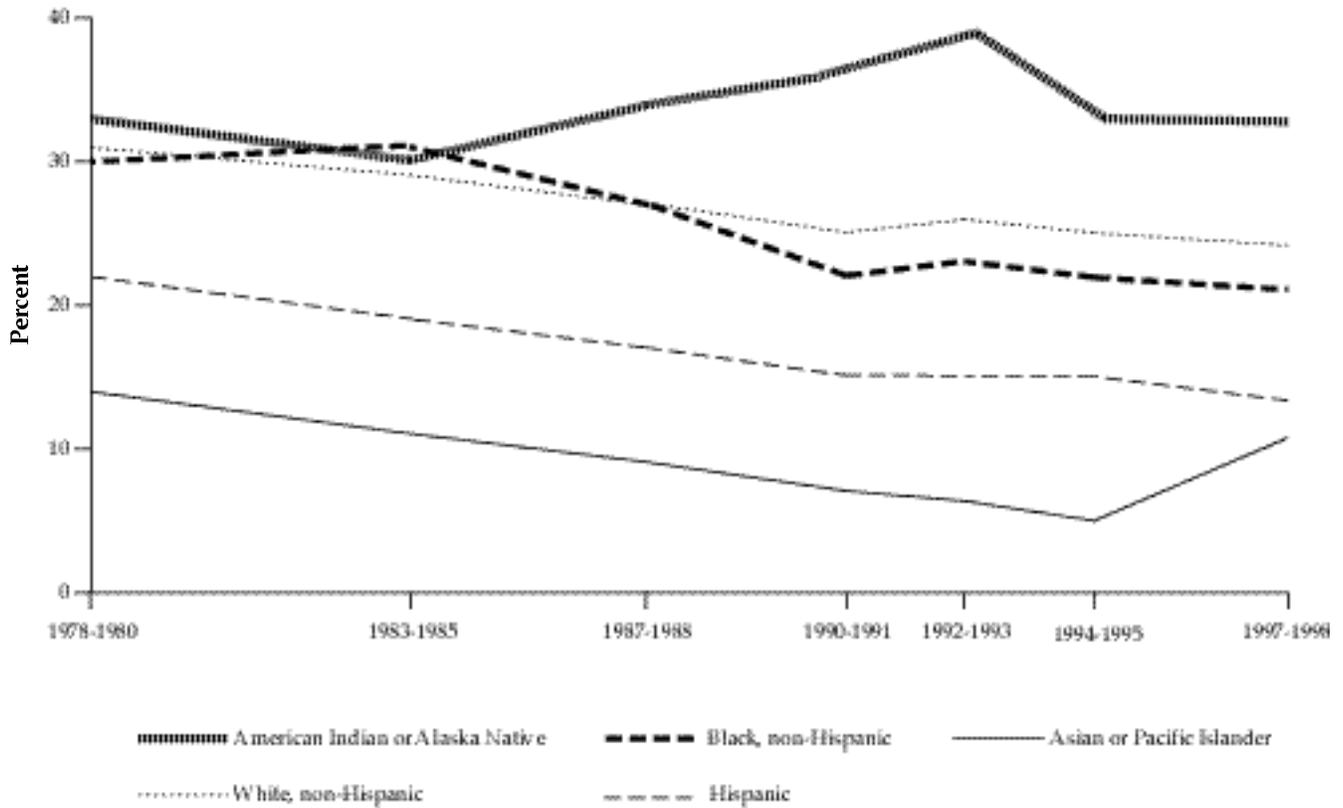
Sources: National Center for Health Statistics, public use data tapes, 1965, 1970, 1974, 1979, 1985, 1990, 1992, 1995, 1998.

small and the increase was not statistically significant. In addition, procedural changes in the NHIS design and changes in the questions defining racial and ethnic groups occurred in 1997. Thus, these data must be interpreted with caution. Adjustment for age had little effect on the trends noted for racial and ethnic groups (USDHHS 1996a, 1998) (Figure 2.3). Similar patterns were also noted when the analysis was restricted to women of reproductive age (data not shown).

Data for 1959–1962 indicated the prevalence of current smoking was lowest among women with 8 or fewer years of education and highest among women with some college education (Hammond and

Garfinkel 1964). However, in 1970–1998, the prevalence of smoking among women was highest among those with 9 to 11 years of education and lowest among those with 8 or fewer or 16 or more years of education (Table 2.3) (Green and Nemzer 1973; USDHEW 1976; Schuman 1977; Zhu et al. 1996). These educational patterns persist even after adjustment for demographic variables, including age (Remington et al. 1985; Zhu et al. 1996). This general pattern was also found in earlier surveys, such as the 1959 CPS-I (Hammond and Garfinkel 1961). NHIS data for 1970–1998 showed that the greatest decline in smoking prevalence occurred among women with 16 or more years of education (15.5 ± 2.3 percentage points),

Figure 2.3. Age-adjusted prevalence (%) of current smoking among women aged 18 years or older, by racial or ethnic group, National Health Interview Survey, United States, 1978–1998, aggregate data



Note: Age-adjusted estimates were produced by using data aggregated for the following years: 1978, 1979, and 1980; 1983 and 1985; 1987 and 1988; 1990 and 1991; 1992 and 1993; 1994 and 1995; and 1997 and 1998. Data were adjusted to the 1990 National Health Interview Survey population. Prevalence of current smoking is the percentage of all persons in each demographic category who reported smoking 100 cigarettes in their lifetime and who smoked at the time of the survey. Since 1992, estimates of current smoking explicitly include persons who smoked only on some days. Sources: National Center for Health Statistics, public use data tapes, 1978–1980, 1983, 1985, 1987, 1988, 1990–1995, 1997–1998.

a finding also noted by Giovino and colleagues (1994) (Table 2.3). Smoking prevalence among women with all levels of educational attainment decreased during 1970–1998. However, when the analysis was restricted to women of reproductive age, no decrease in smoking prevalence was noted among women with 12 years of education (NCHS, public use data tapes, 1970–1998) (data not shown). Other researchers found that education has become the most important demographic correlate of smoking status (Pierce et al. 1989a; Wagenknecht et al. 1990b; Berman and Gritz 1991; Fiore 1992).

For women, trends in smoking are more consistent for education than for income or occupation. Although education, income, and occupation are fairly well correlated as measures of socioeconomic status among men, the correlations among these measures are weaker among women (Coriell and Adler 1996).

The association between current smoking and income has changed over time among women. Studies conducted in 1964–1975 showed that the prevalence of smoking increased with income (USDHEW 1976; Schuman 1977). However, more recent NHIS data showed a decrease in prevalence with higher income (Metropolitan Insurance Companies 1992). In

the NHIS data for 1985–1998, the prevalence of current smoking was higher among women living below the poverty level than among women living at or above the poverty level (Table 2.3). During this same period, prevalence decreased among women living at or above the poverty level. Among women of reproductive age, prevalence declined both for women living at or above the poverty level and for women living below the poverty level (data not shown).

No clear trends have emerged for the relationship between smoking prevalence among women and occupational status (Haenszel et al. 1956; Green and Nemzer 1973; Sterling and Weinkam 1976, 1978; USDHEW 1976; Schuman 1977; Waldron 1980; Stellman and Stellman 1981; Sorensen and Pechacek 1986; Brackbill et al. 1988; Schoenborn 1988; Waldron and Lye 1989; Ebi-Kryston et al. 1990; Wagenknecht et al. 1990b; Covey et al. 1992; Metropolitan Insurance Companies 1992). Some of the inconsistencies in trends result from differences in the definition of unemployment, such as whether housewives or others not in the labor force were included. Estimates from the 1987–1990 NHIS (Nelson et al. 1994) showed a smoking prevalence of 26.7 percent among employed women, 34.9 percent among unemployed women who were looking for work, and 22.1 percent among women not in the labor force (not employed and not looking for work).

Prevalence of smoking among military women aged 18 through 55 years (25.4 ± 1.2 percent) was no different from that in a comparison civilian population of women (26.6 ± 1.0 percent). The information on military women came from a Department of Defense Survey of Health Related Behaviors Among Military Personnel that was conducted in 1998. The final sample consisted of 17,264 active-duty military personnel from all branches of the military. Women in the Marines were more likely than civilian women to smoke, but women in the Army were less likely than civilian women to smoke (Bray et al. 1999). However, women military veterans were more likely than non-veterans to have ever smoked cigarettes (McKinney et al. 1997) or to be current smokers (Klevens et al. 1995; Whitlock et al. 1995).

Consistent with earlier reports (McGinnis et al. 1987; Fiore et al. 1989; Fiore 1992; Metropolitan Insurance Companies 1992), the decline in the prevalence of current smoking in the 1965–1998 NHIS data was greater among men (25.5 ± 1.0 percentage points) than among women (11.9 ± 1.0 percentage points) (Figure 2.4). However, during 1985–1998, the decline was comparable among women (5.9 ± 1.1 percentage points) and men (6.2 ± 1.3 percentage points). The prevalence

of current smoking was lower among women than among men for all years during 1965–1998. This was true for all racial and ethnic groups except American Indians or Alaska Natives (Stellman and Garfinkel 1986; Rogers and Crank 1988; Resnicow et al. 1991; USDHHS 1998).

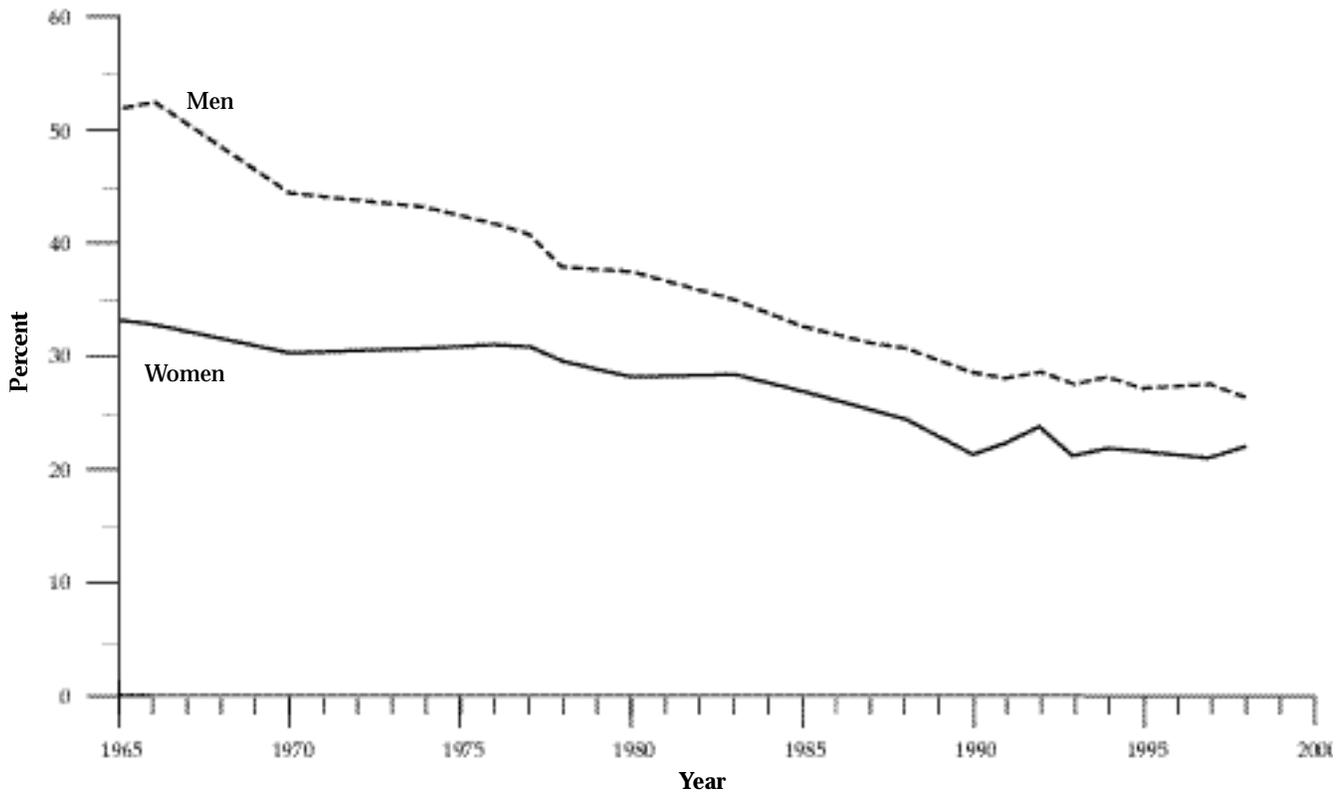
Current Smoking Among Women by Demographic Characteristics

Current smoking among women varies by age, race and ethnicity, sexual orientation, and socioeconomic measures such as level of education and income. Estimates of the prevalence of current smoking among women by various demographic characteristics were obtained from the 1997–1998 NHIS and the 1997–1998 NHSDA. In NHIS data for 1997–1998, the prevalence of current smoking among women was 22.0 percent (CDC 2000a) (Table 2.4). Prevalence was highest among women aged 18 through 44 years (25–44 years in NHSDA) and lowest among women aged 65 years or older. Smoking prevalence was highest among American Indian or Alaska Native women (34.5 percent), intermediate among white women (23.5 percent) and black women (21.9 percent), and lowest among Hispanic women (13.8 percent) and Asian or Pacific Islander women (11.2 percent). Similar patterns were observed in the NHSDA, but the results were not statistically significant for American Indian or Alaska Native women.

National surveys are limited in their assessment of smoking behavior among racial and ethnic groups that constitute a small proportion of the U.S. population or that show variations in smoking prevalence by geographic location or subgroup. Therefore, results from other surveys are presented here for Hispanics, American Indians or Alaska Natives, and Asian or Pacific Islanders.

In the 1982–1983 HHANES, the age-adjusted smoking prevalence ranged from 24 percent among Mexican American women and Cuban American women to 30 percent among Puerto Rican American women (Escobedo and Remington 1989; Haynes et al. 1990). In contrast, NHIS data for the same period showed the prevalence of smoking among Hispanic women overall to be 20.4 percent. HHANES respondents were offered a choice of questionnaires in English or Spanish, so increased comprehension of the survey questions may account for the higher estimates of the prevalence in current smoking from HHANES. On the other hand, NHIS contains a wider range of Hispanic subgroups, some of which may have lower smoking prevalences (USDHHS 1998).

Figure 2.4. Prevalence (%) of current smoking among adults aged 18 years or older, by gender, National Health Interview Survey, United States, 1965–1998



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

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

The 1987 Survey of American Indians and Alaska Natives of the National Medical Expenditure Survey (Lefkowitz and Underwood 1991) reported a smoking prevalence of 28.3 percent among women. This result is lower than the 1987–1988 NHIS estimate of 35.2 percent (USDHHS 1998). The difference was primarily due to different sampling frames and methods. In a 1989–1992 survey of 13 American Indian tribes (Welty et al. 1995), smoking prevalence among women was estimated at 29.3 percent, but it ranged from 12.9 percent among American Indian women in Arizona to 45.3 percent among American Indian women in North Dakota and South Dakota. Aggregated data from the 1988–1992 BRFSS showed that smoking prevalence among American Indian or Alaska Native women varied threefold by region—from 13.5 percent in the Southwest to 37.6 percent in the northern woodlands, 38.4 percent in the northern plains, and 41.7 percent in

Alaska (USDHHS 1998). In BRFSS data for 1994–1996, similar patterns were noted. Prevalence was highest among American Indian or Alaska Native women living in the northern plains (43.5 percent) and in Alaska (40.6 percent), intermediate among women living in the East (33.4 percent) and on the Pacific coast (30.6 percent), and lowest among women living in the Southwest (18.6 percent). The prevalence among women in the Southwest was significantly lower than among women in the northern plains, Alaska, and the East (Denny and Holtzman 1999). In smaller studies, prevalence has been found to be low among Hopi women (5.4 percent) and Navajo women (4.0 percent) but high (45.2 percent) among American Indian women in Montana (Nelson et al. 1997; Strauss et al. 1997; Giuliano et al. 1998). Current Population Survey data for 1992–1993 showed a higher smoking prevalence among Alaska Native women (46 percent) than

Table 2.4. Prevalence (% and 95% confidence interval) of current smoking among adults aged 18 years or older, by gender and selected characteristics, National Health Interview Survey (NHIS) and National Household Survey on Drug Abuse (NHSDA), United States, 1997–1998

Characteristic	NHIS, 1997–1998		NHSDA, 1997–1998	
	Women	Men	Women	Men
Overall	22.0 (±0.5)	27.0 (±0.6)	25.0 (±1.1)	28.8 (±1.3)
Age (years)				
18–24	25.1 (±1.7)	31.5 (±2.0)	28.1 (±1.8)	37.3 (±2.1)
25–44	25.8 (±0.8)	30.3 (±0.9)	29.0 (±1.6)	31.4 (±1.9)
45–64	22.0 (±0.9)	27.7 (±1.1)	24.2 (±2.3)	28.1 (±2.6)
65	11.3 (±0.8)	11.6 (±0.9)	15.4 (±2.5)	15.2 (±3.1)
Race/ethnicity				
White, non-Hispanic	23.5 (±0.6)	27.0 (±0.7)	26.7 (±1.3)	28.8 (±1.6)
Black, non-Hispanic	21.9 (±1.3)	30.6 (±1.7)	24.1 (±1.9)	31.9 (±2.6)
Hispanic	13.8 (±1.0)	25.5 (±1.5)	17.8 (±2.0)	27.9 (±2.3)
American Indian or Alaska Native	34.5 (±7.3)	40.1 (±9.9)	33.7 (±13.2)	30.8 (±16.6)
Asian or Pacific Islander	11.2 (±2.7)	19.8 (±3.2)	8.2 (±3.4)	21.6 (±6.0)
Education (number of years)*				
8	15.9 (±1.6)	28.9 (±2.1)	18.5 (±3.9)	28.7 (±4.8)
9–11	30.9 (±1.6)	39.3 (±2.0)	36.2 (±4.0)	46.1 (±4.8)
12	26.1 (±1.0)	33.2 (±1.2)	30.1 (±2.3)	32.4 (±2.7)
13–15	22.9 (±1.0)	27.0 (±1.2)	25.7 (±2.4)	27.1 (±3.0)
16	10.6 (±0.8)	12.2 (±0.9)	11.9 (±1.8)	15.2 (±2.3)
Socioeconomic status [†]				
Below poverty level	29.6 (±1.4)	37.9 (±2.1)	NA [‡]	NA
At or above poverty level	21.6 (±0.6)	26.5 (±0.7)	NA	NA
Unknown	19.3 (±1.1)	24.4 (±1.4)	NA	NA

Note: Prevalence of current smoking in NHIS is the percentage of all persons in each demographic category who reported smoking 100 cigarettes in their lifetime and who smoked at the time of the survey. Estimates of current smoking explicitly include persons who smoked only on some days. Prevalence for NHSDA is the percentage of all persons in each demographic category who reported smoking 100 days in their lifetime and who smoked in the 30 days before the survey.

*For persons aged 25 years.

[†]See Appendix 2 for definition.

[‡]NA= Not available.

Sources: NHIS: National Center for Health Statistics, public use data tapes, 1997, 1998. NHSDA: Substance Abuse and Mental Health Services Administration, public use data tapes, 1997, 1998.

among American Indian women in the continental United States (35 percent) (Kaplan et al. 1997). Similarly, 1992–1995 combined BRFSS data from 15 states with substantial American Indian or Alaska Native populations showed that the age-standardized smoking prevalence was 30.1 percent among American Indian or Alaska Native women and 21.1 percent among white non-Hispanics in the same states (Deny and Taylor 1999).

Estimates from national surveys indicated that the prevalence of smoking among Asian or Pacific Islander women is lower than that among women in other racial and ethnic groups; data from California support these findings (Pierce et al. 1994a). However, state and local surveys showed that smoking prevalence varies dramatically among ethnic subgroups (USDHHS 1998). In a California survey, the prevalence among Asian women was highest among women of Japanese ancestry (14.9 percent) or Korean

ancestry (13.6 percent) and lowest among women of Chinese ancestry (4.7 percent) (Burns and Pierce 1992). Similarly, in a survey of women enrolled in a prepaid health plan in California, 18.6 percent of Japanese American women and 7.3 percent of Chinese American women were current smokers (Klatsky and Armstrong 1991; USDHHS 1998).

Data on current smoking among lesbians and bisexual women are limited and have been based on convenience samples, which limits generalizability. The few existing studies strongly suggest that prevalence of smoking is higher than in the general population (Bradford et al. 1994; Skinner and Otis 1996; Valanis et al. 2000). A study of lesbians aged 17 years and older found the prevalence of current smoking in 1984–1985 to be 41 percent (Bradford et al. 1994). Another study in the late 1980s of lesbians aged 18 years and older yielded similar findings (Skinner and Otis 1996).

In the 1997–1998 NHIS data, smoking prevalence was highest among women with 9 to 11 years of education (30.9 percent) and lowest among those with 16 or more years of education (10.6 percent). This pattern was also seen for NHSDA (Table 2.4). The prevalence of smoking was higher among women living below the poverty level (29.6 percent) than among women living at or above the poverty level (21.6 percent), a pattern consistent with other data (Resnicow et al. 1991). In 1997–1998, smoking prevalence was 22.0 percent among women and 27.0 percent among men and was generally lower among women than among men across age, race, and socioeconomic groups.

BRFSS and the Current Population Survey both provide state-specific estimates of smoking prevalence. Although sample sizes are larger in the Current Population Survey, more recent data are available from BRFSS. Patterns in the two data sources were generally comparable (BRFSS, public use data tape, 1995–1996; CDC 1997b; Arday et al. 1997). Data from the 1999 BRFSS indicated that the prevalence of smoking among women was highest in Nevada and Alaska and lowest in Utah and California (Figure 2.5). The prevalence of smoking was significantly lower among women than among men in one-third of the states (BRFSS, public use data tape, 1999).

Trends in Quantity of Cigarettes Smoked

The quantity of cigarettes smoked is directly associated with addiction to nicotine and risk for numerous adverse health outcomes; it is inversely associated with success in smoking cessation (see “Nicotine Dependence Among Women and Girls”

and “Smoking Cessation” later in this chapter) (Hammond and Garfinkel 1968; Gordon et al. 1975; McWhorter et al. 1990; Hellman et al. 1991; Coombs et al. 1992; Freund et al. 1992).

Trends in Intermittent Smoking

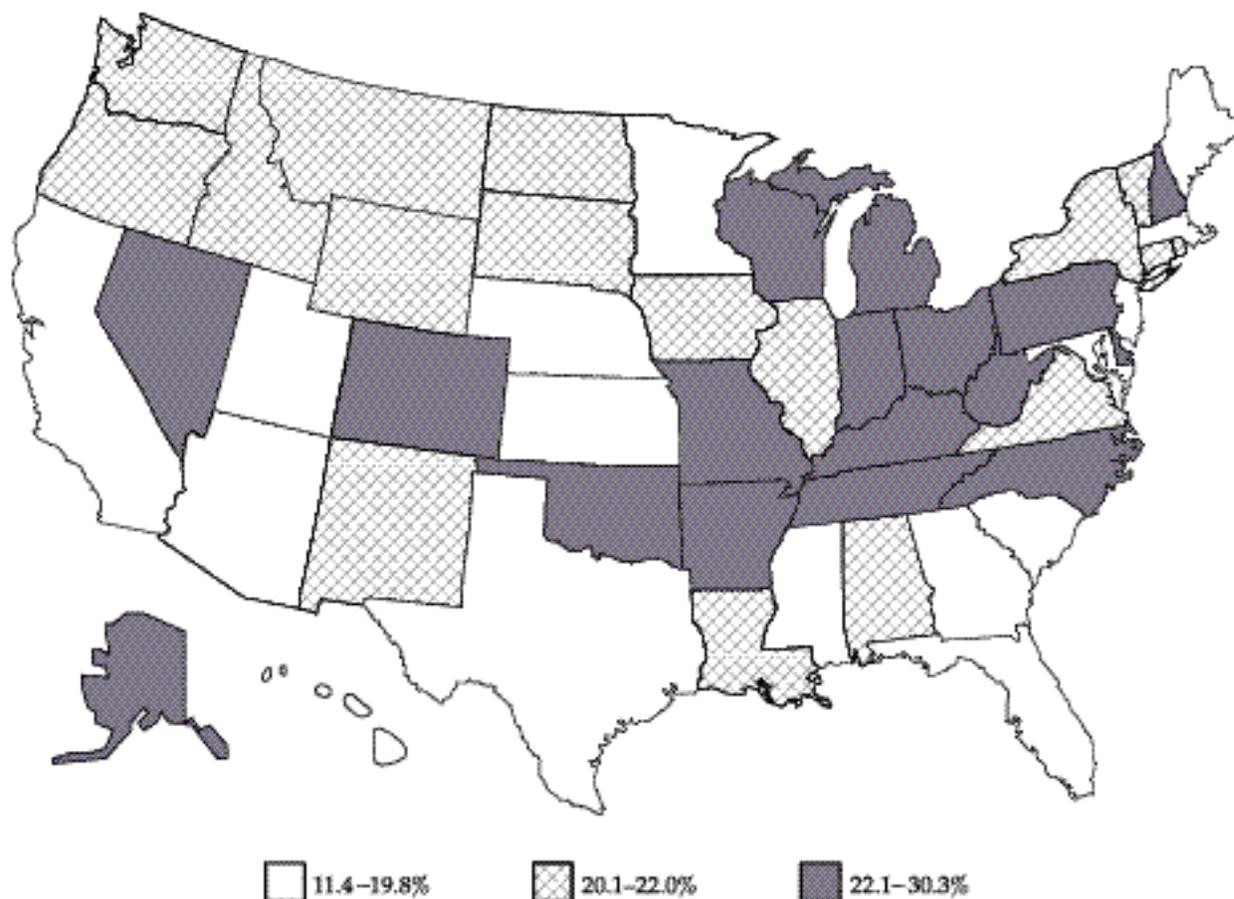
NHIS data for intermittent smoking (smoking only on some days) for women 18 years of age or older showed no change from 1992 (14.8 ± 2.0 percent) through 1998 (16.9 ± 1.6 percent). Prevalence of intermittent smoking was higher among younger smokers, among blacks and Hispanics, and among persons with 16 or more years of education; no differences were noted by gender (NCHS, public use data tapes, 1992–1998). These patterns are consistent with previous findings (Husten et al. 1998).

Trends in Heavy Smoking

Data from the Current Population Survey suggested that 8 to 9 percent of women who smoked consumed 21 or more cigarettes per day in 1955 and that 12 to 16 percent did so in 1966 (NCHS 1970). CPS data from 1959 (CPS-I) and 1982 (Cancer Prevention Study II [CPS-II]) showed that a far higher percentage of smokers smoked 20 or more cigarettes per day in CPS-II than in CPS-I; the absolute average difference was 20.6 percentage points (Hammond and Garfinkel 1961; Stellman and Garfinkel 1986; Garfinkel and Silverberg 1990; Burns et al. 1997).

For analysis of NHIS data, light smoking was defined as smoking fewer than 15 cigarettes per day, moderate smoking as smoking 15 to 24 cigarettes per day, and heavy smoking as smoking 25 or more cigarettes per day. The proportion of women smokers who were light smokers increased during 1965–1998, whereas the proportion who were moderate or heavy smokers was about the same in 1965 and 1998 (Table 2.5). However, the prevalence of heavy smoking increased from 13.8 percent of smokers in 1965 to 22.0 percent in 1979 and then decreased to 12.1 percent in 1998. Similarly, the mean number of cigarettes consumed per day by women who smoked was 7.0 in the 1934 *Milwaukee Journal* survey (USDHHS 1980), 13.0 in the 1955 Current Population Survey (Schuman 1977), 16.2 in the 1965 AUTS, and 17.0 in the 1970 AUTS (Green and Nemzer 1973). In NHIS data, the mean number of cigarettes smoked per day increased from 16.2 (no CI available) in 1965 to 17.6 (± 0.2) in 1970 and 18.9 (± 0.4) in 1979; it then declined to 15.0 (± 0.4) in 1998 (NCHS, public use data tapes, 1965–1998). Increasing restrictions on where smoking is permitted and increases in the real price of cigarettes

Figure 2.5. Prevalence (%) of current smoking among women aged 18 years or older, by state, Behavioral Risk Factor Survey, United States, 1999



Note: Prevalence of current smoking is the percentage of all persons in each state who reported smoking 100 cigarettes in their lifetime and who smoked at the time of the survey. Categories were based on tertiles of smoking prevalence.

Sources: Centers for Disease Control and Prevention, Division of Adult and Community Health, public use data tape, 1999.

since 1981 may have contributed to the decline in the mean number of cigarettes smoked per day (Giovino et al. 1994).

Among female smokers aged 18 through 64 years, NHIS data showed that the proportion of heavy smokers increased during 1965–1979 and then declined (Table 2.5). Heavy smoking among women aged 65 years or older increased during 1965–1974 and then decreased, but not significantly. In 1998, the proportion of heavy smokers among women smokers aged 45 through 64 years (16.8 percent) was greater than that among younger women.

The proportion of heavy smokers among both white women and black women who smoked rose during 1965–1979, but this increase was significant only among white women (Table 2.5). Between 1979 and 1998, heavy smoking declined among white, black, and Hispanic women. Because the sample size was small for black women and Hispanic women, the results should be interpreted with caution. However, analysis of NHIS data for the combined years 1978–1980 through the combined years 1994–1995 also showed a significant decrease among Hispanic women. The prevalence of heavy smoking among

Table 2.5. Distribution (% and 95% confidence interval) of the number of cigarettes smoked and percentage smoking 25 or more cigarettes per day, among women current smokers aged 18 years or older, by selected characteristics, National Health Interview Survey, United States, 1965–1998

Characteristic	1965	1970	1974
Women			
Number of cigarettes/day			
<15	44.4 (±1.2)	38.8 (±1.2)	38.3 (±1.6)
15–24	41.8 (±1.2)	43.1 (±1.1)	43.0 (±1.5)
25	13.8 (±0.9)	18.1 (±0.8)	18.7 (±1.3)
Percent smoking 25 cigarettes/day	13.8 (±0.9)	18.1 (±0.8)	18.7 (±1.3)
Age (years)			
18–24	8.8 (±1.7)	12.1 (±1.4)	13.8 (±2.2)
25–44	16.4 (±1.3)	21.7 (±1.3)	22.5 (±2.3)
45–64	13.6 (±1.7)	17.7 (±1.2)	16.9 (±2.0)
65	6.4 (±3.1)	11.3 (±2.5)	16.2 (±4.3)
Race/ethnicity [†]			
White, non-Hispanic	14.8 (±1.0)	19.4 (±0.8)	20.5 (±1.4)
Black, non-Hispanic	5.7 (±1.8)	7.2 (±1.6)	6.6 (±2.2)*
Hispanic	NA [‡]	NA	NA
Education (number of years) [§]			
8	NA	16.0 (±1.7)	13.8 (±2.7)
9–11	NA	21.2 (±1.7)	23.6 (±3.4)
12	NA	19.8 (±1.3)	20.1 (±2.1)
13–15	NA	21.1 (±2.9)	24.5 (±4.0)
16	NA	17.1 (±3.1)	13.5 (±4.2)
Men smoking 25 cigarettes/day	24.8 (±0.9)	28.0 (±1.1)	31.1 (±1.6)

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

*Estimate should be interpreted with caution because of the small number of respondents.

American Indian or Alaska Native women and among Asian or Pacific Islander women was unchanged from 1978–1980 through 1994–1995 (USDHHS 1998). In all years, white women who smoked were more likely to be heavy smokers than were black women or Hispanic women. This finding was also reported by other investigators (Holck et al. 1982; Marcus and Crane 1985; Hahn et al. 1990; USDHHS 1990a, 1997; Resnicow et al. 1991; Winkleby et al. 1995) and is consistent with earlier surveys, such as the 1947 survey in Columbus, Ohio (Mills and Porter 1953), a 1952–1954 survey in Texas (Kirchoff and Rigdon 1956), and the 1955 Current Population Survey (Haenszel et al. 1956). Other analyses of NHIS data

for 1978–1995 reported that white women who smoked were more likely to be heavy smokers than were American Indian or Alaska Native women or Asian or Pacific Islander women, but the CIs were large (USDHHS 1998).

In the 1998 NHIS, among women who smoked, white women (14.0 percent) were more likely to be heavy smokers than were black women (4.5 percent) or Hispanic women (2.1 percent) (Table 2.5). The mean number of cigarettes smoked per day was 16.1 (±0.4) for white women who smoked, 11.0 (±1.0) for black women who smoked, and 9.1 (±0.9) for Hispanic women who smoked (NCHS, NHIS, public use data tape, 1998). In data from the Stanford Five-City Project,

1979	1985	1990	1992	1995	1998
34.1 (±1.6)	36.9 (±1.4)	40.2 (±1.5)	43.7 (±2.0)	46.8 (±2.5)	48.2 (±1.8)
43.9 (±1.7)	42.5 (±1.5)	43.2 (±1.5)	41.0 (±1.9)	39.1 (±2.4)	39.7 (±1.7)
22.0 (±1.3)	20.6 (±1.3)	16.6 (±1.2)	15.3 (±1.4)	14.1 (±1.7)	12.1 (±1.2)
22.0 (±1.3)	20.6 (±1.3)	16.6 (±1.2)	15.3 (±1.4)	14.1 (±1.7)	12.1 (±1.2)
15.7 (±2.7)	11.7 (±2.3)	6.7 (±3.0)	8.4 (±3.0)	9.6 (±4.9)*	5.1 (±2.4)*
24.6 (±2.1)	23.9 (±1.9)	17.1 (±1.6)	15.3 (±2.1)	12.1 (±2.4)	11.5 (±1.7)
24.8 (±2.5)	22.7 (±2.3)	21.8 (±2.4)	18.7 (±2.9)	19.0 (±3.4)	16.8 (±2.6)
12.7 (±3.8)	13.4 (±3.7)	11.9 (±2.7)	15.3 (±4.5)	16.2 (±5.3)	10.9 (±3.6)
24.4 (±1.5)	23.2 (±1.5)	19.0 (±1.4)	17.4 (±1.6)	15.9 (±2.1)	14.0 (±1.5)
9.2 (±2.6)	7.6 (±2.0)	4.3 (±1.7)	5.2 (±2.0)	5.7 (±2.9)*	4.5 (±2.1)*
11.0 (±4.2)*	13.0 (±5.6)*	3.4 (±2.0)*	5.1 (±2.9)*	9.9 (±4.8)*	2.1 (±1.4)*
20.3 (±4.5)	18.4 (±4.8)	22.0 (±4.7)	19.3 (±7.1)	22.7 (±7.7)	15.0 (±6.0)
24.0 (±3.1)	25.1 (±3.4)	19.9 (±3.2)	22.3 (±4.3)	17.4 (±5.2)	23.6 (±6.0)
24.2 (±2.5)	23.2 (±2.2)	19.0 (±1.9)	16.4 (±2.2)	15.8 (±2.7)	13.9 (±2.2)
26.3 (±3.8)	20.5 (±3.2)	15.9 (±2.8)	13.6 (±3.4)	12.1 (±3.5)	10.8 (±2.4)
19.3 (±4.6)	21.2 (±4.2)	11.9 (±3.1)	11.1 (±3.6)	8.1 (±3.9)*	5.5 (±2.4)*
32.4 (±1.5)	32.4 (±1.6)	28.5 (±1.6)	27.0 (±1.8)	25.5 (±2.3)	22.6 (±1.7)

†Ethnicity was not determined in 1965, 1970, or 1974. Thus, estimates for whites and for blacks during these years likely include data for some persons of Hispanic origin.

‡NA= Not available.

§For women aged ≥ 25 years. Data for the five education categories were not available for 1965.

Sources: National Center for Health Statistics, public use data tapes, 1965, 1970, 1974, 1979, 1985, 1990, 1992, 1995, 1998.

Hispanic women who smoked consumed fewer cigarettes per day than did white women who smoked, regardless of educational attainment (Winkleby et al. 1995). Among Hispanic women who smoked, the 1982–1983 HHANES showed that Mexican American women (18.8 percent) were less likely to be heavy smokers (≥ 1 pack of cigarettes per day) than were Puerto Rican American women (35.1 percent) or Cuban American women (48.6 percent) (Haynes et al. 1990). NHIS data from 1987, 1988, 1990, and 1991 (aggregate data) showed that heavy smoking among Hispanic women who smoked was highest among “other Hispanics” (17.5 percent) and Cuban Americans (10.5 percent) and lowest among Puerto Rican

Americans (6.6 percent) and Mexican Americans (4.0 percent). No CIs were provided (USDHHS 1998). The proportion of heavy smokers (≥ 25 cigarettes per day) among American Indian or Alaska Native women was not significantly different in the combined years 1978–1980 (12.7 percent) than in the combined years 1994–1995 (12.0 percent) (USDHHS 1998). BRFSS data for 1988–1992 showed that the proportion of heavy smokers among American Indian or Alaska Native women who smoked varied from 6.9 percent among women living in the northern plains to 1.2 percent among women living in the Southwest; these differences were not statistically significant (USDHHS 1998).

Novotny and coworkers (1988) concluded that differences by race in the number of cigarettes smoked per day persisted even after adjustment for gender and socioeconomic factors, such as occupation, employment, education, poverty level, and marital status. In the control group in a hospital-based, case-control study, differences by race in the number of cigarettes smoked per day remained significant after adjustment for degree of inhalation, length of the cigarette butt, duration of smoking, tar level, use of menthol cigarettes, time to the first cigarette after awakening, and educational level (Kabat et al. 1991). It is not clear whether racial or ethnic differences in the metabolism or elimination of nicotine (Wagenknecht et al. 1990a) or cultural factors are responsible for the differences in the number of cigarettes smoked per day (Caraballo et al. 1998; Pérez-Stable et al. 1998).

NHIS data also showed that the proportion of heavy smokers among women smokers with 12 years of education increased during 1970–1979, but no change occurred among women in other categories of educational attainment (Table 2.5). During 1979–1998, heavy smoking declined among women with 12 or more years of education. In 1998, women smokers with 9 to 11 years of education were more likely to be heavy smokers than were those with 12 or more years of education; similar patterns were reported for NHSDA data (USDHHS 1997). In NHIS during 1970–1998, a decline in heavy smoking occurred among men with 12 or more years of education (NCHS, public use data tape, 1998).

The prevalence of heavy smoking among both women and men who smoked increased during 1965–1979 and then declined during 1979–1998 (Table 2.5). NHIS data for 1965 and 1998 showed that among both women and men, the proportion of light smokers was higher in 1998. Among men, the proportion of moderate smokers was lower in 1998 than in 1965. The proportion of heavy smokers was comparable among both women and men in 1965 and in 1998. In the 1955 Current Population Survey (Haenszel et al. 1956) and for all years of NHIS, women were less likely than men to be heavy smokers. This finding was confirmed by other studies (Killen et al. 1988; Rogers and Crank 1988; Rimer et al. 1990; Rogers 1991; Giovino et al. 1994; USDHHS 1997) (Table 2.5) and was seen in NHIS data, even after adjustment for demographic factors (Novotny et al. 1988; Rogers et al. 1995). Among smokers, the 1998 NHIS data showed that 12.1 percent of women and 22.6 percent of men were heavy smokers. Among racial and ethnic groups, a significant difference by gender was observed among

white non-Hispanics, black non-Hispanics, and Hispanics. Sample sizes were too small to assess gender differences among Asians and Pacific Islanders or among American Indians and Alaska Natives (NCHS, public use data tape, 1998). However, in NHIS data for the combined years 1978–1980 through the combined years 1992–1993, American Indian and Alaska Native women consistently smoked fewer cigarettes than did men (USDHHS 1998).

Cigarette Brand Preference Among Women

In 1933, the three brands preferred by women were Chesterfield (31 percent), Lucky Strike (31 percent), and Camel (23 percent). In 1935, women smoked Chesterfield (30 percent), Camel (22 percent), Lucky Strike (16 percent), Philip Morris (9 percent), and Kool (8 percent) (Link 1935).

Recent national data on preferences for cigarette brands among women are lacking, and data are even more limited for assessing brand preferences by race or ethnicity. The 1978, 1979, 1980, and 1987 NHIS; the 1986 AUTS; and the 1999 NHSDA asked respondents about their preferences for cigarette brand. As reported in these surveys, women's preferences varied significantly by race and ethnicity and by age. Data from the combined 1978–1980 NHIS indicated that the 3 most popular brands among white women were Marlboro (14.4 percent), Winston (10.8 percent), and Salem (10.3 percent), and that the 3 most popular brands among black women were Kool (24.4 percent), Salem (19.4 percent), and Winston (10.3 percent); 27.5 percent of white women but only 15.6 percent of black women smoked brands other than the 12 most commonly used brands (USDHHS 1998).

Data from the 1986 AUTS also showed that Marlboro (23.7 percent), Salem (10.4 percent), and Winston (8.8 percent) were the most popular brands among white women and that Newport (20.5 percent), Kool (20.3 percent), and Salem (19.7 percent) were the most popular among black women (USDHHS 1998). The 1987 NHIS data showed similar results (USDHHS 1998). A 1993 study of smoking patterns among black women in Ohio found that four cigarette brands (Newport, Kool, Salem, and Benson & Hedges) accounted for 78 percent of the brands smoked and that 90 percent of black women who smoked used mentholated cigarettes (Ahijevych and Wewers 1993).

Published data from the 1999 NHSDA on brand used most often during the past month is available for women current smokers by age, but not by other demographic characteristics (SAMHSA 2000). In 1999, the brand used most often by women aged 26 years or

older was Marlboro (29.1 percent). Each of the other specific brands was used by less than 8 percent of women.

National data on the preferences of Hispanic women for cigarette brand are limited. In the 1982–1984 HHANES, 30.4 percent of Mexican American women who smoked used Marlboro cigarettes, 15.7 percent Salem, 13.6 percent Winston, and 9.9 percent Benson & Hedges (Haynes et al. 1990). Among Puerto Rican American women who smoked, 22.0 percent used Newport cigarettes, 20.5 percent Marlboro, 17.6 percent Winston, and 8.5 percent Kool. Among Cuban American women who smoked, 18.7 percent used Benson & Hedges cigarettes, 16.2 percent Winston, 15.6 percent Salem, and 15.4 percent Marlboro. Cuban American women (25.7 percent) were more likely than Mexican American women (19.0 percent) or Puerto Rican American women (9.8 percent) to choose a brand other than one of the top seven brands (Haynes et al. 1990).

Brand preference appears to vary with age. At older ages, women were increasingly likely to purchase brands other than Marlboro. In the 1986 AUTS, Marlboro was the preference for more than 50 percent of women aged 18 through 24 years, 24 percent of women aged 25 through 44 years, and about 6 percent of women aged 45 years or older (USDHEW, public use data tape, 1986). Similarly, in a 1990 California survey, Marlboro was purchased by 69.4 percent of women aged 18 through 24 years, 49.5 percent of women aged 25 through 29 years, 33.0 percent of women aged 30 through 44 years, and 12.7 percent of women aged 45 years or older (Pierce et al. 1991a). Published data from the 1999 NHSDA noted that 56.6 percent of women smokers aged 18 through 25 years reported that the brand that they used most often in the past month was Marlboro. Newport was used by 16.5 percent of these women, and Camel by 9.2 percent. No other brand was used by more than 2.5 percent, and 10.4 percent chose a brand in the category “all other brands.” For women smokers 26 years of age or older, however, only 29.1 percent reported that Marlboro was the brand used most frequently in the past month. Basic was used by 7.3 percent, Virginia Slims and Doral each by 6.7 percent, Newport by 6.6 percent, and Winston by 4.9 percent; 35.4 percent chose a brand in the category “all other brands” (SAMHSA2000).

In the 1986 AUTS data, women most often reported smoking Marlboro (21.3 percent), Salem (11.4 percent), and Winston (8.4 percent); men most often chose Marlboro (30.2 percent), Winston (12.7 percent), and Salem (7.2 percent) (USDHEW, public use data

tape, 1986). In a 1990 California study, comparable proportions of women (59.0 ± 4.8 percent) and men (66.8 ± 5.0 percent) aged 18 through 29 years purchased Marlboro cigarettes, but women older than age 29 years were less likely than men this age to purchase Marlboro (Pierce et al. 1991a). With increasing age, both women and men chose brands other than the top-selling ones, but women aged 45 years or older were considerably more likely than men in this age group to choose brands other than Marlboro. In published data from the 1999 NHSDA, Marlboro was used by 29.1 percent of women smokers and 41.0 percent of men smokers aged 26 years or older (SAMHSA 2000).

Market share of generic cigarettes increased dramatically from 1990 through 1993. A California study conducted in 1992 found that women were more likely than men to smoke generic brands, even after adjustment for household income (Cavin and Pierce 1996). Women were also more likely than men to smoke generic brands in a 1993 study of the 18 communities in the Community Intervention Trial for Smoking Cessation (COMMIT) (Cummings et al. 1997). Women smokers aged 45 years or older were more likely than younger women to smoke generic brands, and generic was the option most frequently selected by women smokers aged 45 years or older (15.7 percent).

In the United States, production of filter-tipped cigarettes increased from 0.6 percent of all cigarettes produced in 1950 to 97.5 percent in 1992 (Creek et al. 1994). The proportion was 98 percent for 1998 (Federal Trade Commission 2000). National surveys reveal that the use of filter-tipped cigarettes among women increased from 76.6 percent in 1964 to 90.6 percent in 1975. Early national data showed that women were more likely than men to smoke filter-tipped cigarettes (90.6 vs. 79.3 percent in 1975) (Schuman 1977), and results in other studies confirm this finding (Hammond and Garfinkel 1961; Wynder et al. 1984). In a 1984–1985 study of current smokers in New Mexico, however, Coultas and coworkers (1993) suggested that the gender gap had narrowed considerably: 92.9 percent of white women and 94.6 percent of Hispanic women smoked filter-tipped cigarettes, and 90.0 percent of white men and 87.0 percent of Hispanic men.

Since their introduction in the 1970s, consumption of cigarettes with low tar content, as measured by machine smoking, has increased dramatically in the United States (USDHHS 1981). About 13 percent of cigarettes consumed in 2000 had tar levels of 0 to 6 mg, and 52 percent had tar levels of 7 to 15 mg (Maxwell

2000). Hahn and colleagues (1990) found that 37 percent of white women reported trying cigarettes that were low in tar and nicotine, but only 27 percent of black women reported trying these products. Other data also suggested that white women are more likely than black women to choose low-tar or low-nicotine cigarettes (Wagenknecht et al. 1990a). In CPS-II, women were considerably more likely than men to choose cigarettes with tar yields less than 12.0 mg (51.6 vs. 34.8 percent) and were less likely to choose cigarettes with tar yields of 20.2 mg or more (3.6 vs. 8.8 percent) (Stellman and Garfinkel 1986). Other studies consistently showed that women are more likely than men to choose low-tar cigarettes (Hammond and Garfinkel 1961; USDHHS 1983; Wynder et al. 1984; Hahn et al. 1990; Coultas et al. 1993; Giovino et al. 1995) and are more likely to switch from high-nicotine to low-nicotine cigarettes (Grunberg et al. 1991).

The 1987 NHIS included a question on beliefs about the safety of low-tar and low-nicotine cigarettes. Among smokers, 30 percent of women and 34 percent of men believed that people who smoke low-tar and low-nicotine cigarettes are less likely to get cancer than are people who smoke high-tar and high-nicotine cigarettes (NCHS 1989). Thus, the differences in choice of cigarettes by women and men do not appear to be based on differences in the perceived safety of these types of cigarettes.

Summary

Cigarette smoking became prevalent among women after it did among men. The prevalence of current smoking for women aged 18 years or older increased from probably less than 6 percent in 1924 to

33.9 percent in 1965 and then declined to 22.0 percent in 1998. In 1998, the prevalence of smoking was higher for women of reproductive age (25.3 percent) than for women overall (22.0 percent). Prevalence of current smoking peaked among women born in 1925–1944. Current smoking has been lower among women than among men across all surveys, but the decline in smoking prevalence was greater for men than for women from 1965 through 1985, and thus the gap narrowed over time. Since 1985, the pattern of change in prevalence has been comparable among women and men.

In 1997–1998, the prevalence of current smoking was highest among American Indian and Alaska Native women (34.5 percent), intermediate among white women (23.5 percent) and black women (21.9 percent), and lowest among Hispanic women (13.8 percent) and Asian or Pacific Islander women (11.2 percent). Prevalence was also higher among women with 9 to 11 years of education than among women with fewer or more years of education. During 1970–1998, smoking prevalence declined among women at all levels of educational attainment. During the same period, however, no decline was observed in prevalence among women of reproductive age with 12 years of education.

The prevalence of heavy smoking (≥ 25 cigarettes per day) among women who smoked increased from 13.8 percent in 1965 to 22.0 percent in 1979 and then decreased to 12.1 percent in 1998. Among women who smoked in 1998, white women (14.0 percent) were more likely to be heavy smokers than were black women (4.5 percent) or Hispanic women (2.1 percent). Among smokers, women (12.1 percent) were less likely than men (22.6 percent) to be heavy smokers.

Cigarette Smoking Among Young Women

Initiation of tobacco use is largely complete by age 25 years (USDHHS 1994). Although 82 percent of smokers first try a cigarette before age 18 years, another 16 percent first try a cigarette between the ages of 18 and 24 years. As programs and policies increasingly focus on reducing tobacco use among minors, it will be even more important to monitor smoking among young adults, both to determine whether trends in adolescent smoking persist into

adulthood and to monitor the potential increased initiation of tobacco use by young adults. In the analysis of data on cigarette smoking among young women (aged 18 through 24 years), because of small sample sizes in individual years, data from some survey years were combined to yield more stable estimates. Combined data were used for the following years: 1965–1966, 1978–1980, 1983 and 1985 (1983/1985), 1990–1991, 1992–1993, 1994–1995, and 1997–1998.

Trends in Ever Smoking Among Young Women

NHIS data for the years 1965–1966 to 1997–1998 were used to assess the prevalence of ever smoking among young women aged 18 through 24 years (Table 2.6). The prevalence decreased from 43.3 percent in 1965–1966 to 32.9 percent in 1997–1998. No decline occurred between 1965–1966 and 1983/1985, but the decline from then through 1990–1991 was significant; prevalence then remained unchanged through 1998. Giovino and colleagues (1994) reported similar findings. The decline in prevalence of ever smoking among young white women between 1965–1966 and 1997–1998 was relatively small and not statistically significant, but the decline among young black women was dramatic (from 36.9 to 12.4 percent); most of this decline occurred after 1983/1985 (Table 2.6). A large decline also occurred among young Hispanic women between 1978–1980 (40.5 percent) and 1997–1998 (19.1 percent). For all races combined, only among young women with 13 or more years of education did the prevalence of ever smoking significantly decrease between 1970 and 1997–1998.

The prevalence of ever smoking was lower among young women than among young men from 1965–1966 through 1978–1980, the same in 1983/1985 and 1990–1991, and then lower again in 1992–1993, 1994–1995, and 1997–1998. The prevalence of ever smoking among young men decreased continually from 1965–1966 through 1990–1991; among young women, the decrease occurred between 1983/1985 and 1990–1991.

Ever Smoking Among Young Women by Demographic Characteristics

In the 1997–1998 NHIS, the prevalence of ever smoking among young women was 32.9 percent (Table 2.6). The prevalence was lower among black women and Hispanic women than among white women. The prevalence was highest among young women with 9 to 11 years of education and lowest among young women with 13 or more years of education. Similar patterns were noted for the 1997–1998 NHSDA except that prevalence was also significantly lower among women with 8 or fewer years of education (data not shown).

The proportion of persons who had ever smoked was lower among young women (32.9 percent) than among young men (39.1 percent) in the 1997–1998 NHIS (Table 2.6), a pattern also noted in the 1997–1998 NHSDA (SAMHSA, public use data tapes, 1997,

1998). The prevalence of ever smoking was significantly lower among Hispanic women (19.1 ± 3.6 percent) than among Hispanic men (34.0 ± 4.2 percent) and significantly lower among black women (12.4 ± 2.8 percent) than among black men (25.3 ± 4.8 percent). The prevalence was also lower among white women (41.1 ± 2.8 percent) than among white men (43.8 ± 2.6 percent), but the difference was not significant (NCHS, public use data tape, 1997–1998).

Trends in Current Smoking Among Young Women

In NHIS data, the prevalence of current smoking among young women decreased from 37.3 percent in 1965–1966 to 25.1 percent in 1997–1998 (Table 2.7). The decrease was significant from 1965–1966 through 1970, but no significant change occurred from then through 1983/1985. Smoking prevalence again decreased, to 22.4 percent, through 1990–1991 but did not increase significantly through 1997–1998. Other researchers reported similar findings (Novotny et al. 1990; Giovino et al. 1994). The explicit assessment of intermittent or someday smoking since 1992 increased the prevalence of smoking among young women by approximately 2.0 percentage points. However, even with this change in method taken into account, prevalence remained unchanged from 1990–1991 through 1997–1998 (Table 2.7).

Between 1965–1966 and 1997–1998, the prevalence of current smoking decreased substantially (from 34.7 to 9.6 percent) among young black women; most of the decline (from 27.8 to 11.0 percent) occurred from 1983/1985 through 1990–1991 (Table 2.7). A substantial decline in smoking prevalence (from 29.6 to 12.0 percent) also occurred among young Hispanic women from 1978–1980 through 1997–1998; most of the decline occurred between 1978–1980 and 1990–1991. The decline in prevalence among young white women between 1965–1966 and 1997–1998 was smaller (about 6 percentage points). From 1983/1985 through 1997–1998, smoking prevalence was significantly lower among young black women or young Hispanic women than among young white women. Sample sizes were too small to assess current smoking prevalence among young American Indian or Alaska Native women or among young Asian or Pacific Islander women. However, published data for American Indian or Alaska Native women aged 18 through 34 years showed no significant change in current smoking prevalence between 1978–1980 (53.3 percent) and 1994–1995 (48.0 percent) (USDHHS 1998). No

Table 2.6. Prevalence (% and 95% confidence interval) of ever smoking among young women aged 18–24 years, by selected characteristics, National Health Interview Survey, United States, 1965–1998

Characteristic	1965–1966	1970	1974	1978–1980
Young women	43.3 (±1.3)	40.7 (±1.5)	41.8 (±2.1)	42.5 (±1.8)
Race/ethnicity*				
White, non-Hispanic	44.3 (±1.4)	41.5 (±1.6)	42.2 (±2.3)	44.3 (±1.9)
Black, non-Hispanic	36.9 (±4.1)	36.0 (±4.2)	39.1 (±5.4)	35.5 (±4.1)
Hispanic	NA [†]	NA	NA	40.5 (±5.1)
Education (number of years) [‡]				
8	NA	49.9 (±7.5)	39.5 (±12.4) [§]	45.9 (±10.2)
9–11	NA	57.3 (±4.2)	62.5 (±6.6)	68.8 (±5.1)
12	NA	45.8 (±2.8)	46.6 (±3.4)	47.8 (±2.7)
13	NA	38.9 (±2.8)	32.8 (±3.8)	30.2 (±2.7)
Young men	61.1 (±1.4)	55.0 (±1.5)	53.7 (±2.3)	46.4 (±1.8)

Note: Prevalence of ever smoking is the percentage of all persons in each demographic category who reported smoking 100 cigarettes in their lifetime.

*Ethnicity was not determined in 1965, 1966, 1970, or 1974. Thus, estimates for whites and for blacks during these years likely include data for some persons of Hispanic origin.

significant change in current smoking prevalence was observed among Asian or Pacific Islander women aged 18 through 34 years between 1978–1980 (22.5 percent) and 1994–1995 (17.6 percent).

The prevalence of current smoking was significantly lower among young women than among young men from 1965–1966 through 1974 and again from 1994–1995 through 1997–1998 (Table 2.7). The decrease in prevalence was greater among young men than among young women between 1965–1966 and 1983/1985; between 1983/1985 and 1997–1998, however, prevalence decreased among young women but was unchanged among young men (Giovino et al. 1994; CDC 1994c,d, 1996, 1997c, 1999b, 2000a) (Table 2.7). Other researchers reported similar findings (Resnicow et al. 1991; Fiore 1992).

Smoking prevalence decreased significantly between 1970 and 1997–1998 among young women with 8 or fewer or 13 or more years of education; the decrease among young women with 12 years of education was of borderline statistical significance. In the early 1970s, smoking prevalence was lower among young women than among young men, regardless of educational attainment. By the mid-1980s, however, smoking prevalence had increased among young women with 12 or fewer years of education and declined among young men with 12 or fewer years of education, which led to concern that young women

were the fastest growing segment of smokers (Pierce et al. 1989a). Fortunately, this pattern was short lived. Prevalence among young women declined from the mid-1980s through the early 1990s, and trends became similar among young women and young men (McGinnis et al. 1987; Giovino et al. 1993, 1994).

Current Smoking Among Young Women by Demographic Characteristics

In the 1997–1998 NHIS, the prevalence of current smoking among young women was 25.1 percent (Table 2.7). Prevalence was substantially lower among black women (9.6 percent) and Hispanic women (12.0 percent) than among white women (31.6 percent). This pattern was also true for the 1997–1998 NHSDA (combined data) (data not shown) (SAMHSA, public use data tapes, 1997, 1998) and has been reported by other researchers (Winkleby et al. 1995). Aggregate data from California studies in 1990 and 1991 showed that the prevalence of smoking among Asian or Pacific Islander women aged 18 through 24 years was 22.9 percent among Japanese women, 19.9 percent among Korean women, 5.8 percent among Chinese women, and 4.0 percent among Filipino women. No CIs were provided (USDHHS 1998). In NHIS, the prevalence was higher among young women with 9 to 11 years of education than among those with any other level of education (Table 2.7). Similar patterns were found

1983/1985	1990–1991	1992–1993	1994–1995	1997–1998
43.1 (±1.7)	31.2 (±1.6)	30.4 (±2.1)	31.7 (±2.3)	32.9 (±2.0)
47.6 (±2.0)	38.5 (±2.0)	37.6 (±2.7)	39.3 (±3.0)	41.1 (±2.8)
32.6 (±3.9)	15.1 (±2.3)	11.1 (±3.1)	12.3 (±3.4)	12.4 (±2.8)
26.0 (±4.3)	16.8 (±3.2)	17.8 (±4.4)	21.6 (±4.7)	19.1 (±3.6)
57.5 (±9.6)	36.6 (±9.7)	36.7 (±13.3) [§]	33.4 (±15.0) [§]	32.9 (±11.2)
70.6 (±4.8)	55.2 (±5.7)	54.7 (±7.4)	40.9 (±7.6)	47.3 (±6.4)
52.2 (±2.9)	39.0 (±2.7)	37.3 (±4.0)	42.5 (±4.9)	40.3 (±3.8)
29.7 (±2.6)	22.2 (±2.2)	23.2 (±3.0)	27.8 (±3.5)	28.3 (±2.9)
40.0 (±2.0)	33.6 (±1.8)	35.1 (±2.5)	36.8 (±2.8)	39.1 (±2.0)

[†]NA= Not available.

[‡]For women aged 20–24 years. Data for four education categories not available for 1965.

[§]Estimate should be interpreted with caution because of the small number of respondents.

Sources: National Center for Health Statistics, public use data tapes, 1965–1966, 1970, 1974, 1978–1980, 1983, 1985, 1990–1995, 1997–1998.

for the 1997–1998 NHSDA (combined data) (data not shown) (SAMHSA, public use data tapes, 1997, 1998; Gfroerer et al. 1997b). In two self-administered mail surveys based on convenience samples of lesbians, prevalence of current smoking was 45 percent among women aged 17 through 24 years in 1984–1985 (Bradford et al. 1994) and 45 percent among women aged 18 through 25 years in the late 1980s (Skinner and Otis 1996).

The prevalence of current smoking from NHIS data was lower among young women (25.1 percent) than among young men (31.5 percent) (Table 2.7), a pattern also found in the 1997–1998 NHSDA. Within racial and ethnic subgroups, the prevalence of smoking was generally lower among young women than among young men. These findings were statistically significant in NHIS and NHSDA, except among whites in NHIS (data not shown) (NCHS, public use data tapes, 1997, 1998; SAMHSA, public use data tapes, 1997, 1998). A survey of more than 14,000 college students (60 percent of those to whom questionnaires were sent) who were attending 119 nationally representative four-year colleges found the prevalence of cigarette use within the past 30 days was nearly identical among women (28.5 percent) and men (28.4 percent) (Rigotti et al. 2000).

Summary

Smoking among young women (aged 18 through 24 years) declined from 37.3 percent in 1965–1966 to 25.1 percent in 1997–1998. Most of this decline occurred from 1965–1966 through 1970 and from 1983/1985 (combined data) through 1990–1991, and smoking prevalence remained unchanged through 1997–1998. The decline in prevalence of smoking between 1965–1966 and 1983/1985 was greater among young men than among young women, but a decline between 1983/1985 and 1997–1998 only occurred among young women. Young black women had a dramatic decrease in smoking prevalence between 1983/1985 (27.8 percent) and 1997–1998 (9.6 percent). A substantial decline in smoking prevalence occurred among young Hispanic women between 1978–1980 (29.6 percent) and 1997–1998 (12.0 percent). The decline among young white women between 1965 and 1998 was small (6 percentage points). Since 1992–1993, smoking prevalence has been lower among young women than among young men.

Table 2.7. Prevalence (% and 95% confidence interval) of current smoking among young women aged 18–24 years, by selected characteristics, National Health Interview Survey, United States, 1965–1998

Characteristic	1965–1966	1970	1974	1978–1980
Young women	37.3 (±1.3)	32.7 (±1.4)	34.1 (±2.0)	32.7 (±1.7)
Race/ethnicity*				
White, non-Hispanic	37.9 (±1.3)	33.0 (±1.6)	34.0 (±2.2)	33.6 (±1.8)
Black, non-Hispanic	34.7 (±3.7)	32.2 (±3.7)	35.6 (±5.3)	30.4 (±4.4)
Hispanic	NA [†]	NA	NA	29.6 (±5.0)
Education (number of years) [‡]				
8	NA	43.3 (±7.2)	35.4 (±12.0) [§]	36.9 (±8.5)
9–11	NA	48.4 (±3.6)	55.3 (±6.6)	59.2 (±5.3)
12	NA	37.0 (±2.6)	35.8 (±3.2)	35.0 (±2.6)
13	NA	26.8 (±2.1)	26.4 (±3.6)	21.2 (±2.5)
Young men	54.1 (±1.5)	44.3 (±1.6)	42.1 (±2.2)	35.5 (±1.8)

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

*Ethnicity was not determined in 1965, 1966, 1970, or 1974. Thus, estimates for whites and for blacks during these years likely include data for some persons of Hispanic origin.

Cigarette Smoking Among Girls

Smoking among adolescents is critically important because most tobacco use begins before age 18 years. Adolescents who use tobacco often become addicted and experience withdrawal symptoms similar to those reported by adults. Smoking during adolescence also produces significant health problems among young persons, including cough, phlegm production, increased number and severity of respiratory illnesses, decreased physical fitness, and reduced lung function (USDHHS 1994).

Methodologic Issues and Definitions in Measurement of Smoking Among Girls

Methodologic issues exist regarding the measurement of smoking behavior among children and adolescents. In addition, the definitions used to assess smoking status among children and adolescents are different from those used for adults.

Several surveys (see Appendix 1) have assessed smoking behavior among girls (aged 12 through 17 or

18 years). Data from NTTS (girls aged 12 through 18 years) and NYTS (grades 6 through 12) were not analyzed independently for this report, but published estimates are presented here. For this report, primary data were analyzed from NHSDA (girls aged 12 through 17 years), MTF Surveys (8th-, 10th-, and 12th-grade girls), YRBSS (high school girls <18 years of age), the 1989 TAPS I (girls aged 12 through 18 years), and the 1993 TAPS II (girls aged 10 through 22 years). Published data for all five surveys are also cited in this report. NHSDA is a household survey, MTF Survey and YRBSS are self-administered surveys conducted in schools, and the 1989 TAPS I and 1993 TAPS II were telephone surveys that included household interviews of persons who could not be contacted by telephone. The data from these surveys are not directly comparable because of age differences of the populations and differences in survey methods, response rates, sampling error, and the settings of interviews (Gfroerer et al. 1997a). (See Appendix 1 and Appendix 3.)

1983/1985	1990–1991	1992–1993	1994–1995	1997–1998
33.0 (±1.6)	22.4 (±1.4)	24.3 (±2.0)	23.5 (±2.1)	25.1 (±1.7)
36.2 (±1.9)	27.8 (±1.8)	30.3 (±2.6)	29.5 (±2.8)	31.6 (±2.4)
27.8 (±3.7)	11.0 (±2.1)	9.3 (±2.9)	9.8 (±3.0)	9.6 (±2.5)
18.1 (±3.7)	11.8 (±3.1)	13.1 (±4.0)	14.9 (±4.0)	12.0 (±2.3)
48.5 (±9.6)	28.4 (±8.8)	34.1 (±13.1) [§]	29.7 (±14.7) [§]	27.0 (±11.4) [§]
57.8 (±5.2)	46.3 (±5.7)	50.4 (±7.4)	34.6 (±7.8)	42.8 (±6.5)
40.5 (±2.9)	28.0 (±2.4)	28.6 (±3.8)	30.5 (±4.4)	30.8 (±3.7)
20.0 (±2.2)	14.2 (±1.7)	17.6 (±2.7)	19.3 (±3.1)	19.8 (±2.3)
30.5 (±1.8)	25.1 (±1.7)	28.3 (±2.3)	28.8 (±2.6)	31.5 (±2.0)

[†]NA= Not available.

[‡]For women aged 20–24 years. Data for four education categories not available for 1965.

[§]Estimate should be interpreted with caution because of the small number of respondents.

Sources: National Center for Health Statistics, public use data tapes, 1965–1966, 1970, 1974, 1978–1980, 1983, 1985, 1990–1995, 1997–1998.

Self-administered school surveys generally offer greater confidentiality and anonymity than household surveys. Thus, underreporting of smoking is generally a greater issue for household surveys. Williams and colleagues (1979) found that adolescents accurately reported smoking status if confidentiality was stressed. For girls aged 12 through 17 years, NHSDA estimates are used because they allow assessment of time trends since 1975 (see also Appendix 1). However, the potential for underreporting exists, as described below. For high school seniors, MTF Survey estimates are used because they provide data on trends since 1975 and because there is less underreporting in school-based surveys. The 1993 TAPS II was primarily a follow-up survey of the 1989 respondents; it cannot be used for estimates of the prevalence of tobacco use because of differential loss to follow-up among smokers and nonsmokers (see Appendix 1). The survey is used, however, to provide estimates of use of cigarette brands by current smokers.

NHSDA is a household survey conducted periodically to measure the prevalence of use of illicit drugs, alcohol, and tobacco. Before 1994, NHSDA interviewers questioned respondents aloud, which tended to diminish privacy and confidentiality if other persons in the household were present. In the

absence of a special effort to ensure privacy of responses, household surveys have been found to underreport the prevalence of tobacco use, particularly among younger adolescents (USDHHS 1994). Consequently, starting in 1994, information on sensitive topics, such as tobacco use and illicit drug use, was collected through a self-administered, written questionnaire to increase the privacy of responses. In 1994, both the old and new methods were used in a split-sample design. The 1994-A data were obtained through personal interviews, and the 1994-B data were obtained by respondents recording their own answers, which the interviewers did not see. Because respondents recorded their own answers, skip patterns used in the personal interviews could not be used (see definition for “skip pattern” in Appendix 2). In the 1994-B and subsequent surveys, responses were edited to make the initial answers on smoking status consistent with later answers. This increased editing and the change in methods significantly increased the estimate of current smoking (Brittingham et al. 1998). Estimates in the 1994-B NHSDA were two times higher than those in the 1994-A survey overall and three times higher for 12- and 13-year-olds (SAMHSA 1995b). The 1994-B estimates are more comparable to those from self-administered school surveys.

Children who participated in NHSDA during 1974–1977 were categorized as ever having smoked if they reported that they had ever smoked a cigarette. In the 1979–1994-A NHSDA, ever smoked was defined as the converse of never having smoked a cigarette. In the 1994-B and subsequent NHSDA surveys, persons who had ever smoked were respondents who reported ever having smoked a cigarette, even one or two puffs. In the YRBS, ever trying smoking was defined as ever having tried a cigarette, even one or two puffs. For all surveys, current smoking was defined as any cigarette smoking during the 30 days before the survey.

Trends in Ever Trying Smoking or Ever Smoking Among Girls

Trend data for 1968–1979 on the prevalence of adolescent girls ever trying smoking are available from NTTS (USDHEW 1979b). However, comparing these data with the more recent trend data from NHSDA is difficult because in NTTS, data were combined for persons who had never smoked (never tried a cigarette, not even a few puffs) and “experimenters” (persons who had at least a few puffs but had not smoked 100 cigarettes). The NHSDA data include experimenters with persons who had ever smoked. Thus, NTTS data provide lower estimates of the prevalence of ever smoking than do NHSDA data.

The NTTS data showed that the prevalence of ever trying smoking (i.e., former and current smoking combined) increased among females aged 12 through 18 years between 1968 and 1974; it then decreased between 1974 and 1979. NTTS data also indicated that never smoking or only experimenting with cigarettes decreased somewhat with age, whereas current smoking increased with age (USDHEW 1979b).

In the 1974–1994-A NHSDA, the prevalence of ever smoking among girls aged 12 through 17 years declined, on average, 0.86 percentage points per year (Figure 2.6). Comparing these trends to patterns after 1994 is difficult because of the 1994 changes in survey methods. Among girls, however, the new methods increased the estimate of ever smoking by 2 percentage points. The prevalence of ever smoking among girls was essentially unchanged in NHSDA between 1994-B and 1998.

Among adolescents aged 12 through 18 years in NTTS, girls were less likely than boys to have ever tried smoking, but the gap narrowed over time. The prevalence of ever trying smoking was 13.1 percent in 1968, 18.3 percent in 1972, and 18.9 percent in 1979 among girls, and 22.9 percent in 1968, 26.0 percent in

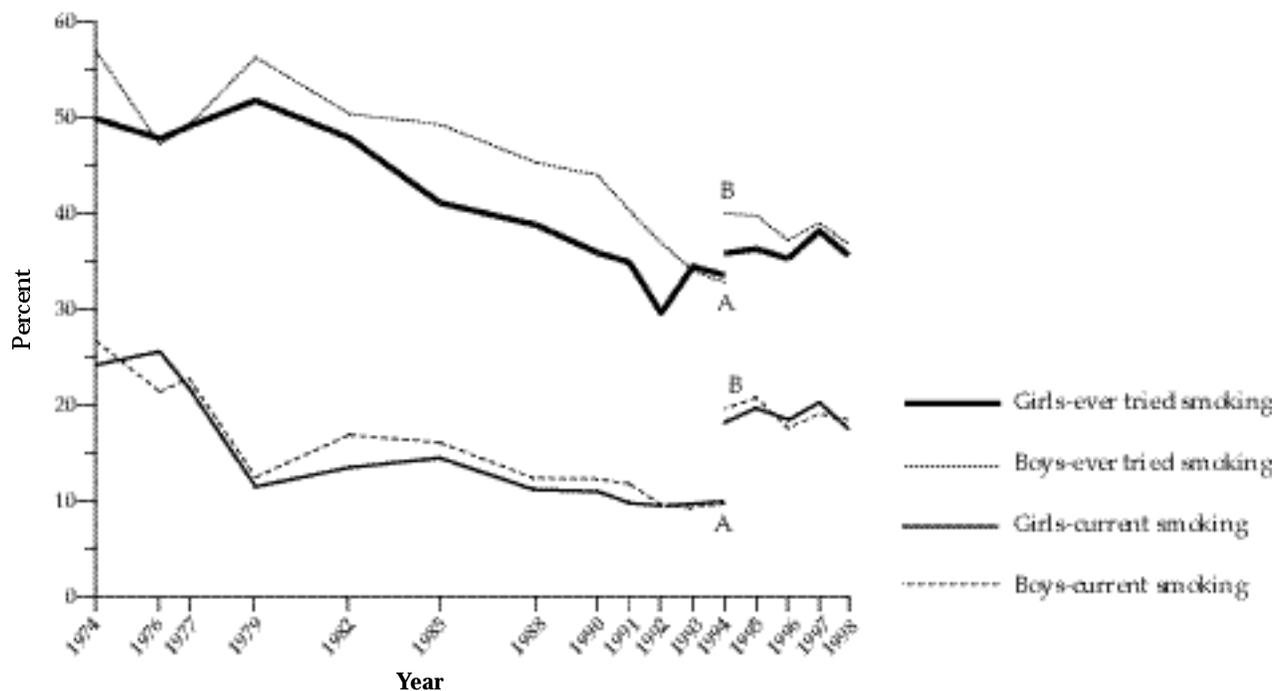
1972, and 19.2 percent in 1979 among boys (USDHEW 1979b). NHSDA data showed no significant gender-specific differences in ever smoking from 1976 through 1985 (Figure 2.6). In 1988–1992, however, the prevalence of ever smoking was significantly lower among girls than among boys. The 1989 TAPS I and the 1992 MTF Survey also found slightly lower estimates among girls than among boys for this period (Bachman et al. 1993b). For example, in the 1989 TAPS I, the prevalence of ever trying smoking was 44.4 percent among girls and 48.2 percent among boys (Moss et al. 1992). However, Kann and colleagues (1993) found no significant gender differences in YRBS. In the 1993–1998 NHSDA, gender-specific differences were generally not significant, a pattern also noted in the 1993, 1995, 1997, and 1999 YRBS and the 1993–1998 MTF Surveys (University of Michigan, Institute for Social Research, public use data tapes, 1993–1998; Kann et al. 1995, 1996, 1998, 2000).

Ever Trying Smoking and Ever Smoking Among Girls by Demographic Characteristics

The prevalence of ever trying smoking or ever smoking varies by age or grade; differences by race or by gender are less consistent. The 1998 NHSDA and the 1999 YRBS were used to estimate the prevalence of ever trying smoking or ever smoking among adolescent girls (Table 2.8). The proportion who had ever tried smoking or who had ever smoked varied dramatically across surveys, ranging from 35.5 percent in NHSDA to 69.1 percent in YRBS. Published 1999 NHSDA data for lifetime smoking among girls aged 12 through 17 years was 36.3 percent (SAMHSA2000). In the 1999 NYTS, 63.0 (± 3.5) percent of high school girls had ever used cigarettes (CDC 2000b). The higher estimates for all demographic categories of YRBS are consistent with the older age of participants in the high school YRBS (generally aged 14 through 17 years); NHSDA assessed adolescents aged 12 through 17 years. The lower NHSDA estimates are also consistent with the underestimation generally found in household surveys. NHSDA estimates were essentially unchanged after adjustment for demographic factors (USDHHS 1997).

In both NHSDA and YRBS, the percentage of girls who had ever tried smoking or who had ever smoked a cigarette increased with age: girls aged 15 through 17 years were more likely than those aged 12 through 14 years to have tried a cigarette or to have ever smoked (Table 2.8). Among girls in the 1998 MTF

Figure 2.6. Prevalence (%) of ever trying smoking and current smoking among adolescents aged 12–17 years, by gender, National Household Survey on Drug Abuse, United States, 1974–1998



Note: The data changed abruptly in 1994 because of a change in survey methodology, questions, and editing procedures. The 1994 survey used a split-sample design; 1994-A used the same method of personal interview as in previous years; 1994-B used a more private self-administered answer sheet and different editing procedures that were also used in subsequent years. In 1974–1977, ever tried smoking is the percentage of all persons in each demographic category who reported ever having smoked. In 1979–1994-A, smoking status was determined by response to the question, “About how old were you when you first tried a cigarette?” If any age was given, the person was considered to have ever tried smoking. For 1994-B–1998, respondents who ever tried smoking were those who had ever smoked a cigarette, even one or two puffs. Prevalence of current smoking is the percentage of all persons in each demographic category who smoked during the 30 days before the survey.

Sources: Alcohol, Drug Abuse, and Mental Health Administration, public use data tapes, 1974, 1976, 1977, 1979, 1982, 1985, 1988, 1990–1992; Substance Abuse and Mental Health Services Administration, public use data tapes, 1993–1998.

Survey, the prevalence of ever trying smoking increased with grade in school: 45.0 percent for 8th graders, 58.7 percent for 10th graders, and 63.4 percent for 12th graders (University of Michigan, Institute for Social Research, public use data tape, 1998). These findings are consistent with those from other studies in which ever trying smoking or ever smoking increased with increasing age or grade in school (CDC 1989, 1991a, 1992; Moss et al. 1992; USDHHS 1994). In published data for the 1999 YRBS, the prevalence of ever trying cigarettes increased from grade 9 through grade 10, then remained unchanged through grade 12 (Kann et al. 2000). In 1999 NYTS data, the prevalence

of ever smoking cigarettes was 27.7 (± 3.7) percent for middle school girls and 63.0 (± 3.5) percent for girls in high school (CDC 2000b).

Although the 1999 YRBS data showed no racial or ethnic differences, in the 1998 NHSDA, white girls were more likely than black girls or Hispanic girls to have ever tried smoking (Table 2.8). Data from the 1989 TAPS I and the 1996–1998 MTF Surveys also indicated that the prevalence of ever trying smoking was higher among white girls than among black girls (Moss et al. 1992; University of Michigan, Institute for Social Research, public use data tapes, 1996–1998). Data from the 1989 TAPS I and the 1994 MTF Survey

Table 2.8. Prevalence (% and 95% confidence interval) of ever trying smoking or ever smoking and current smoking among girls less than 18 years of age, by selected characteristics, National Household Survey on Drug Abuse (NHSDA) and Youth Risk Behavior Survey (YRBS), United States, 1998–1999

Characteristic	Ever trying smoking or ever smoking*		Current smoking†	
	1998 NHSDA (ages 12–17)	1999 YRBS (grades 9–12)	1998 NHSDA (ages 12–17)	1999 YRBS (grades 9–12)
Girls	35.5 (±2.5)	69.1 (±3.1)	17.7 (±2.0)	33.7 (±2.6)
Age (years)				
12–14	21.8 (±3.1)	58.5 (±8.3)	10.7 (±2.3)	22.9 (±5.9)
15–17	49.0 (±3.6)	70.4 (±2.7)	24.7 (±3.1)	35.0 (±2.9)
Race/ethnicity				
White, non-Hispanic	40.9 (±3.4)	69.4 (±4.0)	21.0 (±2.8)	37.9 (±4.0)
Black, non-Hispanic	22.6 (±3.9)	69.0 (±6.6)	10.6 (±2.8)	17.7 (±4.1)
Hispanic	30.7 (±3.9)	70.4 (±4.2)	14.7 (±3.2)	31.1 (±4.7)
Boys	36.1 (±2.4)	68.9 (±4.6)	18.7 (±1.9)	32.5 (±3.0)

Note: NHSDA is a household survey that includes adolescents 12–17 years of age; 67.0% were 14–17 years of age. YRBS is a school-based survey that includes high school students in grades 9–12; these analyses were restricted to those less than 18 years of age; of these, 99.8% were 14–17 years of age. Data are not comparable across surveys due to differences in ages surveyed and survey methods.

*For NHSDA, prevalence of ever smoking is the percentage of all persons in each demographic category who reported having smoked at least one or two puffs from a cigarette. For YRBS, prevalence of ever trying smoking is the percentage of all persons in each demographic category who reported ever trying cigarette smoking, even one or two puffs.

†For NHSDA, prevalence of current smoking is the percentage of all persons in each demographic category who reported any cigarette smoking during the 30 days before the survey. For YRBS, current smoking status is based on response to the question, “How often have you smoked cigarettes during the past 30 days?” Those reporting any cigarette smoking during the 30 days before the survey were classified as current smokers.

Sources: NHSDA: Substance Abuse and Mental Health Services Administration, public use data tape, 1998. YRBS: Centers for Disease Control and Prevention, Division of Adolescent and School Health, public use data tape, 1999.

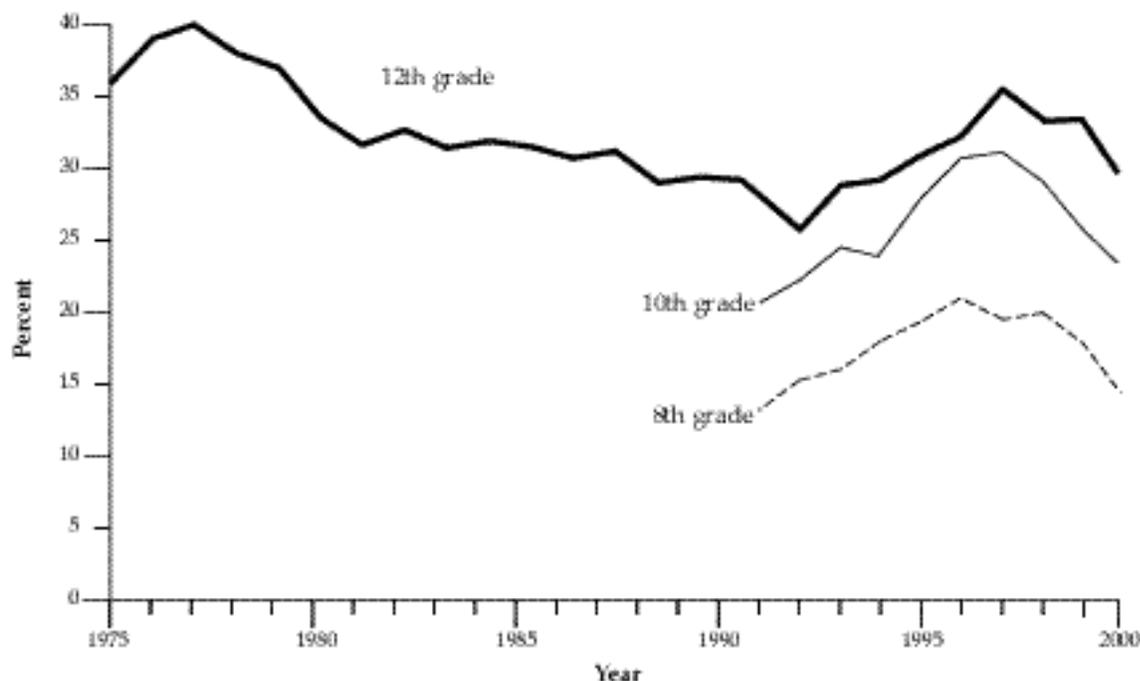
indicated that the prevalence of ever trying smoking was higher among white girls than among Hispanic girls (USDHHS 1994). The 1997 YRBS for all high school students who attended schools funded by the Bureau of Indian Affairs found that the percentage who had ever tried a cigarette was substantially higher among these girls (93.5 percent) than that among high school girls overall (69.3 percent) (Bureau of Indian Affairs 1997; CDC 1998a; Kann et al. 1998).

Both NHSDA and YRBS data showed no significant gender-specific differences in the prevalence of ever trying or ever smoking (Table 2.8), a finding also noted in the 1999 NYTS (CDC 2000b). Data from several other sources indicated that gender-specific differences in the prevalence of ever smoking are small (USDHHS 1994).

Trends in Current Smoking Among Girls

NHSDA data indicated that the prevalence of current smoking among girls aged 12 through 17 years decreased, on average, 0.71 percentage points per year from 1974 through 1994 (Figure 2.6). Most of the decline occurred from 1974 through 1979; the prevalence changed little from 1982 through 1994. The prevalence of current smoking also declined among boys aged 12 through 17 years from 1974 through 1994; the average rate of decline was 0.85 percentage points per year. Comparing these trends with patterns after 1994 is difficult because the changes in NHSDA methods increased the estimate of current smoking by 8 percentage points among girls and 10 percentage points among boys. From 1994 through 1998, current smoking was

Figure 2.7. Prevalence (%) of current smoking among girls, by grade in school, Monitoring the Future Survey, United States, 1975–2000



Note: Prevalence of current smoking is the percentage of all persons in each demographic category who reported smoking 1 cigarette during the previous 30 days.

Sources: University of Michigan, Institute for Social Research, public use data tapes, 1975–1998; University of Michigan 1999b, 2000.

unchanged among girls and boys. No gender-specific differences in prevalence for 1974–1998 were noted.

Beginning in 1991, MTF Surveys assessed current smoking among 8th- and 10th-grade girls (Figure 2.7). During 1991–1996, the prevalence of current smoking increased from 13.1 to 21.1 percent among 8th-grade girls; prevalence then decreased to 14.7 percent in 2000. Among 10th-grade girls, the prevalence of current smoking increased from 20.7 percent in 1991 to 31.1 percent in 1997; prevalence then decreased to 23.6 percent in 2000 (University of Michigan 2000).

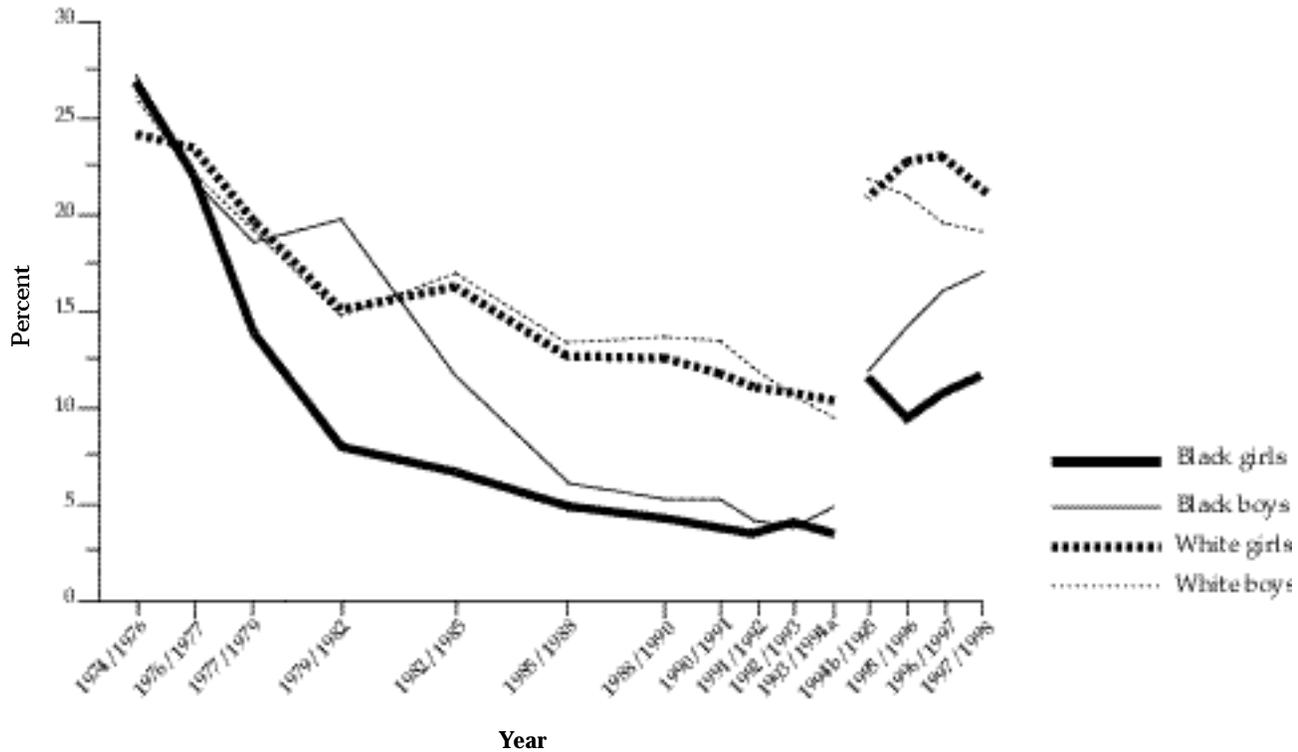
In reporting smoking prevalence by race, two-year rolling averages (see Appendix 2) were used to generate more stable estimates. NHSDA data showed that the prevalence of current smoking decreased between 1974–1976 (combined data) and 1993–1994-A (combined data) among both white girls and black girls (Figure 2.8). The decline was significantly greater among black girls (average, 1.23 percentage points per year) than among white girls (average, 0.73 percentage

points per year), but most of the decline among both white girls and black girls occurred from 1976–1977 through 1985–1988. Comparing these trends with patterns after 1994 is difficult because of changes in NHSDA methods. These changes increased the prevalence estimates by 7 percentage points among white girls and 12 percentage points among black girls. Between 1994 and 1998, current smoking among white girls and black girls was unchanged.

Current Smoking Among Girls by Demographic Characteristics

The association between various demographic characteristics and current smoking was assessed using 1998 NHSDA and the 1999 YRBS data. Estimates of the prevalence of current smoking in 1998–1999 varied markedly by survey, ranging from 17.7 percent (NHSDA) to 33.7 percent (YRBS) (Table 2.8); the lower NHSDA estimate probably reflects the younger age of

Figure 2.8. Prevalence (%) of current smoking among adolescents aged 12–17 years, by race and gender, National Household Survey on Drug Abuse, United States, 1974–1998, aggregate data



Note: Prevalence was calculated by using averages for combined years. Prevalence of current smoking is the percentage of all persons in each demographic category who reported any cigarette smoking during the 30 days preceding the survey. Except for 1985, data include respondents of Hispanic origin. There is an abrupt change in the data points in 1994 because the 1994 survey used a split-sample design: 1994-A used the same method of personal interview as in previous years; 1994-B used a more private self-administered answer sheet and different editing procedures that were also used in subsequent years. Sources: Alcohol, Drug Abuse, and Mental Health Administration, public use data tapes, 1974, 1976, 1977, 1979, 1982, 1985, 1988, 1990–1992; Substance Abuse and Mental Health Services Administration, public use data tapes, 1993, 1994-A, 1994-B, 1995–1998.

respondents as well as the underreporting generally found in household surveys, where privacy may be compromised. Published data from the 1999 NHSDA showed a similar prevalence of current smoking among girls 12 through 17 years of age (15.0 percent) (SAMHSA 2000). In the 1999 NYTS, 28.2 (±3.3) percent of high school girls had smoked cigarettes in the previous month (CDC 2000b).

In both surveys, girls aged 15 through 17 years were significantly more likely to smoke cigarettes than were girls aged 12 through 14 years. For example, the 1998 NHSDA data showed 10.7 percent of girls aged 12 through 14 years and 24.7 percent of girls aged 15 through 17 years were current smokers. The 2000 MTF Survey data indicated that the

prevalence of current smoking among girls was directly associated with grade in school: 14.7 percent for 8th graders, 23.6 percent for 10th graders, and 29.7 percent for 12th graders (Figure 2.7) (University of Michigan 2000). A similar pattern was noted in published data for all high school girls in the 1999 YRBS; the prevalence of current smoking was 40.5 percent for 12th-grade girls but only 29.2 percent for 9th-grade girls (Kann et al. 2000). In the 1999 NYTS, the prevalence of current smoking was 28.2 (±3.3) percent for high school girls but 8.9 (±1.7) percent for middle school girls (CDC 2000b).

Both NHSDA and YRBS data showed that white girls were more likely than black girls to be current smokers (Table 2.8). The NHSDA data also indicated

that white girls were more likely than Hispanic girls to be current smokers. Similar patterns were noted among all high school girls in the 1999 YRBS (Kann et al. 2000). Data on current smoking among girls of other racial and ethnic groups are limited, but a representative 1991 survey of Navajo girls aged 12 through 19 years found a smoking prevalence of 9 percent (Freedman et al. 1997). In contrast, the 1993 YRBS of American Indians who lived on or near Montana reservations reported that the prevalence of cigarette smoking among girls in grades 9 through 12 was 57 percent (Nelson et al. 1997), and the 1997 YRBS data from schools funded by the Bureau of Indian Affairs reported that the prevalence of smoking among all high school girls was 65.1 percent (Bureau of Indian Affairs 1997).

Although sexual orientation is not broken down by category or by gender, state YRBS data represent some of the strongest data available on smoking among gay, lesbian, and bisexual youth in that YRBS uses a probability-based, representative sample instead of a random sample in restricted geographic areas or a convenience sample. Research suggests that the prevalence of current smoking is higher among lesbian, gay, and bisexual youth than among youth in general. The 1993 and 1995 Massachusetts YRBS included a question on sexual orientation. Current smoking among lesbian, gay, and bisexual (data not broken down by category) students was 38.2 ± 12.3 percent in 1993 and 59.3 percent ($p < 0.00001$ compared with youth who were not lesbian, gay, or bisexual) in 1995 (Faulkner and Cranston 1998; Garofalo et al. 1998). This prevalence was greater than current smoking prevalence among students overall in the Massachusetts YRBS (30.2 percent in 1993 and 35.7 percent in 1995) (Kann et al. 1995, 1996).

NHSDA and YRBS data demonstrated that current smoking was equally prevalent among girls and boys (Table 2.8) (CDC 1998a). Similarly, in an examination of adolescent smoking trends, in which MTF Survey, NHSDA, and NHIS data were used, Nelson and coworkers (1995) and others (USDHHS 1994) found that, as of 1991, the prevalence of current smoking was similar among adolescent girls and boys. No gender-specific differences in smoking prevalence were noted in the 1999 NYTS (CDC 2000b).

Trends in Ever Smoking Among High School Senior Girls

Some of the earliest estimates of ever smoking among adolescents are from a study conducted by ACS in 1958 among 21,980 high school students in the

area of Portland, Oregon. In this study, the prevalence of ever smoking among high school senior girls was 68.3 percent and was lower than the 81.0 percent for senior boys (Horn et al. 1959).

MTF Survey data indicated that the prevalence of ever smoking among high school senior girls was 74.8 percent in 1976; it declined to 59.9 percent in 1992 (average annual decline, 0.93 percentage points), but was 63.4 percent in 1998 (average annual increase, 0.58 percentage points) (Table 2.9). The decline in ever smoking from 1976 through 1998 was greater among black high school senior girls (33.0 ± 7.2 percentage points) than among white high school senior girls (6.0 ± 3.7 percentage points). Except for 1981–1982, when the prevalence of ever smoking was higher among senior girls than among senior boys, and 1992, when the prevalence of ever smoking was lower among girls than among boys, no gender-specific differences in ever smoking were noted for MTF Surveys for 1976–1997. In 1998, the prevalence of ever smoking was lower among girls than among boys—this finding was of borderline statistical significance. The average rate of decline in smoking prevalence in 1976–1998 was comparable among girls and boys.

Trends in Current and Daily Smoking Among High School Senior Girls

In 1958, the prevalence of current smoking among high school senior girls was 16.5 percent in the area of Portland, Oregon (Horn et al. 1959). In the NTTS telephone survey of girls 17 through 18 years of age, the prevalence increased from 21.0 percent in 1968 to 27.0 percent in 1979 (USDHEW 1979b). Estimates of current smoking in the late 1970s from NTTS data were lower than those from MTF Survey data, a finding consistent with the methodologic difference between household and school-based surveys. In MTF Surveys, the prevalence of current smoking among high school senior girls declined from 39.9 percent in 1977 to 25.8 percent in 1992, then increased to 35.3 percent in 1997 (Table 2.9 and Figure 2.7). Prevalence decreased to 29.7 percent in 2000 (Figure 2.7) (University of Michigan 2000). Smoking prevalence in 2000 was the same as in 1988. NHSDA data also indicated a peak prevalence of current smoking among 17- to 18-year-old girls in the late 1970s (SAMHSA, public use data tapes, 1976, 1977).

MTF Survey data on senior high school students showed that prevalence of current smoking was higher among girls than among boys in the late 1970s and early 1980s, but the decline in smoking prevalence in 1976–1992 was more rapid among girls than among

Table 2.9. Prevalence (% and 95% confidence interval) of ever smoking and current smoking among high school seniors, by gender, Monitoring the Future Survey, United States, 1976–1998

Year	Ever smoking*		Current smoking†	
	Girls	Boys	Girls	Boys
1976	74.8 (±1.9)	75.8 (±1.5)	39.0 (±2.2)	37.8 (±1.7)
1977	74.9 (±1.8)	76.4 (±1.5)	39.9 (±2.1)	36.6 (±1.7)
1978	75.6 (±1.7)	74.4 (±1.4)	38.0 (±1.9)	34.6 (±1.5)
1979	74.9 (±1.8)	72.6 (±1.5)	37.0 (±2.0)	31.1 (±1.6)
1980	71.7 (±1.9)	70.0 (±1.6)	33.5 (±2.0)	26.6 (±1.5)
1981	73.3 (±1.8)	68.5 (±1.5)	31.6 (±1.9)	26.5 (±1.4)
1982	72.1 (±1.8)	68.0 (±1.5)	32.7 (±1.9)	26.6 (±1.4)
1983	71.4 (±1.9)	69.0 (±1.5)	31.4 (±1.9)	28.0 (±1.5)
1984	71.4 (±1.9)	67.0 (±1.6)	31.9 (±2.0)	26.0 (±1.5)
1985	69.9 (±1.9)	67.1 (±1.6)	31.5 (±1.9)	28.0 (±1.5)
1986	68.8 (±2.0)	66.0 (±1.7)	30.7 (±2.0)	27.9 (±1.6)
1987	68.7 (±1.9)	65.4 (±1.6)	31.2 (±1.9)	27.2 (±1.5)
1988	67.3 (±1.9)	65.3 (±1.6)	29.0 (±1.9)	28.0 (±1.5)
1989	66.6 (±1.9)	64.2 (±1.6)	29.4 (±1.9)	27.6 (±1.5)
1990	64.4 (±2.1)	64.2 (±1.6)	29.2 (±2.0)	29.1 (±1.5)
1991	62.4 (±2.1)	63.6 (±1.7)	27.3 (±2.0)	28.8 (±1.6)
1992	59.9 (±2.0)	63.7 (±1.7)	25.8 (±1.8)	29.3 (±1.6)
1993	60.2 (±2.0)	63.4 (±1.7)	28.6 (±1.9)	30.6 (±1.6)
1994	60.9 (±2.0)	63.2 (±1.7)	29.4 (±2.0)	33.0 (±1.6)
1995	63.6 (±2.0)	64.6 (±1.7)	31.8 (±2.0)	34.7 (±1.7)
1996	62.1 (±2.1)	64.4 (±1.7)	32.4 (±2.1)	35.0 (±1.7)
1997	64.4 (±2.0)	65.9 (±1.7)	35.3 (±2.0)	37.4 (±1.7)
1998	63.4 (±2.1)	67.1 (±1.6)	33.4 (±2.0)	36.2 (±1.7)

Note: Confidence intervals are asymmetric; the number presented here reflects the largest value for each confidence interval to provide the most conservative estimates.

*Based on response to the question, "Have you ever smoked cigarettes?" Prevalence of ever smoking is the percentage of all persons in each demographic category who reported ever having smoked a cigarette, even once or twice.

†Based on response to the question, "How frequently have you smoked cigarettes during the past 30 days?" Prevalence of current smoking is the percentage of all persons in each demographic category who reported smoking 1 cigarette during the previous 30 days.

Sources: University of Michigan, Institute for Social Research, public use data tapes, 1976–1998.

boys (average, 0.83 vs. 0.53 percentage points per year); the increase during 1992–1998 averaged 1.27 percentage points per year for girls and 1.15 percentage points per year for boys (Table 2.9). As a result, prevalence has been comparable among girls and boys since the mid-1980s. In 1998, the prevalence of current smoking was not significantly different among girls (33.4 percent) and boys (36.2 percent). From MTF Surveys, much of the decline in the prevalence of current smoking among high school senior girls occurred from 1976 through 1981. Among girls, the prevalence decreased, on average, 1.48 percentage points per year from 1976 through 1981 and 0.53 percentage points per year from 1981 through 1992. Among boys, the prevalence

decreased, on average, 2.26 percentage points per year from 1976 through 1981 and 0.25 percentage points per year from 1981 through 1992. Similar patterns were seen among 17- and 18-year-olds in NHSDA: current smoking among girls declined, on average, 3.04 percentage points per year from 1976 through 1985 but only 1.2 percentage points per year from 1988 through 1994; it remained unchanged from 1994 through 1998 (SAMHSA, public use data tapes, 1976–1998).

For reporting smoking prevalence by race, two-year rolling averages were used to generate more stable estimates. MTF Survey data showed a decline in the prevalence of current smoking among both white and black high school senior girls between 1976–1977

(combined data) and 1991–1992 (combined data). The decline was dramatic among black girls: from 37.5 ± 3.7 percent in 1976–1977 to 7.0 ± 3.5 percent in 1991–1992 (average, 1.9 percentage points per year). The corresponding decrease among white girls was from 39.9 ± 1.9 to 31.2 ± 1.9 percent (average, 0.54 percentage points per year). Most of the decline among white girls occurred from 1976–1977 through 1981–1982. From 1991–1992 through 1997–1998, prevalence increased among both white and black high school senior girls (from 31.2 ± 1.9 to 41.3 ± 2.1 percent and from 7.0 ± 3.5 to 12.1 ± 2.4 percent, respectively); this increase was statistically significant only among white girls. NHSDA data also showed a decline in current smoking from 1976–1977 through 1993–1994 that was 1.9 times greater among black females than among white females aged 17 or 18 years. No significant change in prevalence was noted among either white girls or black girls from 1994–1995 through 1997–1998 (SAMHSA, public use data tapes, 1976–1998). MTF Survey data for 1976–1979 showed that smoking prevalence among high school senior girls was 55.3 percent among American Indians or Alaska Natives, 39.1 percent among whites, 33.6 percent among blacks, 31.4 percent among Hispanics, and 24.4 percent among Asians or Pacific Islanders (USDHHS 1998). In 1990–1994, smoking prevalence among high school senior girls was highest among American Indians or Alaska Natives (39.4 percent) and whites (33.1 percent), intermediate among Hispanics (19.2 percent) and Asians or Pacific Islanders (13.8 percent), and lowest among blacks (8.6 percent). However, no CIs were provided (USDHHS 1998). In an analysis of combined data from the 1985–1989 MTF Surveys, Bachman and colleagues (1991b) found that the prevalence of current smoking was 24.7 percent among Puerto Rican American and Latin American girls and 18.7 percent among Mexican American girls.

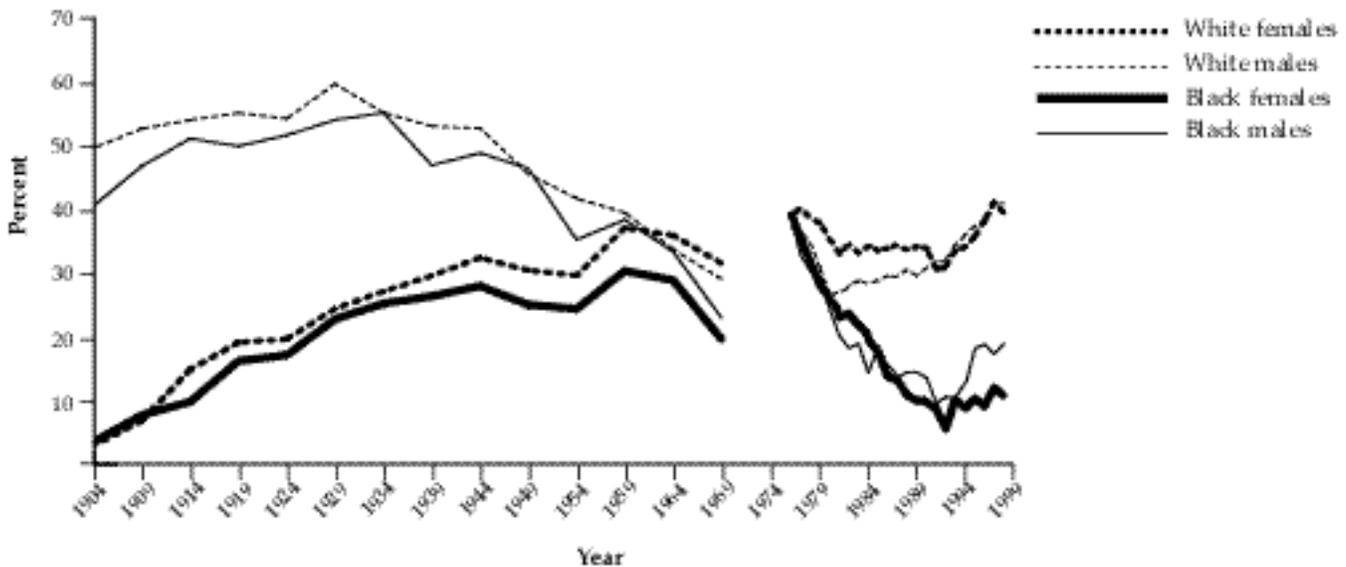
To assess racial differences in smoking before 1976, published data from Burns and colleagues (1997) on smoking among birth cohorts of women over time were used to derive estimates of smoking prevalence among 18-year-old girls and boys. Data for 1976–1998 were obtained directly from MTF Surveys of high school seniors (Figure 2.9). These analyses showed that in the first half of the century, smoking prevalence was high among both white and black 18-year-old boys and low, but increasing, among both white and black 18-year-old girls. After 1950, smoking prevalence decreased among white boys and black boys and continued to increase among white girls and black girls. As a result of these patterns, the prevalence of smoking was comparable among all four racial and

gender groups in the mid-to-late 1970s. Subsequently, prevalence decreased among black girls and boys but remained higher among white girls and boys.

MTF Survey data were also used to assess the prevalence of daily smoking among high school senior girls. Temporal patterns similar to those described for current smoking were found (Figure 2.10). In 1976, 28.8 percent of girls were daily smokers. The prevalence of daily smoking declined among high school senior girls between 1977 and 1981 (from 30.3 to 21.7 percent), but remained essentially stable from 1981 (21.7 percent) through 1987 (20.4 percent). It then decreased to 16.5 percent in 1992, increased to 21.6 percent in 1998, and then decreased to 19.7 percent in 2000 (University of Michigan, Institute for Social Research, public use data tapes, 1976–1998; University of Michigan, unpublished data, 2000). The prevalence of daily smoking was higher among girls than among boys during 1979–1987, but during 1988–1998, there was no gender-specific difference in smoking prevalence (Husten et al. 1996; University of Michigan, Institute for Social Research, public use data tape, 1998). Gender differences remained small in 1999 and 2000 (University of Michigan, unpublished data, 1999, 2000). The 1989 TAPS I data had consistent findings: daily smoking was similar by gender among adolescents aged 16 through 18 years (46.1 percent among girls and 48.7 percent among boys) (CDC, Office on Smoking and Health, public use data tape, 1989).

MTF Survey data on daily smoking were analyzed by race by using two-year rolling averages. Among white high school senior girls, daily smoking declined substantially between 1976–1977 and 1980–1981 (from 30.4 ± 1.8 to 24.0 ± 1.6 percent) but then decreased at a slower rate between 1980–1981 and 1991–1992 (to 20.6 ± 1.6 percent). Daily smoking prevalence increased significantly to 28.3 ± 1.9 percent in 1997–1998 (University of Michigan, Institute for Social Research, public use data tapes, 1976–1998). Among black high school senior girls, daily smoking continued to decline dramatically between 1976–1977 and 1992–1993 (from 24.7 ± 3.3 to 2.4 ± 1.2 percent) (Husten et al. 1996), but increased between 1992–1993 and 1997–1998 (5.4 ± 1.7 percent). For all years, prevalence of daily smoking was higher among white high school senior girls than among black high school senior girls (University of Michigan, Institute for Social Research, public use data tapes, 1976–1998; Patrick O'Malley, unpublished data). Estimates of daily smoking by race in the 1989 TAPS I also showed daily smoking to be higher among white girls than among black girls (Moss et al. 1992). Between 1976 and 1989, the prevalence of daily smoking decreased among Mexican American, Puerto Rican American,

Figure 2.9. Prevalence (%) of current smoking among young adults aged 18 years, for 1904–1969, National Health Interview Survey (NHIS), and high school seniors, for 1976–1998, Monitoring the Future (MTF) Survey, by gender and race, United States



Note: Estimates of prevalence for 1904–1969 were derived from an analysis of NHIS data on recalled age of initiation and recalled age of cessation done by Burns et al. 1997. Data reflect estimated prevalence among persons at age 18 years. Estimates for 1976–1998 were obtained directly from MTF Surveys and are the percentage of all high school seniors who reported smoking 1 cigarette in the previous 30 days. Sources: NHIS: Burns et al. 1997. MTF Survey: University of Michigan, Institute of Social Research, public use data tapes, 1976–1998.

and Latina high school senior girls (Bachman et al. 1991b).

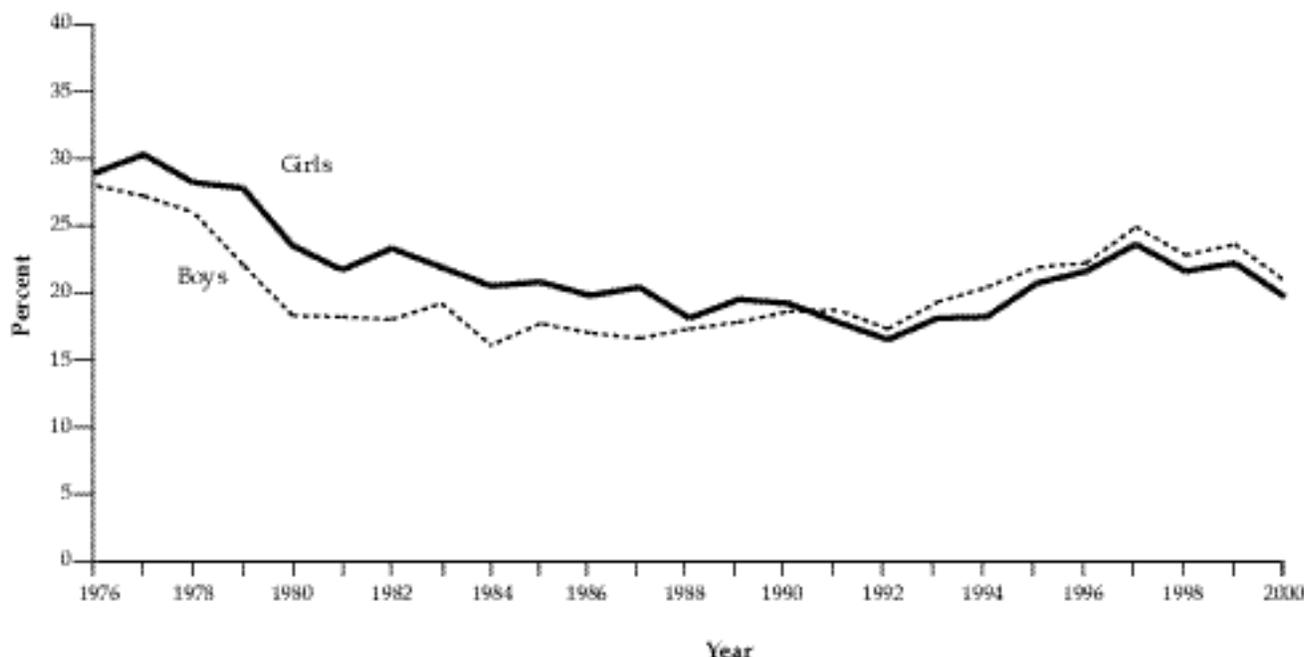
Smoking Intensity Among Girls

Heavy smoking among girls and boys is defined here as smoking about one-half pack of cigarettes (6 to 15 cigarettes) or more per day (USDHHS 1994). In the 1998 NHSDA, 5.0 percent of all adolescent girls aged 12 through 17 years were heavy smokers; among adolescent girls who smoked, 29.9 percent were heavy smokers. Among smokers, black girls (9.7 percent) and Hispanic girls (15.8 percent) were less likely than white girls (34.2 percent) to be heavy smokers (Table 2.10). Comparable estimates were obtained from the 1999 YRBS of high school students less than 18 years of age. In the 1999 NYTS, 12.3 (± 3.3) percent of girls in middle school and 25.2 (± 3.7) percent of girls in high school reported that they smoked 6 or more cigarettes on the days they smoked. Although girls were

somewhat less likely than boys to smoke heavily, the difference was not statistically significant (CDC 2000b). Using combined data from MTF Surveys for 1985–1989, Bachman and coworkers (1991b) reported the following prevalence of heavy smoking (one-half pack or more per day) among current smokers: 23.4 percent among Native American girls, 13.3 percent among white girls, 4.5 percent among Asian girls, 4.2 percent among Puerto Rican American and Latin American girls, 2.5 percent among Mexican American girls, and 2.2 percent among black girls.

Another measure of smoking intensity is frequent smoking, which is defined here as having smoked on 20 or more of the past 30 days (USDHHS 1994). Among girls aged 12 through 17 years who smoked, 44.8 percent were frequent smokers in the 1998 NHSDA (Table 2.10). Comparable estimates were obtained by analyzing data from the 1999 YRBS data for high school students less than 18 years of age. In the 1998 NHSDA data, white girls who smoked

Figure 2.10. Prevalence (%) of daily smoking among high school seniors, by gender, Monitoring the Future Survey, United States, 1976–2000



Note: Estimates for daily smoking are based on responses to the question, “How frequently have you smoked cigarettes in the past 30 days?” Persons reporting smoking ≥ 1 cigarette/day during the previous 30 days were classified as daily smokers. Sources: University of Michigan, Institute for Social Research, public use data tapes, 1976–1998; University of Michigan 2000.

were more likely than Hispanic girls who smoked to be frequent smokers; the percentage for non-Hispanic black girls was intermediate to the percentages for white girls and Hispanic girls. Among current smokers in the 1997 YRBS, 47.5 percent of the girls in grades 9 through 12 and less than 18 years of age in schools funded by the Bureau of Indian Affairs smoked at least 20 of the last 30 days (CDC, Division of Adolescent and School Health, public use data tape, 1997).

In both NHSDA and YRBS data, the prevalence of heavy or frequent smoking was generally somewhat lower among girls aged 12 through 14 years than among girls aged 15 through 17 years, but these differences were not statistically significant (Table 2.10). Other data have shown that the prevalence of frequent smoking increased as grade in school increased (Johnston et al. 2000a; Kann et al. 1998, 2000).

No significant gender-specific differences were found in the prevalence of heavy or frequent smoking in either survey (Table 2.10). In the 1989 TAPS I, among adolescents aged 12 through 18 years who smoked, 23.5 percent of girls and 27.6 percent of boys

smoked 10 to 19 cigarettes per day, and 12.1 percent of girls and 19.2 percent of boys smoked 20 or more cigarettes per day. However, smoking on 10 to 29 days of the past month was equally common among girls (26.2 percent) and boys (26.6 percent), as was daily smoking (40.6 vs. 41.0 percent) (Moss et al. 1992).

Relationship of Smoking to Socioeconomic and Other Factors

Socioeconomic status and social bonding in school and with peers are strongly associated with initiation of cigarette smoking among adolescents (Conrad et al. 1992; USDHHS 1994; Distefano et al. 1998; Flay et al. 1998; Harrell et al. 1998). MTF Surveys elicited data on several of the sociodemographic risk factors for ever smoking and current smoking among high school senior girls; data for 1994–1998 were combined to provide stable estimates (Table 2.11).

Students' household structure was related to both ever smoking and current smoking. MTF Survey data showed that high school senior girls who lived with both parents or with only their mother had the lowest

Table 2.10. Percentage (and 95% confidence interval) of girls less than 18 years of age who were current smokers who reported frequent or heavy use of cigarettes, by selected characteristics, National Household Survey on Drug Abuse (NHSDA) and Youth Risk Behavior Survey (YRBS), United States, 1998–1999

Characteristic	Heavy use*		Frequent use [†]	
	1998 NHSDA (ages 12–17)	1999 YRBS (grades 9–12)	1998 NHSDA (ages 12–17)	1999 YRBS (grades 9–12)
Girls	29.9 (±6.1)	24.5 (±3.6)	44.8 (±7.0)	44.1 (±5.5)
Age (years)				
12–14	18.8 (±10.9) [‡]	27.8 (±9.5) [‡]	33.3 (±13.9)	36.7 (±11.3)
15–17	34.0 (±7.3)	24.3 (±3.9)	48.7 (±8.1)	44.7 (±5.8)
Race/ethnicity				
White, non-Hispanic	34.2 (±7.4)	27.5 (±5.2)	48.5 (±8.3)	49.3 (±7.1)
Black, non-Hispanic	9.7 (±7.5) [‡]	11.5 (±7.6) [‡]	35.5 (±17.0) [‡]	30.8 (±20.1)
Hispanic	15.8 (±8.8) [‡]	12.7 (±5.7)	23.7 (±11.5) [‡]	25.1 (±7.4)
Boys	32.1 (±5.8)	30.2 (±3.9)	43.9 (±6.4)	48.5 (±5.3)

Note: NHSDA is a household survey that includes adolescents 12–17 years of age; 67.0% were 14–17 years of age. YRBS is a school-based survey that includes high school students in grades 9–12; these analyses were restricted to those less than 18 years of age; of these, 99.8% were 14–17 years of age. Data are not comparable across surveys due to differences in ages surveyed and survey methods.

*For NHSDA, prevalence of heavy use of cigarettes is based on response to the question, “When you smoked cigarettes during the past 30 days, how many did you usually smoke each day?” For YRBS, prevalence of heavy use is based on response to the question, “During the past 30 days, on the days you smoked, how many cigarettes did you smoke per day?” In both surveys, prevalence of heavy use is the percentage of all persons in each demographic category who reported smoking about one half pack/day or more on the days they smoked during the past 30 days. In NHSDA, responses were coded as 6–15 cigarettes/day or more, and a comparable code was used in YRBS.

[†]Based on response to the question, “During the past 30 days, on how many days did you smoke cigarettes?” Prevalence of frequent use is the percentage of all persons in each demographic category who reported smoking on 20 of the past 30 days.

[‡]Estimate should be interpreted with caution because of the small number of respondents.

Sources: NHSDA: Substance Abuse and Mental Health Services Administration, public use data tape, 1998. YRBS: Centers for Disease Control and Prevention, Division of Adolescent and School Health, public use data tape, 1999.

prevalence of ever smoking and current smoking (Table 2.11). In published data from the 1994–1995 NHSDA (combined data), girls and boys aged 12 through 17 years who lived in a family structure other than a two-biological-parent family were more likely to have smoked in the past year than were those who lived with both biological parents (USDHHS 1997). For girls aged 12 through 17 years, the 1989 TAPS I data showed that 14.5 (±3.4) percent of girls who spent 10 or more hours a week at home without a parent or another adult present, and 8.2 (±1.6) percent of girls who were never home alone, were current smokers (NCHS, public use data tape, 1989).

In MTF Surveys, level of parental education, defined as the highest grade either parent had completed, was generally not related to smoking status among high school senior girls (Table 2.11). In the 1992 YRBS,

after adjustment for age, gender, race and ethnicity, and school enrollment, the likelihood that adolescents aged 12 through 17 years smoked cigarettes was inversely related to the number of years of education completed by the responsible adult or to the 1986–1990 family income (Lowry et al. 1996). Conversely, a representative national sample of students enrolled in four-year colleges in the United States in 1993 found that female students with at least one parent who graduated from college were 1.19 (95 percent CI, 1.06 to 1.33) times as likely to have smoked in the past 30 days as students whose parents did not graduate from college (Emmons et al. 1998). Emmons and associates also controlled for other demographic factors, lifestyle choices, and risk behaviors. Prospective studies that examined the influence of parental education on smoking initiation have also yielded conflicting results. Some studies

Table 2.11. Prevalence (% and 95% confidence interval) of ever smoking and current smoking among high school seniors, by gender and sociodemographic risk factors, Monitoring the Future Survey, United States, 1994–1998, aggregate data

Sociodemographic risk factor	Ever smoking*		Current smoking†	
	Girls	Boys	Girls	Boys
Household structure				
Lives with both parents	61.9 (±1.3)	64.3 (±1.0)	32.0 (±1.3)	34.5 (±1.0)
Lives with mother only	62.7 (±2.4)	65.2 (±2.1)	30.8 (±2.3)	34.6 (±2.1)
Lives with father only	71.7 (±5.6)	69.9 (±3.6)	41.4 (±6.1)	39.1 (±3.9)
Lives alone	70.0 (±17.9)	69.3 (±9.6)	47.2 (±19.5)	48.1 (±10.3)
Other	68.7 (±4.1)	69.4 (±3.2)	36.6 (±4.3)	41.2 (±3.4)
Parental education level				
Some high school or less	61.2 (±3.9)	65.7 (±3.4)	28.8 (±3.6)	32.5 (±3.3)
Completion of high school	64.8 (±2.3)	66.1 (±1.8)	34.0 (±2.3)	35.9 (±1.8)
Some college	63.5 (±2.4)	65.3 (±1.9)	31.8 (±2.3)	35.2 (±1.9)
Completion of college	62.3 (±2.1)	64.7 (±1.6)	32.6 (±2.0)	35.4 (±1.6)
Graduate/professional	62.5 (±2.6)	64.8 (±1.9)	33.4 (±2.5)	35.5 (±1.9)
Population density of locale where respondent grew up				
Farm	63.0 (±5.3)	67.8 (±3.3)	32.9 (±5.2)	38.5 (±3.5)
Country	63.5 (±3.1)	67.7 (±2.3)	33.9 (±3.1)	37.4 (±2.4)
Small city	64.3 (±2.1)	66.7 (±1.6)	34.5 (±2.0)	37.5 (±1.6)
Medium-sized city or suburb	63.4 (±2.5)	65.5 (±2.0)	32.5 (±2.4)	34.7 (±2.0)
Large city or suburb	61.7 (±2.7)	62.2 (±2.1)	30.2 (±2.6)	32.3 (±2.0)
Very large city or suburb	59.7 (±3.4)	61.8 (±2.4)	29.3 (±3.2)	31.5 (±2.3)
Self-reported overall academic performance				
Above average	54.7 (±1.9)	58.7 (±1.4)	25.7 (±1.7)	29.0 (±1.3)
Slightly above average	63.8 (±2.3)	64.9 (±1.8)	32.2 (±2.2)	34.4 (±1.8)
Average	68.5 (±1.8)	69.4 (±1.4)	37.2 (±1.8)	39.7 (±1.5)
Below average	73.9 (±4.3)	74.8 (±2.7)	43.2 (±4.8)	47.3 (±3.1)
Plans to complete 4 years of college				
Definitely or probably will	60.7 (±1.3)	61.7 (±1.0)	30.0 (±1.2)	31.1 (±1.0)
Definitely or probably will not	72.3 (±2.4)	73.9 (±1.6)	41.8 (±2.6)	46.2 (±1.8)
Importance of religion				
Very important	50.2 (±2.0)	56.4 (±1.8)	20.2 (±1.6)	25.4 (±1.6)
Important	66.2 (±2.1)	67.6 (±1.6)	34.8 (±2.1)	37.0 (±1.7)
Not or somewhat important	72.4 (±1.8)	68.9 (±1.3)	42.1 (±1.9)	40.7 (±1.3)
Weekly personal income				
\$10	49.7 (±3.0)	51.3 (±2.5)	20.5 (±2.4)	22.1 (±2.0)
\$11–50	60.0 (±2.1)	61.5 (±1.7)	28.6 (±1.9)	30.4 (±1.6)
\$51	68.1 (±1.5)	69.0 (±1.1)	37.5 (±1.5)	39.8 (±1.1)

*Prevalence of ever smoking is the percentage of all persons in each demographic category who reported ever having smoked cigarettes at least once or twice.

†Prevalence of current smoking is the percentage of all persons in each demographic category who reported having smoked 1 cigarette in the 30 days before the survey.

Sources: University of Michigan, Institute for Social Research, public use data tapes, 1994–1998.

showed that less parental education predicted smoking initiation, but other studies found no relationship (Conrad et al. 1992; Harrell et al. 1998).

MTF Survey data for high school senior girls showed an inverse relationship between academic performance and prevalence of ever smoking and current smoking (Table 2.11). This relationship was also observed among girls aged 12 through 17 years in the 1989 TAPS I (NCHS, public use data tape, 1989). The prevalence of ever smoking was 23.9 (± 2.1) percent among girls with above-average performance, 36.2 (± 2.6) percent among girls with average performance, and 63.1 (± 9.2) percent among girls with below-average performance. The prevalence of current smoking was 8.9 (± 1.3) among girls with above-average performance, 15.6 (± 2.1) percent among girls with average performance, and 43.4 (± 10.0) percent among girls with below-average performance. Using longitudinal data from TAPS (1989–1993), Distefan and colleagues (1998) observed that youth with average or below-average school performance at baseline were 1.34 (95 percent CI, 1.11 to 1.63) times as likely to have tried a cigarette at follow-up as those with above-average performance.

Plans for education after graduation also were strongly associated with smoking status. In MTF Surveys, high school senior girls who did not plan to complete four years of college were more likely than those who planned to complete college to ever smoke (72.3 vs. 60.7 percent) or to smoke currently (41.8 vs. 30.0 percent) (Table 2.11). TAPS I data also were analyzed by “dropout” status: 17 percent of girls who were high school students or graduates, but 33 percent of girls who dropped out of high school, had smoked in the past week (USDHHS 1994). In the 1998 NHSDA data, among adolescent girls aged 12 through 17 years, 61.2 (± 17.0) percent of those who dropped out of high school, but 17.2 (± 2.2) percent of girls who remained in school, had smoked in the past month (SAMHSA, public use data tape, 1998). Among the college-age population (aged 17 through 22 years) in the 1998 NHSDA, 54.9 (± 8.5) percent of girls who dropped out of high school, 45.4 (± 6.2) percent of high school graduates who were not attending college, and 37.3 (± 9.3) percent of those attending college, had smoked in the past month (SAMHSA, public use data tape, 1998). The follow-up surveys of the high school graduating classes of 1976–1994 (modal ages, 19 through 22 years) showed that girls who did not go to college were more likely to smoke one-half pack of cigarettes or more each day than were girls attending college (Bachman et al. 1997). Academic values and expectations were also consistent predictors of

smoking initiation in several prospective studies of adolescents (Conrad et al. 1992; Flay et al. 1998).

The prevalence of both ever smoking and current smoking among high school senior girls was inversely related to the self-reported importance of religion. MTF Survey data showed that girls for whom religion was not important or was only somewhat important had the highest prevalence of ever smoking (72.4 percent) and current smoking (42.1 percent) (Table 2.11). Similarly, in the 1989 TAPS I, 18.5 (± 3.3) percent of girls aged 12 through 17 years who never attended religious services, but 7.7 (± 1.4) percent of girls this age who often attended religious services, were current smokers (NCHS, public use data tape, 1989). In the 1993 national survey of students in four-year colleges, Emmons and colleagues (1998) observed that female students who viewed religion as not important were 1.71 (95 percent CI, 1.41 to 2.07) times as likely to have smoked in the past 30 days as those who viewed religion as important.

Weekly personal income among high school senior girls was directly related to the prevalence of both ever smoking and current smoking. Data from the MTF Survey indicated that as personal income increased from \$10 or less to \$51 or more, the prevalence of ever smoking increased from 49.7 to 68.1 percent and the prevalence of current smoking increased from 20.5 to 37.5 percent (Table 2.11). This finding may reflect the fact that adolescents with the highest academic performance are less likely to have jobs (Johnston et al. 1982; University of Michigan, Institute for Social Research, public use data tapes, 1994–1998). In both TAPS I and TAPS II, the prevalence of ever smoking was lower among adolescent girls whose weekly discretionary income was \$1 to \$20 than among adolescents who had no discretionary income or whose income was more than \$20. The difference was statistically significant only in comparison to girls who had more than \$20 of discretionary income (CDC, Office on Smoking and Health, public use data tapes, 1989, 1993). A similar relationship was found for current smoking. The relationship between smoking initiation and religiousness or availability of spending money generally has not been examined in prospective studies (Conrad et al. 1992).

MTF Surveys found few gender-specific differences in the sociodemographic factors related to ever smoking and current smoking (Table 2.11). Among high school seniors who considered religion to be very important, those with above-average academic performance, and those who lived with both parents, girls were less likely than boys to be ever smokers or current smokers.

An analysis of the association of these same demographic factors with experimental smoking showed that only the self-reported importance of religion and weekly personal income were associated with experimental smoking. (Experimental smoking is defined here as having ever smoked, but never regularly). Girls who reported that religion was very important were less likely to have experimented with smoking than were girls who reported that religion was important. Girls who had a weekly personal income of \$10 or less were less likely to have experimented with smoking than were girls with a weekly personal income of \$11 or more. Among boys, similar relationships with the importance of religion and personal income were observed, but boys who reported no plans to attend college also demonstrated a lower prevalence of experimental smoking (University of Michigan, Institute for Social Research, public use data tapes, 1994–1998). In contrast, Distefan and colleagues (1998) used longitudinal data from TAPS (1989–1993) and observed that youth with average or below-average school performance at baseline were 1.34 (95 percent CI, 1.11 to 1.63) times as likely to have experimented with smoking but not yet smoked 100 cigarettes at follow-up and were 1.68 (95 percent CI, 1.14 to 2.48) times as likely to have progressed from experimentation to established smoking as those with above-average performance.

Attitudes About Smoking Among Girls

MTF Survey data for 1998 indicated that 64.8 percent of high school senior girls reported preferring to date people who do not smoke and that 42.4 percent reported strongly disliking being near people who are smoking (Table 2.12). Only 39.2 percent reported that they did not mind being around people who are smoking. Most girls (66.9 percent) disapproved of adults who smoke one or more packs of cigarettes per day, thought that becoming a smoker reflects poor judgment (54.1 percent), thought that their close friends would disapprove of them smoking one or more packs of cigarettes per day (72.7 percent), and believed that smoking is a dirty habit (72.4 percent). Young adolescents and young adults may be even more likely than high school seniors to have negative perceptions about smoking (Johnston et al. 2000a,b). In the 1989 TAPS I, 86.0 (± 1.1) percent of girls aged 12 through 17 years reported that they would rather date people who do not smoke, and in the 1993 TAPS II, 68.2 (± 1.6) percent of girls aged 10 through 17 years reported that they strongly dislike being around people who are smoking (NCHS, public use data tapes,

1989, 1993). In the 1993 MTF Survey of college students and young adults, 76.0 percent of those aged 19 through 22 years, 77.4 percent of those aged 23 through 26 years, and 86.8 percent of those 27 through 30 years reported that their friends would disapprove of their smoking one pack of cigarettes a day (Johnston et al. 1994b).

Perceptions about smoking are related to the smoking status of respondents (USDHHS 1994; Otero-Sabogal et al. 1995). For example, in the 1989 MTF Survey, 80 percent of nonsmokers and only 50 percent of smokers classified smoking as a dirty habit (USDHHS 1994). More than 85 percent of nonsmokers, but only about one-third of smokers, reported that they preferred to date nonsmokers (USDHHS 1994). In the 1999 NYTS, of girls in middle school, 93.8 (± 1.5) percent of never smokers and 92.3 (± 3.1) percent of current smokers thought persons can get addicted to cigarettes; for girls in high school, the percentages were 94.1 (± 3.1) and 94.6 (± 2.2), respectively. Among girls in middle school, 95.4 (± 0.9) percent of never smokers and 76.2 (± 6.4) percent of current smokers did not think it was safe to smoke 1 to 2 years and then quit; for girls in high school, the percentages were 97.2 (± 1.0) and 84.8 (± 2.9), respectively. Among girls in middle school, 91.8 (± 1.9) percent of never smokers and 88.4 (± 3.8) percent of current smokers thought that smoking one or more packs per day was a health risk; among girls in high school, the percentages were 93.7 (± 3.4) and 95.3 (± 1.5), respectively (CDC 2000b). In a TAPS cohort analysis, female Hispanics aged 12 through 18 years who did not dislike being around smokers were twice as likely as those who disliked being around smokers to have initiated smoking by the time they were resurveyed at ages 15 through 22 (Cowdery et al. 1997).

MTF Surveys showed that the social desirability of smoking was unchanged from 1981 through 1998 among high school senior girls, except for attitudes about dating smokers and adult smoking (Table 2.12). The percentage of girls who preferred to date nonsmokers increased from 1981 through 1991, then decreased nonsignificantly through 1998. Significantly fewer high school senior girls disapproved of adult smoking in 1998 than in 1986. The overall pattern from 1981 through 1998 among high school senior girls largely reflects trends among whites, the majority of the population.

In the 1960s and 1970s, high school students reported that peers and friends were more likely to disapprove of smoking by girls than to disapprove of smoking by boys (Zagona 1967; Johnston et al. 1980a,b). In a more recent study of seventh-grade

Table 2.12. Trends (% and 95% confidence interval) in the beliefs and attitudes of high school seniors about smoking and smokers, by gender, Monitoring the Future Survey, United States, 1981–1998

Beliefs and attitudes	1981		1986		1991		1996		1998	
	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys
I prefer to date people who don't smoke.*	62.2 (±4.6)	71.3 (±3.5)	69.0 (±4.6)	73.5 (±3.8)	74.4 (±4.8)	74.0 (±3.9)	67.6 (±5.2)	65.0 (±4.6)	64.8 (±5.3)	67.7 (±4.4)
I strongly dislike being near people who are smoking.*	NA [†]	NA	46.1 (±5.0)	44.5 (±4.3)	50.4 (±5.6)	48.2 (±4.5)	45.9 (±5.5)	39.1 (±4.7)	42.4 (±5.5)	39.9 (±4.6)
I personally don't mind being around people who are smoking.*	42.7 (±4.7)	33.5 (±3.6)	39.2 (±4.9)	34.6 (±4.1)	36.6 (±5.4)	29.2 (±4.1)	39.7 (±5.4)	38.6 (±4.7)	39.2 (±5.5)	37.4 (±4.6)
Do you disapprove of people (age 18 years) who smoke one or more packs of cigarettes per day? [‡]	69.4 (±4.1)	71.2 (±3.3)	76.4 (±4.0)	74.0 (±3.4)	73.9 (±4.7)	68.8 (±3.8)	65.6 (±2.6)	59.1 (±2.3)	66.9 (±2.6)	58.4 (±2.3)
I think that becoming a smoker reflects poor judgement.*	53.9 (±4.7)	60.8 (±3.8)	57.5 (±4.9)	62.0 (±4.2)	60.0 (±5.4)	62.6 (±4.4)	55.3 (±5.5)	55.0 (±4.8)	54.1 (±5.6)	55.4 (±4.7)
How do you think your close friends feel (or would feel) about your smoking one or more packs of cigarettes per day? [§]	73.9 (±4.1)	74.0 (±3.4)	77.1 (±4.2)	74.9 (±3.7)	76.9 (±4.7)	72.1 (±4.1)	73.4 (±5.2)	65.0 (±4.6)	72.7 (±5.1)	65.8 (±4.6)
Smoking is a dirty habit.*	66.7 (±4.5)	64.7 (±3.7)	69.6 (±4.6)	67.3 (±4.0)	73.1 (±4.9)	70.2 (±4.1)	72.2 (±5.0)	63.7 (±4.6)	72.4 (±5.0)	68.6 (±4.4)

*Percentage who agree.

[†]NA= Not available.

[‡]Percentage who disapprove.

[§]Possible responses included “not disapprove,” “disapprove,” and “strongly disapprove.” Percentages include those who “disapprove” or “strongly disapprove.”

Sources: University of Michigan, Institute for Social Research, public use data tapes, 1981, 1986, 1991, 1996, 1998.

students, girls were less likely than boys to believe that their friends approved of smoking (Flay et al. 1994). In the 1998 MTF Survey, girls were more likely than boys to disapprove of adults smoking one or more packs of cigarettes per day (Table 2.12).

When asked in the 1998 MTF Survey how smoking makes a “girl” their age look, a substantial majority responded that it did not make her look “conforming,” “independent and liberated,” “mature, sophisticated,” or “cool, calm, in control” (Table 2.13). They viewed smoking by a “guy” their age in a similar way. These perceptions changed little between 1981 and 1998. The 1998 MTF Survey found no gender-specific differences in how girls and boys who smoked

were perceived except that boys were more likely than girls to report that smoking by a “guy” made him look “mature, sophisticated.” Only 7.5 percent of boys, however, agreed with this assessment. In the 1999 NYTS, among girls in middle school, 10.8 (±1.9) percent of never smokers and 37.5 (±5.6) percent of current smokers thought smokers have more friends; among girls in high school, the percentages were 12.2 (±2.5) and 20.0 (±3.5), respectively. Among girls in middle school, 4.8 (±1.0) of never smokers and 25.3 (±5.7) percent of current smokers thought smokers looked cool; among girls in high school, the percentages were 5.1 (±1.6) and 12.4 (±2.3), respectively (CDC 2000b). (See “Factors Influencing Initiation of

Table 2.13. Trends (% and 95% confidence interval) in the opinions* of high school seniors about smokers, by gender, Monitoring the Future Survey, United States, 1981, 1990, 1998

Opinions	1981		1990		1998	
	Girls	Boys	Girls	Boys	Girls	Boys
In my opinion, when a girl my age is smoking a cigarette, it makes her look...						
...like she's trying to appear mature and sophisticated	64.8 (±4.6)	65.0 (±3.7)	62.2 (±5.5)	66.6 (±4.2)	56.2 (±5.5)	49.8 (±4.7)
...insecure	45.9 (±4.7)	49.4 (±3.9)	50.0 (±5.6)	52.3 (±4.4)	42.2 (±5.5)	40.0 (±4.6)
...conforming	25.5 (±4.2)	28.2 (±3.5)	19.5 (±4.5)	19.7 (±3.6)	18.8 (±4.4)	19.3 (±3.8)
...independent and liberated	10.9 (±3.0)	12.0 (±2.5)	9.7 (±3.3)	9.8 (±2.7)	8.5 (±3.1)	9.0 (±2.7)
...mature, sophisticated	6.8 (±2.4)	7.4 (±2.1)	4.1 (±2.2)	5.1 (±2.0)	4.5 (±2.3)	5.6 (±2.2)
...cool, calm, in control	5.7 (±2.2)	5.5 (±1.8)	4.1 (±2.2)	4.2 (±1.8)	5.9 (±2.6)	4.7 (±2.0)
In my opinion, when a guy my age is smoking a cigarette, it makes him look...						
...like he's trying to appear mature and sophisticated	61.6 (±4.6)	61.9 (±3.7)	60.4 (±5.5)	62.3 (±4.3)	55.6 (±5.5)	48.4 (±4.7)
...insecure	38.9 (±4.6)	45.2 (±3.8)	46.6 (±5.6)	44.6 (±4.4)	35.8 (±5.3)	34.7 (±4.5)
...conforming	24.9 (±4.1)	26.4 (±3.4)	17.6 (±4.3)	17.1 (±3.3)	17.9 (±4.3)	21.2 (±3.9)
...rugged, tough, independent	9.1 (±2.7)	8.6 (±2.2)	11.7 (±3.6)	8.5 (±2.4)	10.0 (±3.3)	11.8 (±3.0)
...mature, sophisticated	4.9 (±2.1)	6.1 (±1.8)	2.2 (±1.7)	3.9 (±1.7)	3.0 (±1.9)	7.5 (±2.5)
...cool, calm, in control	6.5 (±2.3)	6.4 (±1.9)	5.1 (±2.5)	5.5 (±2.0)	6.6 (±2.7)	9.1 (±2.7)

*Percentage who agree.

Sources: University of Michigan, Institute for Social Research, public use data tapes, 1981, 1990, 1998.

Smoking” in Chapter 4 and “Gender-Specific Similarities and Differences in Motives and Barriers to Stop Smoking” in Chapter 5 for further information about sociodemographic and behavioral factors associated with smoking.)

Cigarette Brand Preference Among Girls

A 1990 study of preference for cigarette brand among smokers aged 12 through 17 years in California found that the market share of both Marlboro and Camel cigarettes increased from 1986 through 1990 among girls (Pierce et al. 1991a). In the 1993 TAPS II, 90 percent of girls aged 10 through 17 years who smoked purchased Marlboro (63.1 percent), Newport (16.9 percent), or Camel cigarettes (10.0 percent) (Table

2.14)—the three most heavily advertised brands in 1993 (Maxwell 1994). In published data from the 1999 NHSDA, the most frequent brands used in the past month by girls aged 12 through 17 years were Marlboro (55.6 percent), Newport (22.6 percent), and Camel (8.3 percent) (SAMHSA 2000). Similar proportions were noted in the 1998 MTF Survey for grades 8, 10, and 12 combined (Marlboro, 61.9 percent; Newport, 18.6 percent; Camel, 5.8 percent) (University of Michigan 1999a). In the 1999 NYTS, 39.8 percent of girls in middle school identified Marlboro as the usual brand of cigarette smoked in the 30 days preceding the survey; 26.2 percent smoked Newport, 5.7 percent smoked Camel, 13.1 percent smoked “another” brand, and 15.1 percent reported that they had no usual brand. Among girls in high school, 56.8 percent

Table 2.14. Prevalence (% and 95% confidence interval) of use of cigarette brands among current smokers aged 10–17 years, by gender and race, Teenage Attitudes and Practices Survey II, United States, 1993

Gender and race	Marlboro	Newport	Camel
Girls	63.1 (±7.2)	16.9 (±5.6)	10.0 (±4.2)*
White, non-Hispanic	68.9 (±7.6)	10.2 (±5.0)*	11.1 (±4.8)*
Black, non-Hispanic	20.6 (±26.1)*	64.1 (±28.3)*	0.0*
Hispanic	36.4 (±28.7)*	49.6 (±29.8)*	5.8 (±11.2)*
Boys	54.8 (±7.4)	12.6 (±4.3)	16.6 (±6.1)
White, non-Hispanic	62.2 (±8.3)	4.1 (±2.8)*	19.2 (±7.2)
Black, non-Hispanic	0.0*	72.6 (±20.5)*	0.0*
Hispanic	30.9 (±20.3)*	32.9 (±22.2)*	14.1 (±15.2)*

Note: Cigarette brand is based on response to the question, "What brand do you usually buy?" Current smoking is defined as any cigarette smoking during the 30 days before the survey.

*Results, particularly by race and ethnicity, should be interpreted with caution because of the small sample sizes.

Sources: Centers for Disease Control and Prevention, Office on Smoking and Health, public use data tape, 1993.

smoked Marlboro, 18.4 percent smoked Newport, 7.0 percent smoked Camel, 10.0 percent smoked "other," and 7.8 percent reported no usual brand (CDC 2000b). This concentration of brand use has been noted by others (Cummings et al. 1997).

No gender-specific differences in brand preference were noted in the 1993 TAPS II (Table 2.14). However, a 1993 California study reported that girls were less likely than boys to choose Camel cigarettes (Cavin and Pierce 1996)—a finding also noted in the 18 communities that were part of COMMIT (Cummings et al. 1997), in published data from the 1999 NHSDA (SAMHSA 2000), and in data from the 1998 MTF Survey (University of Michigan 1999a). Both COMMIT and the 1999 NHSDA also found that adolescent girls had little interest in generic cigarettes.

Data from the 1993 TAPS II showed that cigarette brand preference differed by race and ethnicity. Newport cigarettes were the most commonly purchased brand among black girls (64.1 percent) and Hispanic girls (49.6 percent); white girls preferred Marlboro cigarettes (68.9 percent). Results from the 1989 TAPS I and the 1998 MTF Survey also indicated a race-specific difference for brand preference: white adolescents preferred the Marlboro brand, and black adolescents preferred the Newport brand (Allen et al. 1993; University of Michigan 1999a).

In the 1993 TAPS II, 52.7 percent of girls smoked regular cigarettes, and 47.3 percent smoked light or ultralight cigarettes. Girls were almost twice as likely as boys to smoke light or ultralight cigarettes (47.3 vs. 25.3 percent) (NCHS, public use data tape, 1993; Giovino et al. 1996).

Summary

Household surveys provide lower estimates than school-based surveys, but the patterns of tobacco use were similar regardless of the source of data. The prevalence of current smoking among girls 12 through 17 years of age declined between 1974 and 1998, but most of the decline occurred between 1974 and the early 1980s. The decline in prevalence was greater among black girls than among white girls. Smoking prevalence increased among 8th-, 10th-, and 12th-grade girls between 1991–1992 and 1996–1997. In 1999, the prevalence of current smoking was 17.7 percent among 8th-grade girls, 25.8 percent among 10th-grade girls, and 33.5 percent among high school senior girls; the prevalence of daily smoking among high school senior girls was 22.2 percent. Thus, much of the progress in reducing smoking prevalence among girls in the 1970s and 1980s was lost with the increased prevalence in the 1990s; current smoking among high school senior girls in 2000 was the same as in 1988. Among high school seniors, smoking prevalence was higher among girls than among boys in the 1970s and early 1980s, but comparable since the mid-1980s.

In 1998–1999, prevalence of ever smoking, current smoking, heavy smoking, and frequent smoking was directly associated with age or grade; the prevalences of current, heavy, and frequent smoking were lower among black girls than among white girls. The patterns among Hispanic girls were less clear for ever and current smoking, but for heavy or frequent smoking, the prevalence among Hispanic girls in 1998 was lower

than that among white girls. In 1993, 90 percent of girls aged 10 through 17 years who smoked cigarettes purchased the three most heavily advertised brands.

Socioeconomic and other factors related to smoking patterns among adolescent girls include household structure, school performance and educational plans, religiousness, and level of discretionary income. Measures of the social desirability of smoking,

as viewed by high school senior girls, showed little change from 1981 through 1998, except for disapproval of adult smoking, which was lower in 1998 than in 1986. Nevertheless, most high school senior girls disapprove of adults smoking and associate smoking with negative qualities. These girls also have a negative view of peers who smoke.

Cigarette Smoking Among Pregnant Women and Girls

Cigarette smoking during pregnancy increases the risk of intrauterine growth retardation, low birth weight, and other unfavorable pregnancy outcomes (USDHHS 1989) (see "Reproductive Outcomes" and "Birth Outcomes" in Chapter 3). Historical data are available from the National Natality Survey, which provides data for samples of married women whose infants were born alive in 1967 or 1980. Among married mothers younger than age 20 years, smoking prevalence during pregnancy remained about the same between the two survey years: about 39 percent among white women and 27 percent among black women. Smoking prevalence among mothers aged 20 years or older declined from 40 to 25 percent among white women and from 33 to 23 percent among black women (Kleinman and Kopstein 1987).

The National Survey of Family Growth collected data in 1982, 1988, and 1995 on the smoking behavior of girls and women aged 15 through 44 years during their most recent pregnancy. The prevalence of smoking during pregnancy declined from 31 percent in 1982 to 27.5 percent in 1988. The prevalences for the two survey years, respectively, were 32.8 and 30.5 percent among white mothers, 29.2 and 23.4 percent among black mothers, and 17.2 and 13.7 percent among Hispanic mothers (Pamuk and Mosher 1988; Chandra 1995). Data from the 1995 National Survey of Family Growth indicated that 17.8 percent of pregnant and postpartum women smoked (NCHS 1997); data were not reported by race.

In the 1985 and 1990 NHIS, questions related to smoking were asked of women aged 18 through 44 years who had given birth within the past five years. In 1985, 31.8 percent of women reported that they smoked during the 12 months before giving birth, and 25.1 percent reported that they smoked after learning

they were pregnant. In 1990, the prevalences were 23.7 and 18.3 percent, respectively. These prevalences were consistently higher among white mothers (33.2 and 26.0 percent in 1985, and 25.3 and 19.7 percent in 1990) than among black mothers (27.5 and 22.6 percent in 1985, and 19.0 and 14.1 percent in 1990) or among Hispanic mothers (16.8 and 10.3 percent in 1985, and 12.1 and 8.0 percent in 1990) (Floyd et al. 1993).

Data from the 1988 National Maternal and Infant Health Survey are available for white, black, and American Indian women. These data indicated that the proportion of women who smoked cigarettes in the 12 months before giving birth was similar among American Indian women (35 percent) and white women (32 percent) but slightly lower among black women (27 percent) (Sugarman et al. 1994).

The National Pregnancy and Health Survey, which was conducted from October 1992 through August 1993, provided nationally representative data on the prevalence of prenatal use of drugs among women aged 15 through 44 years. In these data, 20.4 percent of women reported smoking cigarettes during pregnancy. Statistically significant differences were noted by race and ethnicity: 24.4 percent of white women, 19.8 percent of black women, and 5.8 percent of Hispanic women reported smoking during pregnancy (USDHHS 1996b).

Since 1989, data on smoking during pregnancy have been available from information collected on the revised U.S. Standard Certificate of Live Birth. These data are currently available from birth certificates in 46 states, New York City, and the District of Columbia and are included as part of the final natality statistics compiled each year (see "Natality Statistics" in Appendix 1). At the time of birth, mothers in these states and localities are asked whether they used

tobacco “during pregnancy” and the average number of cigarettes smoked per day (NCHS 1992, 1994a; Ventura et al. 1995, 1997, 1999, 2000; Matthews 1998). The proportion of women and girls who had live births who reported being smokers during pregnancy

declined from 19.5 percent in 1989 to 12.9 percent in 1998 (Table 2.15). Analysis of BRFSS data suggested that the decline was primarily due to a decrease in smoking initiation among women of childbearing age rather than an increase in smoking cessation during

Table 2.15. Trends (%) in live births in which mothers reported smoking during pregnancy, by selected characteristics, United States, 1989–1998

Characteristic	1989	1991	1993	1995	1997	1998
Overall*	19.5	17.8	15.8	13.9	13.2	12.9
Age (years)*						
<18	18.3	16.0	14.4	14.2	15.1	15.1
18–24	23.6	21.2	19.2	17.4	17.2	17.1
25–49	17.2	15.8	13.9	12.1	11.0	10.5
Race/ethnicity†						
White, non-Hispanic	21.7	20.5	18.6	17.1	16.5	16.2
Black, non-Hispanic	17.2	14.6	12.7	10.6	9.8	9.6
Hispanic	8.0	6.3	5.0	4.3	4.1	4.0
American Indian or Alaska Native	23.0	22.6	21.6	20.9	20.8	20.2
Asian or Pacific Islander	5.7	5.2	4.3	3.4	3.2	3.1
Education (number of years)‡						
8	20.8	18.3	15.2	12.6	12.1	11.7
9–11	35.0	31.9	29.0	26.2	25.7	25.5
12	22.2	20.6	19.3	17.7	17.1	16.8
13–15	13.6	12.4	11.3	10.5	9.9	9.6
16	5.0	4.2	3.1	2.7	2.4	2.2
Number of cigarettes/day						
10	57.8	60.4	62.7	65.4	67.9	68.6
11–20	35.6	33.8	32.1	30.1	28.1	27.6
21	6.6	5.8	5.2	4.6	4.0	3.8

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

*Includes data for 43 states and the District of Columbia (DC) in 1989; 46 states and DC in 1991–1993; and 46 states, DC, and New York City in 1995–1998. Excludes data for California, Indiana, New York State, and South Dakota for all years; Louisiana, Nebraska, and Oklahoma in 1989; and New York City in 1989–1993, which did not require the reporting of mother’s tobacco use during pregnancy on the birth certificate.

†For American Indians or Alaska Natives and Asians or Pacific Islanders, includes data for 43 states and DC in 1989; 46 states and DC in 1991–1993; and 46 states, DC, and New York City in 1995–1998. Excludes data for California, Indiana, New York State, and South Dakota for all years; Louisiana, Nebraska, and Oklahoma in 1989; and New York City in 1989–1993, which did not require the reporting of mother’s tobacco use during pregnancy on the birth certificate. For white non-Hispanics, black non-Hispanics, and Hispanics, includes data for 42 states and DC in 1989; 45 states and DC in 1991; 46 states and DC in 1993; and 46 states, DC, and New York City in 1995–1998. Excludes data for California, Indiana, New York State, and South Dakota for all years; Louisiana, Nebraska, and Oklahoma in 1989; New Hampshire in 1989–1991; and New York City in 1989–1993, which did not require the reporting of mother’s tobacco use during pregnancy or mother’s Hispanic origin on the birth certificate.

‡Includes data for 42 states and DC in 1989; 45 states and DC in 1991; 46 states and DC in 1993; and 46 states, DC, and New York City in 1995–1998. Excludes data for California, Indiana, New York State, and South Dakota for all years; Louisiana, Nebraska, and Oklahoma in 1989; Washington in 1989–1991; and New York City in 1989–1993, which did not require the reporting of mother’s tobacco use during pregnancy or mother’s education on the birth certificate.

Sources: National Center for Health Statistics 1992, 1994a; Ventura et al. 1995, 1997, 1999, 2000; Mathews 1998.

pregnancy (Ebrahim et al. 2000). Because most mothers who stop smoking during pregnancy relapse to smoking after delivery (Fingerhut et al. 1990; Mullen et al. 1997), the percentage of women who report smoking during pregnancy is substantially lower than the prevalence of smoking among all women of reproductive age (18 through 44 years). Researchers found that some pregnant women and girls conceal their smoking from the clinician (Windsor et al. 1993; Kendrick et al. 1995; Ford et al. 1997). Such concealment would result in underreporting of smoking prevalence during pregnancy on birth certificates. Underreporting also occurs if information on smoking from the hospital medical record is not transferred onto the birth certificate (Dietz et al. 1998). Point prevalence data on smoking among pregnant women from the 1996 BRFSS was 12 percent (Ebrahim et al. 2000). A report of the combined 1994-B-1995 NHSDA data estimated that 21.5 percent of pregnant girls and women aged 12 through 44 years smoked in the past month (USDHHS 1997). Data from the Pregnancy Risk Assessment Monitoring System in 13 states for 1997 showed that the reported prevalence of smoking during the last three months of pregnancy ranged from 11 to 24 percent (Gilbert et al. 1999).

Smoking prevalence during pregnancy differs by age and by race and ethnicity. Although the prevalence declined in all age groups and in all racial and ethnic groups between 1989 and 1998, it was consistently highest among women aged 18 through 24 years, lower among girls, and generally lowest among women aged 25 through 49 years (Table 2.15). The greatest decline occurred among black mothers (from 17.2 percent in 1989 to 9.6 percent in 1998) and white mothers (from 21.7 to 16.2 percent). The prevalence decreased from 5.7 to 3.1 percent among Asian or Pacific Islander mothers and from 8.0 to 4.0 percent among Hispanic mothers. Tobacco use during pregnancy by American Indian or Alaska Native mothers was higher than that in any other group, but the prevalence decreased from 23.0 percent in 1989 to 20.2 percent in 1998. Published data from the natality statistics reported that among Asian or Pacific Islander women, prevalence was highest among pregnant Hawaiian and part-Hawaiian women and lower among pregnant Chinese, Filipinos, Japanese, and other Asians or Pacific Islanders (Ventura et al. 1999). For pregnant Hispanic women, prevalence was highest among Puerto Rican, other Hispanic, and women

of unknown Hispanic status. Prevalence was lower among pregnant Cuban, Mexican American, and Central and South American women.

Smoking during pregnancy is particularly uncommon among Mexican women and Asian or Pacific Islander women born outside the United States (Ventura et al. 1995). In 1993, for example, the prevalence of smoking during pregnancy was 6 percent among Mexican mothers born in the United States, and only 2 percent among Mexican mothers born elsewhere. Similarly, 12 percent of Asian or Pacific Islander mothers born in the United States were smokers, but only 3 percent of those born elsewhere were smokers.

The prevalence of maternal smoking also differs by educational attainment (Table 2.15). In 1998, the prevalence of smoking during pregnancy was only 2.2 percent among mothers with 16 or more years of education, 9.6 percent for 13 to 15 years of education, 16.8 percent for 12 years of education, 25.5 percent for 9 to 11 years of education, and 11.7 percent for 8 or fewer years of education. From 1989 through 1998, the prevalence declined among mothers at all levels of education, but the decline was much greater among women with fewer than 12 years of education (NCHS 1992, 1994a; Ventura et al. 1995, 1997, 1999, 2000; Matthews 1998).

The proportion of pregnant smokers who smoke more than 10 cigarettes per day also has declined steadily (Table 2.15). The proportion of mothers who smoked 21 or more cigarettes per day during pregnancy decreased from 6.6 percent in 1989 to 3.8 percent in 1998, and the proportion who smoked 11 to 20 cigarettes per day decreased from 35.6 to 27.6 percent. The proportion who smoked 10 or fewer cigarettes per day increased from 57.8 to 68.6 percent (NCHS 1992, 1994a; Ventura et al. 1995, 1997, 1999, 2000; Matthews 1998).

Summary

Birth certificate data indicate that tobacco use during pregnancy declined from 19.5 percent in 1989 to 12.9 percent in 1998. The number of cigarettes smoked per day by pregnant women and girls who smoke also decreased. However, pregnant women and girls may conceal their smoking from clinicians, and this concealment could result in an underestimation of smoking prevalence from data on birth certificates. Survey data suggest that up to 22 percent of pregnant women and girls smoke.

Smoking Initiation

Age at initiation of smoking is an important indicator of smoking behavior. Persons who start smoking when they are young are more likely to smoke heavily and to become dependent on nicotine than are those who start smoking later in life. They are also at increased risk for smoking-related illnesses or death (Schuman 1977; USDHHS 1989; Breslau and Peterson 1996; Chassin et al. 1996; Chen and Millar 1998).

Several studies suggested that persons who began smoking at ages 14 through 16 years are more likely to become nicotine dependent than are persons who started smoking at an older age (Breslau 1993; Breslau et al. 1993a,b). However, initiation of smoking before age 14 years was not associated with a further increase in nicotine dependence, presumably because such initiation was associated with a slower progression to daily smoking than was initiation at ages 14 through 16 years. However, Everett and coworkers (1999b) found that among high school students aged 16 years or older, early age of initiation was directly related to current, frequent, and daily smoking.

In NHIS data by birth cohorts, a direct relationship was found between age at smoking initiation and the number of cigarettes smoked per day (USDHHS 1986b). This relationship was shown for women and for men. In 1955 Current Population Survey data for women aged 35 through 44 years, 19.7 percent of those who started smoking before age 18 years but only 8.8 percent of those who started smoking after age 22 years smoked more than one pack of cigarettes per day (Haenszel et al. 1956). In a study of almost 12,000 women, the age at smoking initiation was related to the intensity of smoking: 26.9 percent of women who started smoking at or before age 16 years and 15.4 percent of those who started at age 20 years or older smoked 31 or more cigarettes per day in adulthood (Taioli and Wynder 1991).

NHIS data also showed that persons who became smokers at earlier ages were more likely to continue smoking—a finding that was consistent across birth cohorts. For example, nearly 70 percent of women born in 1920–1929 who started to smoke before age 14 years, but 62 percent of women in the same birth cohort who began to smoke at age 18 or 19 years, were still smoking in 1980 (USDHHS 1986b). Similar conclusions were reported from CPS-I (Hammond and Garfinkel 1968), the 1975 AUTS (USDHEW 1976), and the U.S. Nurses' Health Study (Myers et al. 1987). In

NHANES data, however, smoking initiation at an older age was not a predictor of successful cessation (McWhorter et al. 1990).

Three main measures are used to present data on smoking initiation patterns: the median or mean age at initiation, the percentage of smokers who started to smoke by a certain age, and the smoking initiation rate. To determine the median or mean age at smoking initiation or the estimated percentage of persons who had ever smoked by a certain age, researchers use the reconstructed prevalence of ever smoking by birth cohorts or the recalled age at initiation reported by persons at various ages over multiple survey years. The smoking initiation rate is calculated as the number of persons who started to smoke in a particular year, divided by the number who had not started smoking before that year. Trends in these measures of age at initiation and in initiation rates, as well as the methods used to derive them, are discussed here.

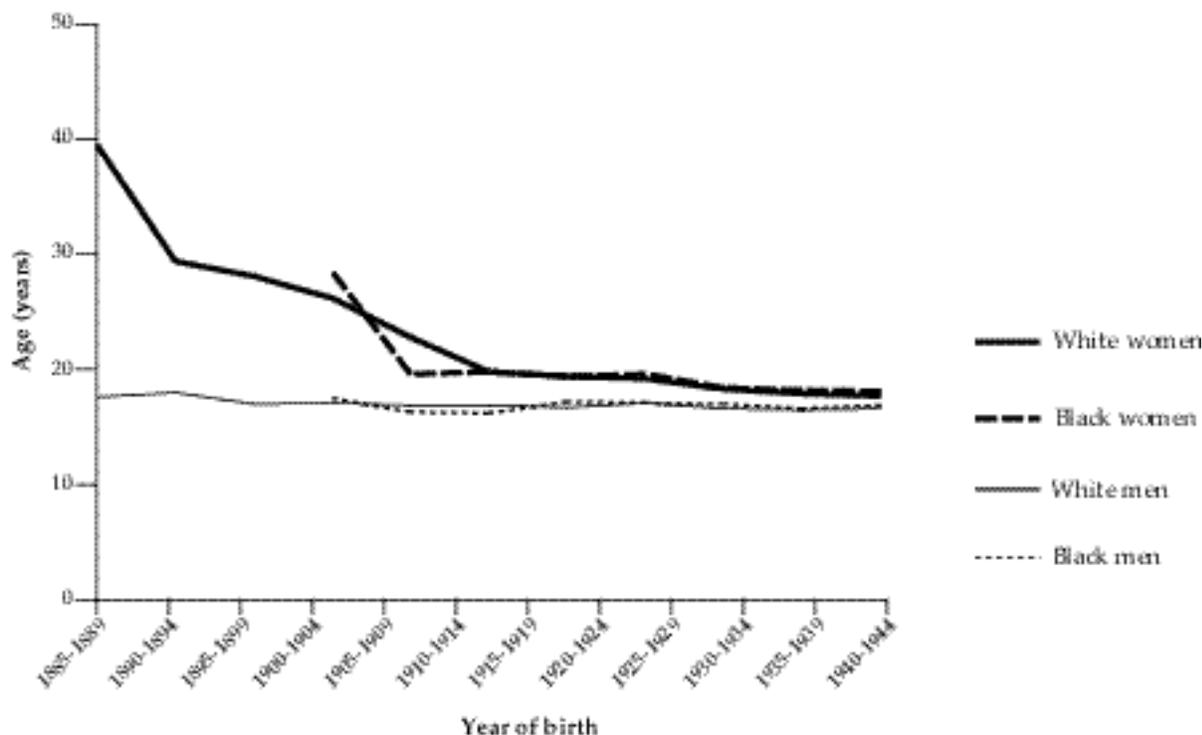
Median Age at Smoking Initiation

Women Born in 1885–1944

The median age at smoking initiation among women born between 1885 and 1944 was determined by reconstructing the prevalence of ever smoking for birth cohorts with use of NHIS data for 1970, 1978, 1979, 1980, 1987, and 1988 (Burns et al. 1997). Using the age at which respondents reported beginning to smoke, Burns and colleagues determined the percentage who had ever smoked in each birth cohort by age, race, and gender. For this analysis, the median age at smoking initiation was the age at which one-half of the persons who had ever smoked in each cohort were smoking, that is, the age at which one-half of the maximum prevalence of ever smoking was attained for that cohort. For example, the maximum prevalence of ever smoking among white women born in 1900–1904 was 26.4 percent, and the age by which one-half of these women (13.2 percent) were smoking was 26.2 years. The median age at smoking initiation decreased dramatically among women born in 1885–1914; the median age at initiation occurred 20 years earlier among women born in 1910–1914 than among women born in 1885–1889.

Among white women, the median age at smoking initiation declined from age 39.5 to 17.5 years in successive cohorts born in 1885–1944; most of the

Figure 2.11. Median age at smoking initiation among adults aged 18 years or older, by race, gender, and birth cohort, United States, 1885–1944



Note: Estimates for smoking initiation are based on responses to the question, “How old were you when you began to smoke cigarettes fairly regularly?” Age at which respondents reported beginning to smoke was used to determine the percentage who ever smoked, by birth cohort. Median age at smoking initiation was age at which one-half of persons who ever smoked in each cohort were smoking.

Source: Burns et al. 1997. Estimates derived from analyses of National Health Interview Survey data for 1970–1988.

decrease (from 39.5 to 19.8 years) occurred in the cohorts born in 1885–1914 (Figure 2.11). Among black women, the median age at smoking initiation declined from 28.5 to 17.9 years among cohorts born in 1900–1944. There were no consistent differences in the median age at initiation among black women and white women.

Among all cohorts, the median age at smoking initiation was later among women than among men. Among white women born before 1930, the median age at initiation was older than 18 years; among those born in 1930 through 1944, it was younger than 18 years. Among black women, the median age at initiation was younger than 18 years for the 1940–1944 cohort only. In contrast, the median age at initiation was younger than 18 years among almost all cohorts of men (Shopland 1995; Burns et al. 1997). In other cohort analyses of NHIS data for women, the trends

for mean ages at smoking initiation (USDHHS 1980; Harris 1983) and the patterns by gender (USDHHS 1980; Harris 1983; CDC 1991b) were similar to those reported here.

Findings in the 1955 Current Population Survey were also consistent with results in these cohort analyses. The median age at smoking initiation among women declined from 35.3 years among women born in 1891–1900 to 21.3 years among women born in 1911–1920 (Burbank 1972). Although the median age at smoking initiation decreased dramatically among women born in 1890–1910, the rate of decline slowed (decrease of only two years) among women born in 1910–1940 (Haenszel et al. 1956). Further evidence consistent with these findings comes from birth cohort analyses of self-reported age at smoking initiation in CPS-I and CPS-II (Stellman and Garfinkel 1986; Garfinkel and Silverberg 1990). The

trend from the 1890–1894 cohort through the 1930–1934 cohort is comparable to estimates reconstructed from NHIS data. Both analyses showed a 12-year decrease in the age at initiation among white women, but the estimates of age from CPS-I and CPS-II are consistently two to four years older than those obtained from NHIS data. This discrepancy is probably because CPS-I and CPS-II data are for volunteers who were predominantly middle class, white, well educated, and older than women in the general U.S. population (Stellman et al. 1988).

Mean Age at Smoking Initiation

Women Born in 1931–1962

Because smoking initiation must be completed before a median age at initiation can be determined, the median age cannot be determined for recent cohorts of smokers. However, the mean age at smoking initiation can be assessed in surveys of persons aged 30 through 39 years. By restricting analyses to this age group, researchers can assume that smoking initiation is nearly complete and that differential mortality is not yet an issue, but data may be skewed by recall bias. Because the age of survey participants is restricted and is similar over time, however, recall bias probably does not affect trends. The mean age at smoking initiation may be higher than the reconstructed median age because of outlier values, which represent persons who started smoking at an unusually late age.

In the 1959 CPS-I, the mean age at smoking initiation was 20.2 years among women aged 30 through 39 years at the time of the survey (born in 1920–1929) (Hammond and Garfinkel 1961). In 1970, 1978–1980

(combined data), 1988, and 1992, NHIS included questions about smoking initiation. Thus, the mean age at smoking initiation for persons aged 30 through 39 years can be determined among persons born in 1931–1962. Mean age was based on the question “How old were you when you started smoking cigarettes fairly regularly?” The mean age at initiation of regular smoking decreased from 19.3 years among women born in 1931–1940 to 17.7 years among women born in 1953–1962 (Table 2.16)—a decrease of about 1.5 years. The only racial or ethnic difference in the mean age at initiation of regular smoking was older mean age among black women than among white women for the 1931–1940 and 1949–1958 birth cohorts. Among all four cohorts (1931–1940, 1940–1949, 1949–1958, and 1953–1962) and the three racial and ethnic groups (whites, blacks, and Hispanics) examined, the mean age at initiation was older among women than among men.

Women Born in 1961–1979

Mean age at smoking initiation can also be determined from surveys of young adults or adolescents. These data are more current than information obtained by the other methods, and they minimize recall bias. However, smoking initiation may not be complete among these respondents, particularly adolescents, and the estimates derived from such surveys tend to be lower than those obtained by the other methods. Because initiation largely occurs before age 18 years, surveys of young adults but not surveys of adolescents were used to estimate age at smoking initiation for this report.

Table 2.16. Mean age (years and 95% confidence interval) at smoking initiation of regular smoking for selected birth cohorts, by gender and race or ethnicity, United States, 1931–1962

Birth cohort	White, non-Hispanic women		Black, non-Hispanic women	Hispanic women	All men
	All women				
1931–1940	19.3 (±0.2)	19.2 (±0.2)	20.0 (±0.5)	NA*	17.6 (±0.1)
1940–1949	18.5 (±0.3)	18.4 (±0.3)	19.0 (±0.7)	18.8 (±1.4)	17.2 (±0.2)
1949–1958	18.1 (±0.2)	17.9 (±0.2)	18.8 (±0.5)	18.9 (±0.8)	17.3 (±0.2)
1953–1962	17.7 (±0.3)	17.5 (±0.3)	18.6 (±1.1)	18.4 (±1.4)	16.9 (±0.4)

Note: Smoking initiation is based on response to the question, “How old were you when you first started smoking cigarettes fairly regularly?” Respondents were women aged 30–39 years in National Health Interview Surveys in 1970–1992 (e.g., women born in 1931–1962). Some birth cohorts overlap slightly, reflecting years that data were available. *NA= Not available. Ethnicity was not determined in 1970, so for women born 1931–1940, estimates for whites and for blacks likely include data for some persons of Hispanic origin.

Sources: National Center for Health Statistics, public use data tapes, 1970, 1979, 1988, 1992.

Data from the 1982, 1985, 1988, 1991, 1994, and 1997 NHSDA were used to determine trends in mean recalled age at smoking initiation among women 18 through 21 years old (i.e., women born in 1961–1979) who had ever smoked (Table 2.17). NHSDA data on the age at first trying a cigarette are available for 1982–1997, and NHSDA data on the age at starting to smoke daily are available for 1985–1997. The mean recalled age at first use of a cigarette was older (14.3 years) among young women born in 1976–1979 than among young women born in 1964–1973. The mean recalled age at initiation of daily smoking was older (16.0 years) among young women born in 1967–1970 than among young women born in 1964–1967. The mean recalled age at initiation of daily smoking was 15.8 years among young women born in 1976–1979. For both measures, the mean ages did not differ by gender.

Rogers and Crank (1988) used data for persons aged 17 through 24 years, but they used earlier NHIS data (1979–1980) to determine the average age at smoking initiation. The average age was 19.6 years among women and 17.2 years among men. The mean age at smoking initiation was highest (20.5 years) among Mexican American women, intermediate among black women (19.9 years), and lowest among white women (19.6 years). The mean age at smoking initiation was significantly higher among women than among men in all three racial and ethnic groups.

Percentage of Women Who Smoked by a Certain Age

Birth Cohort Analyses

Estimates can also be constructed for prevalence of ever smoking by a certain age (e.g., 18 or 20 years). This method of reconstructing prevalence provides estimates of smoking initiation for years before 1965, when ongoing surveillance of smoking behavior began. However, reconstructed estimates are subject to biases from the differential mortality of smokers (Tolley et al. 1991; Burns et al. 1997). Smokers who began smoking at a young age are more likely than other smokers to die prematurely and not be available to participate in a survey. This bias increases the estimated average age at smoking initiation for early cohorts, but some investigators, such as Burns and coworkers (1997), adjusted for this differential mortality. Biases can also be introduced if older persons are less likely than younger persons to accurately recall their age at smoking initiation. Although Harris (1983) suggested that the accuracy of recall for age at smoking initiation and cessation decreased as age increased, Gilpin and colleagues (1994) found that the distribution of reported age at smoking initiation among birth cohorts was consistent across survey years.

Table 2.17. Mean recalled age (years and 95% confidence interval) at smoking initiation among persons who ever smoked, by gender, United States, 1961–1979

Birth cohort	Mean age at first use of a cigarette*		Mean age at start of daily smoking†	
	Women	Men	Women	Men
1961–1964	13.0 (±1.2)	12.9 (±1.4)	NA‡	NA‡
1964–1967	12.2 (±0.6)	12.9 (±0.9)	14.9 (±0.6)	15.7 (±0.7)
1967–1970	13.4 (±0.4)	12.7 (±0.7)	16.0 (±0.4)	15.4 (±0.8)
1970–1973	13.3 (±0.4)	13.2 (±0.4)	15.7 (±0.4)	15.9 (±0.3)
1973–1976	13.9 (±0.4)	13.3 (±0.5)	15.6 (±0.4)	15.7 (±0.4)
1976–1979	14.3 (±0.4)	13.7 (±0.4)	15.8 (±0.3)	15.8 (±0.3)

Note: Respondents were aged 18–21 years in the National Household Surveys on Drug Abuse in 1982–1997 (e.g., born in 1961–1979). For 1991 and preceding years, ever smoking is defined as having smoked 100 cigarettes (about 5 packs) in their lifetime. For 1994-B and subsequent years, ever smoking is defined as having smoked 100 days in their lifetime.

*For 1991 and preceding years, respondents were asked, "About how old were you when you first tried a cigarette?" For 1994-B and subsequent years, respondents were asked, "How old were you the first time you smoked a cigarette, even one or two puffs?"

†Respondents were asked, "About how old were you when you first started smoking daily?"

‡NA= Not available.

Sources: Alcohol, Drug Abuse, and Mental Health Administration, public use data tapes, 1982, 1985, 1988, 1991; Substance Abuse and Mental Health Services Administration, public use data tapes, 1994-B, 1997.

NHIS data suggested that of the women who had ever smoked, 42 percent started smoking before age 20 years in the 1910–1919 birth cohort, 49 percent in the 1920–1929 birth cohort, and 84 percent in the 1950–1959 birth cohort (USDHHS 1986b). Cohort analysis of NHSDA data suggested that among women who had ever smoked, 51 percent started smoking before age 21 years in the 1919–1929 birth cohort, 70 percent in the 1956–1960 cohort, and 68 percent in the 1966–1970 birth cohort (Johnson and Gerstein 1998). Other analyses of NHIS data have also shown that, over time, proportionally more women began to smoke before age 18 or 20 years (USDHHS 1986b, 1989).

Pierce and colleagues (1991b) used NHIS data for 1978, 1979, 1980, and 1987 to reconstruct the prevalence of smoking among birth cohorts of women and men from 1920–1924 through 1955–1959 and then determined the proportion among persons who had ever smoked who became regular smokers before age 25 years. The proportion was 75.8 percent among the 1920–1924 birth cohort of women and 96.7 percent among the 1950–1954 cohort. The researchers concluded that smoking initiation generally occurs before age 25 years, particularly among recent birth cohorts of women.

In the U.S. Nurses' Health Study, the percentage of women who started to smoke before age 20 years increased for each successive birth cohort, from 23.8 percent among women born in 1921–1926 to 37.5 percent among women born in 1942–1946 (Myers et al. 1987). The greatest percent increase in the prevalence of smoking occurred at ages 20 through 25 years for the two older cohorts (born in 1921–1931) and at ages 15 through 20 years for the three younger cohorts (born in 1932–1946).

Burns and coworkers (1997) analyzed NHIS data by birth cohort. The analysis revealed that, among women who had ever smoked, the percentage who started smoking fairly regularly before age 18 years increased with each successive cohort from 1900–1904 through 1940–1944 (Figure 2.12). The increase in smoking initiation before age 18 years was greater among white women (29 percentage points) than among black women (24 percentage points). The percentage of women who had ever smoked and who started smoking by age 15 years increased 8 percentage points among white women and 5 percentage points among black women between the 1900–1904 cohort and the 1950–1954 cohort. Among those who had ever smoked, for all cohorts examined, a greater percentage of men than women had started smoking by age 15 or 18 years. However, the proportion of men who had ever smoked and started smoking by age 15 years

was greater among the 1900–1904 cohort than among the 1950–1954 cohort, and the increase in the proportion of men from those cohorts who started smoking by age 18 years was less than the increase in the proportion for women.

An analysis of the 1991–1993 NHSDA found that among the cohort of women born in 1919–1929, 51 percent reported any cigarette use by age 21 years. This percentage increased to 67 percent by the 1941–1945 birth cohort and remained at about 67 percent through the 1971–1975 birth cohort. The percentage of women who reported regular use of cigarettes by age 21 years increased from 19 percent among the 1919–1929 birth cohort to 35 percent among the 1941–1945 birth cohort, then remained fairly constant (around 35 percent) through the 1971–1975 birth cohort. The ratio of females to males who started using cigarettes daily before age 21 years was about 0.65 among the 1919–1929 birth cohort, 0.80 among the 1941–1945 birth cohort, 0.90 among the 1956–1960 cohort, and nearly 1.00 among the 1971–1975 birth cohort (Johnson and Gerstein 1998).

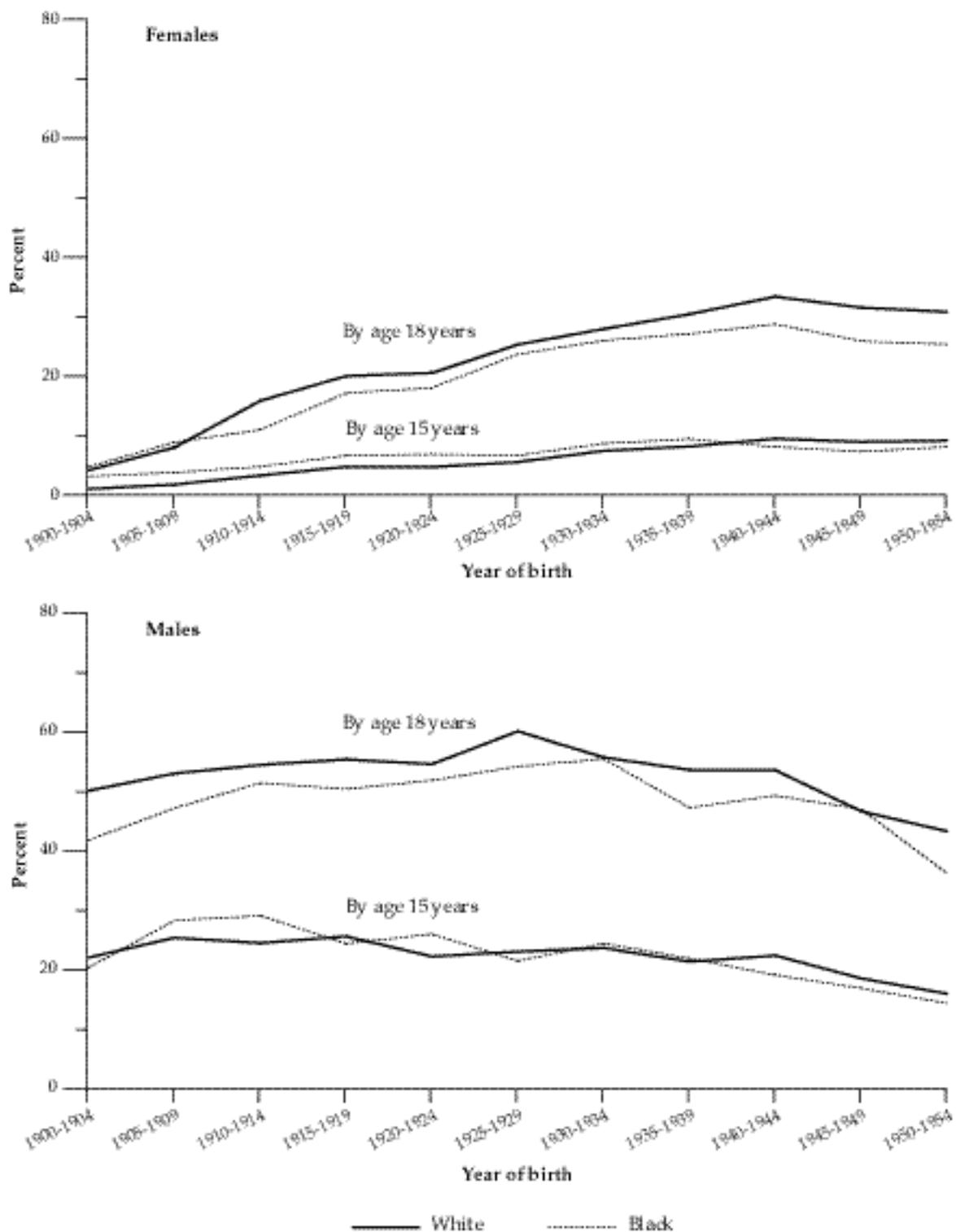
All these results are consistent with those for other analyses of NHIS data (USDHHS 1986b, 1989, 1994). Over time, a greater proportion of women started to smoke cigarettes before age 18 years, and this increase was more striking among women than among men. However, data for all birth cohorts consistently showed that a lower percentage of women than men began smoking fairly regularly before age 18 years. This pattern reflects the findings that men born in earlier cohorts started smoking before age 18 years but that smoking was started before age 18 years only among more recent birth cohorts of women (USDHHS 1986b).

Women Aged 30 Through 39 Years

The percentage of women who smoked by a certain age can also be calculated by surveys that assess the recalled age at initiation for women aged 30 through 39 years. By restricting analyses to this age group, researchers can assume that initiation is nearly complete and that differential mortality is not yet an issue. However, these analyses are limited in that they cannot provide information on initiation behavior among cohorts born after 1968.

Data from the 1998 NHSDA provided the age at which women aged 30 through 39 years recalled having first tried a cigarette or recalled smoking cigarettes daily (Table 2.18). Of all women in the survey, 8.0 percent first tried a cigarette before age 12 years, and 55.6 percent did so before age 18 years; 22.9 percent

Figure 2.12. Percentage of persons aged 18 years or older who ever smoked who started smoking fairly regularly by age 15 or 18 years, by race, gender, and birth cohort, United States, 1900–1954



Note: Persons who ever smoked are those who reported smoking 100 cigarettes in their lifetime. Age of initiation was determined by responses to the question, “How old were you when you began to smoke cigarettes fairly regularly?” Source: Burns et al. 1997. Estimates derived from analysis of National Health Interview Survey data for 1970–1988.

Table 2.18. Cumulative percentage (and 95% confidence interval) of recalled age at which respondents aged 30–39 years first tried a cigarette or began to smoke daily, by gender, National Household Survey on Drug Abuse, United States, 1998

Age (years)	All persons				Persons who ever smoked daily			
	First tried a cigarette*		Began smoking daily [†]		First tried a cigarette*		Began smoking daily [†]	
	Women	Men	Women	Men	Women	Men	Women	Men
<12	8.0 (±1.8)	12.8 (±2.4)	1.1 (±0.8) [‡]	1.3 (±0.8) [‡]	10.3 (±2.9)	13.1 (±4.2)	2.7 (±1.8)	3.4 (±2.1)
<14	23.4 (±2.7)	26.8 (±3.1)	4.6 (±1.4)	3.8 (±1.4)	34.5 (±4.8)	31.4 (±5.4)	11.4 (±3.4)	10.2 (±3.5)
<16	41.6 (±3.1)	46.0 (±3.5)	12.0 (±2.0)	8.5 (±1.8)	62.6 (±5.0)	57.9 (±5.9)	29.7 (±4.6)	22.8 (±4.7)
<18	55.6 (±3.1)	60.0 (±3.5)	22.9 (±2.7)	18.3 (±2.7)	80.6 (±4.2)	80.8 (±4.6)	56.7 (±5.1)	49.2 (±5.9)
<19	61.5 (±3.0)	65.8 (±3.4)	28.0 (±2.9)	23.5 (±3.0)	89.5 (±3.0)	88.3 (±3.7)	69.4 (±4.7)	63.1 (±5.8)
<20	63.5 (±3.0)	68.8 (±3.3)	29.6 (±2.9)	26.5 (±3.2)	91.8 (±2.7)	90.8 (±3.4)	73.3 (±4.5)	71.2 (±5.4)
<25	69.3 (±2.8)	74.4 (±3.1)	36.9 (±3.1)	34.8 (±3.4)	97.7 (±1.2)	97.8 (±2.4)	91.6 (±2.6)	93.5 (±3.1)
<30	70.8 (±2.8)	76.0 (±3.0)	39.1 (±3.1)	36.8 (±3.5)	99.7 (±0.3)	100.0 (±0.0)	97.0 (±1.6)	98.9 (±1.1)
39	71.6 (±2.7)	76.2 (±3.0)	40.3 (±3.1)	37.2 (±3.5)	100.0 (±0.0)	100.0 (±0.0)	100.0 (±0.0)	100.0 (±0.0)

*Respondents were asked, "How old were you the first time you smoked a cigarette, even one or two puffs?"

[†]Respondents were asked, "How old were you when you first started smoking cigarettes every day?"

[‡]Estimate should be interpreted with caution because of the small number of respondents.

Source: Substance Abuse and Mental Health Services Administration, public use data tape, 1998.

smoked daily before age 18 years. Published data from the 1994–1995 NHSDA showed that white women (7.8 percent) were more likely than black women (4.6 percent) or Hispanic women (3.5 percent) to first try a cigarette before age 12 years and more likely to try a cigarette before age 18 years (67.5, 43.9, and 33.9 percent, respectively) (USDHHS 1998).

Of women who had ever smoked, 10.9 percent first tried a cigarette before age 12 years and 80.4 percent before age 18 years (SAMHSA, public use data tape, 1998). Because the recalled age is about the same among women who had ever smoked and among those who had ever smoked daily, detailed data are presented only for women who had ever smoked daily (Table 2.18). Of these women, 10.3 percent first tried a cigarette before age 12 years and 80.6 percent before age 18 years, whereas 2.7 percent smoked daily before age 12 years and 56.7 percent smoked daily before age 18 years. Published analyses reported that among women who had ever smoked daily, 8.9 percent of whites, 6.9 percent of Hispanics, and 5.9 percent of blacks first tried a cigarette before age 12 years and 85.9 percent of whites, 68.6 percent of Hispanics, and 66.8 percent of blacks first tried a cigarette before age 18 years (USDHHS 1998). Among women who had ever smoked daily, 1.6 percent of whites, 1.6 percent of blacks, and 0.7 percent of Hispanics smoked daily before age 12 years. Among women who had ever smoked daily, 58.3 percent of whites, 41.8 percent

of blacks, and 35.4 percent of Hispanics began smoking daily before age 18 years. No CIs were provided.

Girls experimented with cigarettes at older ages than did boys: fewer women than men first tried a cigarette before age 12 years (8.0 vs. 12.8 percent) (Table 2.18). However, girls and boys were equally likely to have tried a cigarette and to have smoked daily before age 18 years.

Young Women

The percentage of women who smoked by a certain age can be calculated by using surveys that assess the recalled age at initiation among young women or adolescents. Although these data reflect current patterns of initiation and minimize recall bias, smoking initiation may not be complete among these respondents, particularly adolescents. Thus, estimates derived from such surveys tend to be lower than those obtained by other methods. Because initiation largely occurs before age 18 years, surveys of young adults were used to estimate recent patterns of smoking initiation for this report.

Data from the Current Population Survey showed that the percentage of women aged 18 through 24 years who had started smoking by age 15 years was 2.1 percent in 1955 and 8.4 percent in 1966. The proportion of young women who had started to smoke by age 18 years was 15.9 percent in 1955 and 29.9 percent in 1966 (NCHS 1970; Schuman 1977).

Table 2.19. Cumulative percentage (and 95% confidence interval) of recalled age at which respondents aged 18–21 years first tried a cigarette or began to smoke daily, by gender, National Household Survey on Drug Abuse, United States, 1998

Age (years)	All persons				Persons who ever smoked daily			
	First tried a cigarette*		Began smoking daily [†]		First tried a cigarette		Began smoking daily	
	Young women	Young men	Young women	Young men	Young women	Young men	Young women	Young men
<12	6.3 (±1.8)	8.8 (±2.2)	1.0 (±0.6) [‡]	1.1 (±0.7) [‡]	14.1 (±4.9)	14.1 (±4.6)	3.1 (±1.9)	3.2 (±1.9)
<14	17.1 (±2.7)	23.5 (±3.2)	3.3 (±1.4)	4.2 (±1.4)	36.9 (±6.6)	36.7 (±6.4)	10.4 (±4.3)	12.0 (±4.0)
<16	35.2 (±3.5)	42.3 (±3.7)	9.9 (±2.3)	11.7 (±2.4)	67.8 (±6.7)	62.8 (±6.5)	31.5 (±6.4)	33.2 (±6.1)
<18	55.1 (±3.5)	63.5 (±3.5)	23.5 (±3.2)	26.0 (±3.4)	95.5 (±3.1)	95.4 (±2.1)	74.8 (±6.4)	74.3 (±5.9)
Mean age	NA [§]	NA	NA	NA	14.1 (±0.3)	14.2 (±0.3)	16.1 (±0.3)	16.1 (±0.3)

*Respondents were asked, “How old were you the first time you smoked a cigarette, even one or two puffs?”

[†]Respondents were asked, “How old were you when you first started smoking cigarettes every day?”

[‡]Estimate should be interpreted with caution because of the small number of respondents.

[§]NA= Not applicable.

Source: Substance Abuse and Mental Health Services Administration, public use data tape, 1998.

The 1998 NHSDA data were used to determine the cumulative percentages of young women aged 18 through 21 years who first smoked a cigarette by a given age and the age at which they first started smoking daily (Table 2.19). Among these young women, 6.3 percent had tried a cigarette before age 12 years and 55.1 percent before age 18 years; 23.5 percent began smoking daily before age 18 years. Among those who were ever daily smokers, 14.1 percent tried a cigarette before age 12 years and 95.5 percent before age 18 years; 74.8 percent were daily smokers before age 18 years. Fewer young women than young men first tried a cigarette by age 18 years, but the age at first smoking daily did not differ by gender. Similarly, the data from the 1992 YRBS, a household survey, found that among young women aged 18 through 21 years who had ever smoked, 7.9 percent smoked their first whole cigarette at or before age 10 years and 37.1 percent did so at 11 through 14 years of age (Adams et al. 1995).

Initiation Rate

Another method used to assess smoking initiation is the smoking initiation rate: the proportion of persons at risk for initiation of smoking who begin to smoke by a certain age or date. The rate is generally calculated as the number of persons who started to smoke in a particular year, divided by the number of persons who had not started smoking before that year. Lee and colleagues (1993) used data on recalled age at smoking initiation that were collected by NHIS

for selected years between 1970 and 1988 for women aged 20 through 50 years. The analysis was restricted to women participants in this age group to avoid bias due to differential mortality. They calculated initiation rates by age for female participants aged 12 through 24 years in 1950, 1965, or 1980. In 1950, the highest yearly increase in smoking initiation occurred among those 18 years of age, and the second-highest increase occurred among those 20 years of age. By 1980, the greatest increases were among girls aged 16 or 18 years.

Another analysis, by Pierce and Gilpin (1995), used the 1955 Current Population Survey as well as the 1970, 1978, 1980, 1987, and 1988 NHIS. The investigators restricted the analysis to women 20 years of age or older at the time of the survey and made no adjustment for differential mortality. Initiation rates were calculated for females aged 10 through 25 years for the years 1910–1977. During 1910–1925, initiation rates among girls aged 10 through 13 years remained low. For those aged 14 through 21 years, the rates increased slightly and for women aged 22 through 25 years, the rates were stable. During 1926–1939, initiation rates among girls aged 10 through 13 years remained stable, but rates increased among female participants aged 14 through 25 years. During 1940–1967, initiation rates increased among female participants aged 10 through 21 years, but they did not change among women aged 22 through 25 years. For the period 1968–1977, the initiation rates increased slightly among girls aged 10 through 13 years, whereas they

increased significantly among girls aged 14 through 17 years and decreased among women aged 18 through 25 years.

NHIS data for 1970, 1978, 1980, 1987, and 1988 were used to calculate initiation rates, on the basis of recalled age at smoking initiation, for all respondents 20 years of age or older (Burns et al. 1995, 1997). Estimates of rates were adjusted for differential mortality. Rates decreased among white women born during 1940–1954. The rate among the 1955–1959 cohort was higher than that among the 1950–1954 cohort, but the rate among the 1960–1964 cohort was comparable to that among the 1950–1954 cohort. In contrast, among young men, smoking initiation rates estimated from recalled age at initiation were consistently lower for these birth cohorts. NHIS data for women aged 20 through 50 years were also used to construct age-specific rates of smoking initiation among women aged 10 through 24 years during 1944–1985 (Gilpin et al. 1994; Pierce et al. 1994b). Smoking initiation rates among young women began to decline in the 1950s and early 1960s. However, among girls, smoking initiation rates increased from 1944 until the mid-1970s and then declined. The increase from the late 1960s to mid-1970s was particularly pronounced among girls 12 through 17 years of age; this increase was 1.7 times greater among girls who did not go on to college than among those who did go on to college.

The 1992–1993 Current Population Survey was used to estimate initiation rates among adolescents (aged 14 through 17 years) or young adults (aged 18

through 21 years) during 1980–1989. Among adolescents, the initiation rate decreased slightly during 1980–1984, then increased during 1984–1989; the largest annual increase occurred in 1988. Among young adults, initiation rates decreased during 1980–1989. No gender-specific differences in initiation rates were noted for either age group (CDC 1995c). Data from the 1990 YRBS of high school students showed that the smoking initiation rate among girls was greatest for girls at ages 13 and 14 years. Initiation rates were similar among girls and boys, except boys were more likely than girls to start smoking before age 9 years (Escobedo et al. 1993).

Summary

Historically, women started to smoke at a later age than men. Beginning with the 1960 cohort, however, the mean age at smoking initiation has not differed by gender. The median age at smoking initiation decreased dramatically among women born in 1885–1914; the median age at initiation occurred 20 years earlier among women born in 1910–1914 than among women born in 1885–1889. Among cohorts of women born in 1931–1962, the mean age at smoking initiation declined about 1.5 years, but the mean age at first use of a cigarette (14.3 years) among young women born in 1976–1979 was not significantly different than among women born in 1961–1976. Because smoking initiation is not complete by age 21 years, this estimate is somewhat lower than it eventually may be.

Nicotine Dependence Among Women and Girls

Symptoms associated with nicotine withdrawal include nausea, headache, constipation, diarrhea, increased appetite, drowsiness, fatigue, insomnia, inability to concentrate, irritability, hostility, anxiety, and craving for tobacco (Shiffman 1979; Hatsukami et al. 1985). In its *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition (*DSM-IV*), the American Psychiatric Association (APA) recognized nicotine dependence as a mental disorder due to psychoactive substance abuse (APA 1994).

Data suggest that heavy smokers and smokers who are dependent on nicotine are less likely to quit

smoking than those who are not dependent on nicotine (USDHHS 1988b; Killen et al. 1992; Breslau and Peterson 1996) (see “Trends in Quantity of Cigarettes Smoked” earlier in this chapter). Among persons aged 21 through 30 years who had ever smoked, 84 percent of those who ever met the criteria of the *Diagnostic and Statistical Manual of Mental Disorders*, third edition, revised (*DSM-III-R*) for nicotine dependence had smoked in the previous year, compared with 64 percent of those who never met the criteria (Breslau et al. 1993b). In a study of 622 students in grades 6 through 12, however, smoking cessation was not related to

negative symptoms associated with withdrawal, such as feeling sick, dizzy, or shaky; having a stomachache or headache; gaining weight; or experiencing increased appetite (Ershler et al. 1989).

Estimates of the prevalence of several measures of nicotine dependence among girls and women who smoke are discussed here. These measures include time to the first cigarette after awakening, reasons for smoking, withdrawal symptoms, and other indicators of nicotine dependence. (See “Nicotine Pharmacology and Addiction” in Chapter 3 for further discussion of nicotine dependence, and “Smoking Cessation and Nicotine Addiction Treatment Methods” in Chapter 5 for further information on the relationship of heavy smoking with smoking cessation and relapse.)

Time to First Cigarette After Awakening

Smoking within 30 minutes of awakening is a component in the Fagerström nicotine addiction scale (Fagerström 1978), and time to the first cigarette of the day has been associated with successful smoking cessation (Kabat and Wynder 1987; Hymowitz et al. 1997). For this report, time to the first cigarette was evaluated by using the 1993 TAPS II data for girls aged 10 through 17 years and young women aged 18 through 22 years. The 1987 NHIS data were used for young women 18 through 24 years and women aged 25 years or older.

Women

In the 1987 NHIS data, 36.8 percent of women smokers aged 18 years or older smoked their first cigarette within 10 minutes of awakening, and 60.5 percent did so within 30 minutes of awakening (Table 2.20). These percentages were comparable across all age groups of women, even after stratification by the number of cigarettes smoked per day. In a survey of members of the American Association of Retired Persons (AARP), 66 percent of smokers aged 50 through 102 years smoked within 30 minutes of awakening (Rimer et al. 1990).

In the 1987 NHIS data, white women (38.0 percent) and black women (34.9 percent) who smoked were equally likely to smoke the first cigarette within 10 minutes of awakening, but white women (63.2 percent) were more likely than black women (52.1 percent) to smoke within 30 minutes of awakening (Table 2.20). White women also smoke more cigarettes per day than do black women (see “Trends in Quantity of Cigarettes Smoked” earlier in this chapter). However, when the data were stratified by smoking intensity (quantity of cigarettes smoked), black women who smoked fewer than 25 cigarettes per day were

significantly more likely than their white counterparts to smoke within 10 minutes of awakening. Of those who smoked fewer than 15 cigarettes per day, black women were significantly more likely than white women to smoke within 30 minutes of awakening. In baseline data from COMMIT, a community-based smoking intervention trial conducted in 1988–1993 in 22 communities in the United States and Canada, black women who smoked were more likely than white women who smoked to smoke the first cigarette within 10 minutes of awakening (Royce et al. 1993). Black women may be more sensitive than white women to the dependence-producing properties of nicotine; serum cotinine levels have been found to be higher among black women than among white women, even though black women smoked fewer cigarettes per day (Caraballo et al. 1998). Wagenknecht and associates (1990a) hypothesized that black women may smoke cigarettes with a higher nicotine content or inhale more deeply than do white women.

Gender-specific differences regarding time to the first cigarette appear to exist. Among persons who smoked 25 or more cigarettes per day, women were more likely than men to smoke within 10 minutes of awakening (69.0 vs. 58.6 percent), but this difference was largely a result of significant gender-specific differences for women aged 18 through 24 years (NCHS, public use data tape, 1987). As age increased, the difference by gender became nonsignificant. COMMIT, which did not report data by age groups, found that women who were light smokers (15 cigarettes per day) or moderate smokers (24 cigarettes per day) were more likely than their male counterparts to report smoking within 10 minutes of awakening (Royce et al. 1997).

Girls and Young Women

In 1992, 33 percent of adolescent current smokers aged 12 through 17 years reported smoking within 30 minutes of arising; 64 percent of heavy smokers reported smoking within 30 minutes of arising (George H. Gallup International Institute 1992). (For this analysis, heavy smoking was defined as smoking 5 cigarettes daily on 10 days in the preceding month.) In the 1993 TAPS II data, 42.0 (± 8.4) percent of girls aged 10 through 17 years who were current regular smokers smoked a cigarette within 30 minutes of awakening (data not shown). (For this analysis, current regular smokers were defined as smokers who had smoked 2 cigarettes daily on 3 days in the past week.) The percentage who smoked within 30 minutes of awakening increased as the number of

Table 2.20. Percentage (and 95% confidence interval) of current women smokers aged 18 years or older who reported that they smoked their first cigarette within 10 or 30 minutes of awakening, by selected characteristics, National Health Interview Survey, United States, 1987

Characteristic	Smoke within 10 minutes of awakening	Smoke within 30 minutes of awakening
Women	36.8 (±2.1)	60.5 (±2.1)
<15 cigarettes/day*	15.6 (±2.7)	32.5 (±3.2)
15–24 cigarettes/day	38.7 (±3.1)	68.3 (±3.1)
25 cigarettes/day	69.0 (±4.2)	91.6 (±2.5)
Race/ethnicity		
White, non-Hispanic	38.0 (±2.4)	63.2 (±2.3)
<15 cigarettes/day*	12.8 (±3.1)	30.5 (±4.0)
15–24 cigarettes/day	37.6 (±3.3)	68.5 (±3.4)
25 cigarettes/day	69.1 (±4.3)	91.4 (±2.6)
Black, non-Hispanic	34.9 (±5.3)	52.1 (±5.5)
<15 cigarettes/day*	24.9 (±5.8)	41.3 (±6.2)
15–24 cigarettes/day	52.8 (±10.2)	71.9 (±9.9)
25 cigarettes/day	78.2 (±16.4) [†]	97.7 (±3.3) [†]
Men	37.8 (±2.1)	64.4 (±2.1)
<15 cigarettes/day*	11.9 (±2.8)	26.3 (±3.8)
15–24 cigarettes/day	36.8 (±3.5)	69.5 (±3.5)
25 cigarettes/day	58.6 (±3.7)	88.0 (±2.3)

Note: Current smokers were persons who reported smoking 100 cigarettes in their lifetime and who smoked at the time of the survey.

*Includes persons who did not smoke daily.

[†]Estimate should be interpreted with caution because of the small number of respondents.

Source: National Center for Health Statistics, public use data tape, 1987.

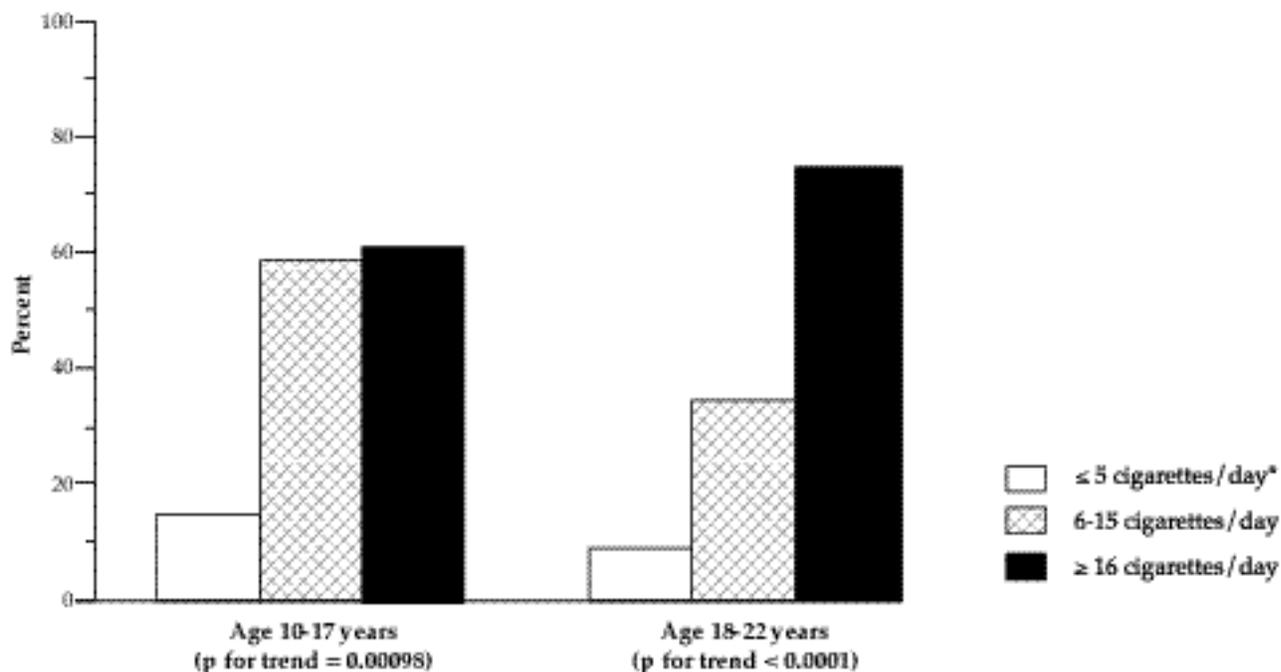
cigarettes smoked per day increased (Figure 2.13). Although some sample sizes were small, the test for trend was highly significant ($p < 0.001$). Girls and boys who smoked regularly were equally likely to smoke within 30 minutes of awakening. However, because some adolescents may have to wait until they leave home before they can smoke the first cigarette of the day, smoking within 30 minutes of awakening may be a less valid measure for adolescents than for adults.

TAPS II reported that, among young women aged 18 through 22 years who smoked regularly, 21.6 (±4.6) percent smoked within 10 minutes of awakening and 40.6 (±5.2) percent smoked within 30 minutes of awakening (data not shown). The proportion who smoked within 30 minutes of awakening increased directly with the number of cigarettes smoked per day (Figure 2.13), and the test for trend was highly significant ($p < 0.0001$). Young women (21.6 ± 4.6 percent) and young men (21.8 ± 3.7 percent) who smoked

regularly were equally likely to smoke within 10 minutes of awakening, but young women (40.6 ± 5.2 percent) were less likely than young men (50.4 ± 4.6 percent) to smoke within 30 minutes of awakening (data not shown). These findings had borderline statistical significance.

In the 1987 NHIS data, among young women aged 18 through 24 years who smoked, 30.7 (±4.9) percent smoked within 10 minutes of awakening and 49.0 (±6.0) percent did so within 30 minutes of awakening (NCHS, public use data tape, 1987). The percentage who smoked within 10 or 30 minutes of awakening increased directly with the number of cigarettes smoked per day, and the test for trend was highly significant ($p < 0.0001$). Even among young women who smoked fewer than 15 cigarettes per day, more than one-fourth smoked within 30 minutes of awakening. On the basis of time to the first cigarette after awakening, young women who smoke appear to

Figure 2.13. Percentage of young female current smokers aged 10–22 years who smoked their first cigarette within 30 minutes of awakening, by age and quantity of cigarettes smoked, Teenage Attitudes and Practices Survey II, United States, 1993



Note: Question was only asked of persons who smoked 2 cigarettes on 3 days in the week before the survey.

*Includes persons who did not smoke daily.

Source: Centers for Disease Control and Prevention, Office on Smoking and Health, public use data tape, 1993.

be as dependent as older women on nicotine. In a study of smoking cessation among 45 women, O'Hara and Portser (1994) found that women aged 20 through 49 years and women aged 50 through 75 years were equally likely to be classified as highly dependent smokers.

Reasons for Cigarette Use by Girls and Young Women

In the 1993 TAPS II data, among current smokers who had smoked in the previous 30 days, 67.9 percent of girls aged 10 through 17 years and 75.5 percent of young women aged 18 through 22 years said they smoked because smoking relaxed or calmed them (Table 2.21). Even among girls who smoked five or fewer cigarettes per day, 60.7 percent reported that smoking relaxed or calmed them. The percentage of female smokers (girls and young women) who gave this response increased as the number of cigarettes

smoked per day increased, and the test for trend was highly significant ($p < 0.003$). Charlton (1984) also found that 55 percent of girls aged 11 through 13 years and 76 percent of girls aged 14 through 16 years who smoked one or more cigarettes per week did so to calm nerves. McNeill and colleagues (1987) reported that the most common subjective effect reported by children who smoked was feeling calmer (64 percent among daily smokers and 38 percent among nondaily smokers). The researchers noted that reports of feeling calmer, which may be a surrogate for nicotine dependence, were directly associated with reports of having withdrawal symptoms among persons attempting to quit smoking: 82 percent of respondents who reported feeling calmer by smoking, and 40 percent of respondents who did not report feeling calmer by smoking, had at least one withdrawal symptom. This relationship was found even for children and adolescents who had been smoking for less than one year.

Table 2.21. Prevalence (% and 95% confidence interval) of selected reasons of current smokers for using cigarettes, among girls aged 10–17 years and young women aged 18–22 years, by selected characteristics, Teenage Attitudes and Practices Survey II, United States, 1993

Characteristic	"It relaxes or calms me"	"It's really hard to quit"
Female smokers		
Aged 10–17 years	67.9 (±6.0)	56.0 (±6.3)
5 cigarettes/day*	60.7 (±8.1)	38.3 (±8.7)
6–15 cigarettes/day	72.9 (±10.4)	78.1 (±9.3)
16 cigarettes/day	88.0 (±11.4) [†]	80.3 (±15.4) [†]
Aged 18–22 years	75.5 (±3.6)	61.6 (±4.2)
5 cigarettes/day*	67.8 (±6.6)	33.9 (±7.6)
6–15 cigarettes/day	79.1 (±5.2)	70.4 (±6.0)
16 cigarettes/day	80.8 (±7.4)	87.4 (±5.5)
Male smokers		
Aged 10–17 years	58.7 (±6.6)	57.7 (±7.2)
Aged 18–22 years	63.3 (±4.0)	63.1 (±4.2)

Note: Current smokers were persons in each demographic category who reported that they smoked cigarettes during the past 30 days.

*Includes persons who did not smoke daily.

[†]Estimate should be interpreted with caution because of the small number of respondents.

Source: Centers for Disease Control and Prevention, Office on Smoking and Health, public use data tape, 1993.

Girls and young women who had smoked in the previous 30 days were equally likely to report that they did so because it was "really hard" to quit smoking (Table 2.21). Even among girls who smoked five or fewer cigarettes per day, 38.3 percent reported that it was really hard to quit smoking. The percentage who gave this response increased as the number of cigarettes smoked per day increased, and the test for trend was highly significant ($p < 0.0001$). Among young women, 33.9 percent of those who smoked 5 or fewer cigarettes per day and 87.4 percent of those who smoked 16 or more cigarettes per day said it was really hard to quit smoking. When results were stratified by the number of cigarettes smoked per day, there were no significant differences between data for girls and young women.

Although no significant gender-specific differences were found among children, among young adults who smoked 16 or more cigarettes per day, women (80.8 ± 7.4 percent) were more likely than men (64.8 ± 6.8 percent) to report that they smoked because smoking relaxed or calmed them or that it was really hard to quit (87.4 ± 5.5 vs. 75.4 ± 5.7 percent) (CDC, Office on Smoking and Health, public use data tape, 1993).

Indicators of Nicotine Dependence

Women

The 1992–1994-A NHSDA (combined data) was used to assess self-reported indicators of nicotine dependence among women: "felt [they needed] or were dependent on cigarettes," "needed larger amounts [more cigarettes] to get the same effect," "felt unable to cut down on [their] use, even though [they] tried," and "had withdrawal symptoms, that is, felt sick because [they] stopped or cut down on cigarette use" (Table 2.22). Of the women who were current smokers, 77.5 percent reported one or more indicators of nicotine dependence, and 71.0 percent reported feeling dependent on cigarettes. Among women who had tried to cut back on their smoking, 79.2 percent reported being unable to do so, and 33.4 percent reported feeling sick when they tried to do so. On the basis of self-reports of three or more measures from *DSM-III-R*, Anthony and associates (1994) estimated that one of three tobacco smokers aged 15 through 54 years is nicotine dependent. However, in a small, local survey of 46 persons in Burlington, Vermont, about 75 percent of women who were current smokers met *DSM-III-R* criteria for nicotine dependence and 71 percent of women had withdrawal symptoms when

Table 2.22. Percentage (and 95% confidence interval) of current women smokers aged 18 years or older who reported selected indicators of nicotine dependence, by race or ethnicity and quantity of cigarettes smoked, National Household Survey on Drug Abuse, United States, 1992–1994, aggregate data

Characteristic	Indicators of nicotine dependence				
	Felt dependent on cigarettes	Needed more cigarettes for same effect	Unable to cut down*	Felt sick when cut down on smoking*	Any dependence indicator†
Women overall	71.0 (±3.1)	14.8 (±2.4)	79.2 (±3.1)	33.4 (±3.8)	77.5 (±2.8)
15 cigarettes/day‡	61.7 (±4.9)	10.5 (±2.2)	70.2 (±4.9)	27.8 (±4.8)	68.9 (±4.7)
16–25 cigarettes/day	80.2 (±3.6)	13.8 (±3.3)	85.5 (±4.0)	35.3 (±5.2)	85.4 (±3.1)
26 cigarettes/day	78.6 (±9.2)	29.0 (±9.0)	90.8 (±7.7)	44.8 (±11.1)	86.1 (±5.7)
Race/ethnicity					
White					
15 cigarettes/day‡	74.2 (±3.6)	14.6 (±2.8)	79.6 (±3.6)	33.8 (±4.4)	79.8 (±3.3)
16–25 cigarettes/day	65.0 (±6.5)	9.6 (±2.7)	68.3 (±6.4)	27.4 (±5.9)	71.0 (±6.2)
26 cigarettes/day	82.4 (±3.6)	12.9 (±3.3)	86.3 (±4.3)	35.8 (±5.6)	86.6 (±3.3)
Black					
15 cigarettes/day‡	78.9 (±9.9)	29.4 (±9.5)	91.2 (±7.9)	44.0 (±11.6)	86.6 (±6.0)
16–25 cigarettes/day	56.1 (±5.4)	15.3 (±5.1)	76.7 (±6.6)	29.8 (±6.5)	67.7 (±5.2)
26 cigarettes/day	55.7 (±6.0)	13.4 (±4.2)	75.4 (±7.8)	28.2 (±8.4)	65.8 (±6.5)
Hispanic					
15 cigarettes/day‡	53.0 (±14.0)	20.1 (±17.6)	80.5 (±16.1)	28.6 (±10.3)	71.5 (±9.9)
16–25 cigarettes/day	70.8 (±13.8)	19.4 (±15.1) [§]	79.0 (±24.5)	54.6 (±24.1) [§]	75.4 (±12.9)
26 cigarettes/day	56.8 (±5.7)	15.6 (±4.6)	78.8 (±6.9)	33.9 (±6.8)	65.8 (±5.5)
Men overall					
15 cigarettes/day‡	46.5 (±6.2)	12.8 (±4.8)	78.6 (±6.9)	30.8 (±8.7)	57.7 (±6.2)
16–25 cigarettes/day	82.8 (±7.7)	21.0 (±12.7)	75.8 (±18.1)	33.9 (±15.3)	85.5 (±7.2)
26 cigarettes/day	86.6 (±12.3)	31.5 (±29.5) [§]	93.0 (±9.1)	66.6 (±24.7) [§]	91.8 (±6.6)

Note: Current smokers were persons who reported smoking 100 cigarettes (about 5 packs) during their lifetime and who smoked at the time of the survey. Indicators of nicotine dependence were (1) “felt [they needed] or were dependent on cigarettes,” (2) “needed larger amounts [more cigarettes] to get the same effect,” (3) “felt unable to cut down on [their] use, even though [they] tried,” and (4) “had withdrawal symptoms, that is, felt sick because [they] stopped or cut down on cigarette use.”

*Analysis of “unable to cut down” and “felt sick” was restricted to persons who reported trying to reduce their use of cigarettes during the preceding 12 months. In addition, for indicator “unable to cut down,” because of the question design, respondents who reported not trying to reduce any drug use during the preceding 12 months were excluded from this analysis.

†Current smokers who reported 1 of the 4 indicators of nicotine dependence.

‡Includes smokers who did not smoke daily.

§Estimate should be interpreted with caution because of the small number of respondents.

Sources: Alcohol, Drug Abuse, and Mental Health Administration, public use data tape, 1992; Substance Abuse and Mental Health Services Administration, public use data tapes, 1993, 1994-A.

they tried to reduce or stop smoking (Hale et al. 1993). Beginning with the 1994-B NHSDA, only two measures of nicotine dependence were used: smoking cigarettes more than intended in the past 12 months, and tolerance to cigarettes built up in the past 12 months. In the 1997–1998 NHSDA (combined data), one-half of the women who smoked reported at least one of these measures of nicotine dependence (data not shown) (SAMHSA, public use data tapes, 1997–1998).

In the 1992–1994-A NHSDA data, the percentage of women who reported indicators of nicotine dependence increased as the number of cigarettes smoked per day increased, particularly as daily smoking increased from 15 or fewer cigarettes per day to 16 to 25 cigarettes per day (Table 2.22). Similar patterns were noted for the indicators of nicotine dependence in the 1997–1998 NHSDA (combined data), although for these indicators the most dramatic increase occurred as daily smoking increased from 16 to 25 cigarettes per day to 26 or more cigarettes per day (data not shown). Other studies confirm that smokers who are dependent on nicotine consume more cigarettes per day than do nondependent smokers (Killen et al. 1988; Breslau et al. 1993b).

The 1992–1994-A NHSDA data indicated that black women (67.7 percent) and Hispanic women (65.8 percent) who smoked were less likely than white women who smoked (79.8 percent) to report one or more indicators of nicotine dependence (Kandel et al. 1997a) (Table 2.22). White women were more likely to report feeling dependent on cigarettes than were black women or Hispanic women. These findings may reflect differences in numbers of cigarettes smoked per day across racial and ethnic groups. Despite the higher likelihood that white women will report nicotine dependence, black women have been reported to have higher blood levels of cotinine (a nicotine metabolite) than do white women for comparable quantities of cigarettes smoked (Ahijevych et al. 1996; Caraballo et al. 1998).

The 1992–1994-A and 1997–1998 NHSDA data showed that women and men were equally likely to report one or more indicators of nicotine dependence, and no significant gender-specific differences were noted for individual indicators. In other studies, researchers have reported that women are more likely than men to describe themselves as “hooked on” or addicted to cigarettes (Eiser and Van Der Pligt 1986). This difference may reflect cultural rather than physiologic factors: in NHSDA data, no gender-specific differences were found for reporting withdrawal symptoms or feeling unable to cut down on smoking among adults who had tried to reduce smoking.

Investigators in still other studies reported no gender-specific differences in prevalence of withdrawal symptoms determined either objectively or subjectively (Gunn 1986; Svikis et al. 1986; Pirie et al. 1991). Thus, several researchers have concluded that the prevalence of nicotine dependence is about the same among women and men (Svikis et al. 1986; Breslau et al. 1993a; Breslau 1995). However, some study findings suggested that women report more symptoms of nicotine dependence, more severe withdrawal symptoms, or longer duration of withdrawal symptoms than do men (Guilford 1967; Shiffman 1979; Pomerleau and Pomerleau 1994; Kandel et al. 1997a; Kandel and Chen 2000). Any gender-specific differences in withdrawal symptoms could be due to differences in attention to or reporting of symptoms, rather than to a biological difference (Waldron 1983).

Study results also differ on whether nicotine affects women and men differently (Pomerleau 1996). Some investigators reported few gender-specific differences in the subjective, behavioral, or physiologic effects of nicotine (Perkins 1995). Depending on the nicotine effect examined (e.g., dose-related withdrawal response or weight gain), others reported that women exhibit either less or greater sensitivity to nicotine than do men. Silverstein and coworkers (1980) suggested that, because women are more likely to report feeling sick after smoking their very first cigarette, they may be more sensitive than men to nicotine. Some researchers have attributed this increased sensitivity to women's smaller size, higher percentage of body fat, and slower clearance of nicotine from the body (Gorrod and Jenner 1975; Benowitz and Jacob 1984; Grunberg et al. 1991). Others have concluded that any gender-specific differences in the physiologic response to nicotine have a minor influence on differences in smoking behavior of women and men (Waldron 1991), or they have attributed a difference in the effect of nicotine to gender-specific differences in smoking patterns (Schievelbein et al. 1978).

Girls and Young Women

The 1993 TAPS II was used to assess symptoms of nicotine withdrawal among girls aged 10 through 17 years and among young women aged 18 through 22 years who had smoked in the previous seven days and had attempted to quit smoking in the past. The items used to assess symptoms of withdrawal were having a strong need or urge to smoke; feeling more irritable; finding it hard to concentrate; feeling restless; feeling hungry more often; and feeling sad, blue, or depressed.

Of respondents who smoked in the previous seven days, 86.8 (± 5.7) percent of girls and 90.0 (± 3.1) percent of young women reported one or more symptoms of nicotine withdrawal during previous attempts to quit smoking. More than one-half of each group reported feeling a strong need or urge to smoke, feeling more irritable, feeling restless, and feeling hungry more often (NCHS, public use data tape, 1993).

In TAPS II data, the percentage of girls or young women who reported withdrawal symptoms during previous attempts to quit smoking increased with the number of cigarettes smoked per day (Figure 2.14). This finding is consistent with Stanton's (1995) study of 18-year-olds in which the number of cigarettes smoked per day was associated with dependence on tobacco. In TAPS II data, no significant differences were found between girls and young women in the reporting of symptoms of nicotine withdrawal. These findings have also been noted in other studies (CDC 1995a).

Ershler and coworkers (1989) found that 53.7 percent of adolescent smokers reported feeling worse when they stopped smoking. Adverse symptoms were reported by a greater proportion of heavy smokers (>10 cigarettes per day) (66.0 percent) than daily smokers (≤ 10 cigarettes per day) (55.1 percent) and by a much lower proportion of occasional smokers (sporadic, "bingey," or less than daily smoking) (15.4 percent). In a study of 24 high schools in California and Illinois in 1988–1992 by Sussman and colleagues (1998), 68 percent of high school girls reported that it bothered them to go a whole day without smoking, and 61 percent reported that they did not feel right if they went too long without a cigarette. McNeill and colleagues (1986) found that among British girls aged 11 through 17 years, 74 percent of daily smokers and 47 percent of occasional smokers who had ever tried to stop smoking permanently reported withdrawal symptoms: 13 percent of all girls who smoked reported being unable to concentrate, 33 percent being hungry, 22 percent having increased irritability, 38 percent having a strong need to smoke, and 16 percent being restless. It may be that the prevalences reported by McNeill and colleagues were lower than the prevalences from TAPS II because the mean number of cigarettes smoked per day by respondents in the study by McNeill and colleagues was lower (6.8 cigarettes per day) than that in TAPS II (7.8 cigarettes per day). Girls were as likely as young women to report withdrawal symptoms, even after adjustment for the number of cigarettes smoked per day. In a New Zealand study of 18-year-olds who had smoked every day for

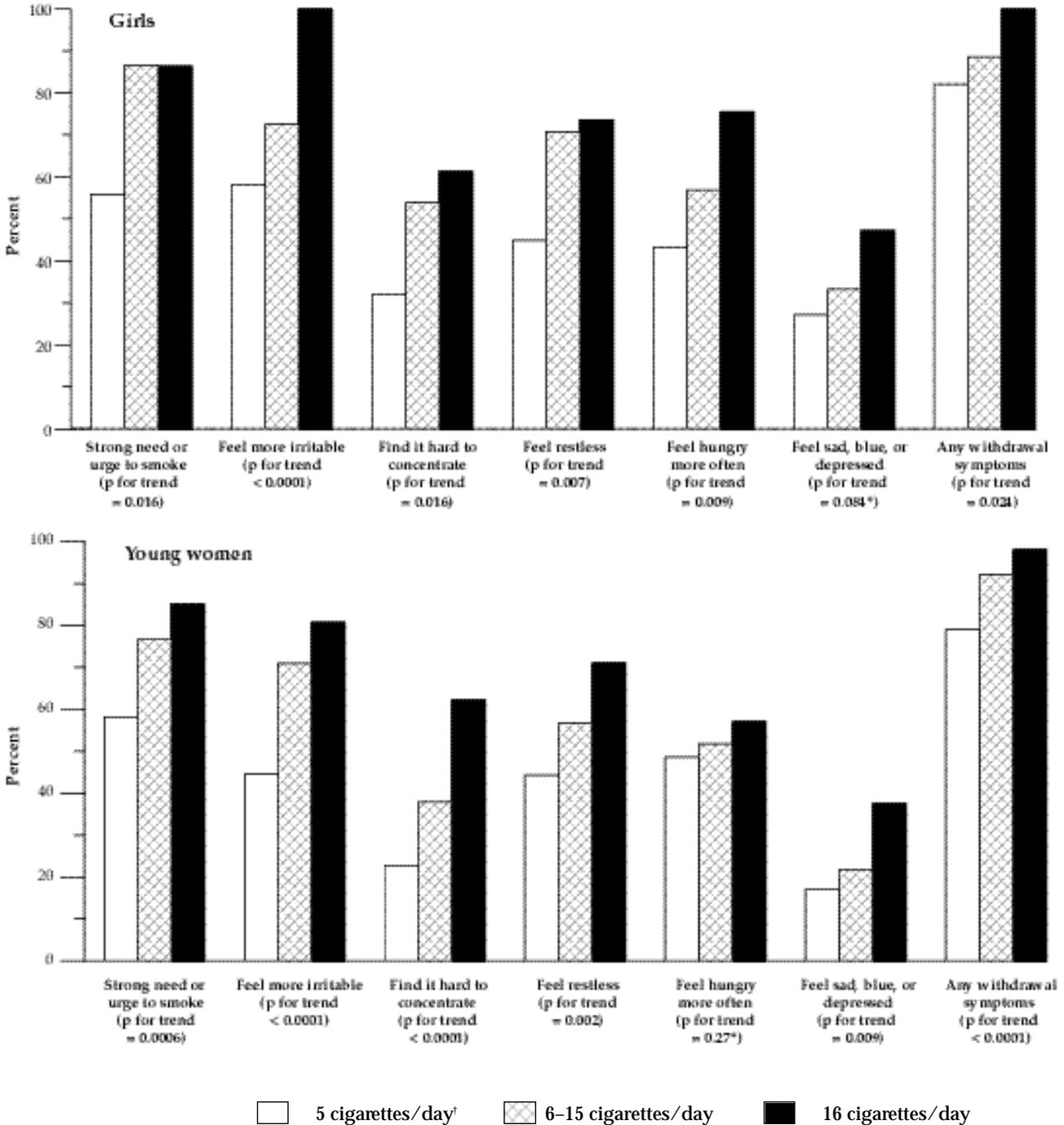
at least one month in the past year, Stanton (1995) found that 61 percent reported craving cigarettes, 43 percent being irritable, 46 percent being restless, 25 percent having difficulty concentrating, 45 percent having increased appetite or weight gain, and 20 percent feeling depressed when they had tried to quit smoking.

In the 1992–1994-ANHSDA (combined data), the prevalence of self-reported indicators of nicotine dependence was assessed for girls aged 12 through 17 years and young women aged 18 through 24 years who had smoked within the past 30 days (Table 2.23). These indicators included "felt [they needed] or were dependent on cigarettes," "needed larger amounts [more cigarettes] to get the same effect," "felt unable to cut down on [their] use, even though [they] tried," and "had withdrawal symptoms, that is, felt sick because [they] stopped or cut down on cigarette use." Among girls who smoked, 63.1 percent reported one or more indicators and 51.6 percent reported feeling dependent on cigarettes. Among those who had tried to cut down on their smoking, 70.0 percent felt unable to do so and 28.2 percent had withdrawal symptoms when they did so. The percentage of girls who smoked who reported one or more indicators of nicotine dependence increased as the number of cigarettes smoked per day increased: 58.3 (± 11.5) percent of girls who smoked 5 or fewer cigarettes per day and 96.9 (± 3.5) percent of those who smoked 16 or more cigarettes per day reported one or more indicators of nicotine dependence (Figure 2.15) (Alcohol, Drug Abuse, and Mental Health Administration, public use data tape, 1992; SAMHSA, public use data tapes, 1993, 1994-A).

In the 1997–1998 NHSDA (combined data), nearly one-half of the girls aged 12 through 17 years reported either having used cigarettes more than intended in the past 12 months or having built up tolerance to cigarettes in the past 12 months. The prevalence of these indicators increased as the intensity of smoking increased (data not shown) (SAMHSA, public use data tapes, 1997–1998).

In the 1992–1994-A NHSDA data, 81.2 percent of the young women aged 18 through 24 years who smoked reported one or more of these indicators (Table 2.23); 74.6 percent reported feeling dependent on cigarettes. Among those who had tried to cut down on their smoking, 79.0 percent reported being unable to do so and 32.3 percent reported withdrawal symptoms. The prevalence of indicators of nicotine dependence generally increased as the intensity of smoking increased (Figure 2.15). Similarly, in the 1997–1998 NHSDA data, more than one-half of young

Figure 2.14. Percentage of girls aged 10–17 years and young women aged 18–22 years who smoked during the past week who reported selected symptoms of nicotine withdrawal during previous attempts to stop smoking, by quantity of cigarettes smoked, Teenage Attitudes and Practices Survey II, United States, 1993



Note: Current smokers are defined as persons who reported smoking during the 7 days before the survey.

*Not significant.

†Includes persons who did not smoke daily.

Source: Centers for Disease Control and Prevention, Office on Smoking and Health, public use data tape, 1993.

Table 2.23. Percentage (and 95% confidence interval) of adolescents aged 12–17 years and young adults aged 18–24 years who were current smokers who reported selected indicators of nicotine dependence, by gender and age, National Household Survey on Drug Abuse, United States, 1992–1994, aggregate data

Characteristic	Indicators of nicotine dependence				
	Felt dependent on cigarettes	Needed more cigarettes for same effect	Unable to cut down*	Felt sick when cut down on smoking*	Any dependence indicator†
Female smokers					
Aged 12–17 years	51.6 (±7.2)	22.4 (±5.9)	70.0 (±8.4)	28.2 (±8.5)	63.1 (±6.1)
Aged 18–24 years	74.6 (±4.0)	18.2 (±3.3)	79.0 (±4.5)	32.3 (±4.5)	81.2 (±3.6)
Male smokers					
Aged 12–17 years	50.6 (±7.1)	22.7 (±6.3)	68.6 (±10.1)	31.9 (±9.7)	61.7 (±7.3)
Aged 18–24 years	60.5 (±3.6)	18.5 (±3.1)	68.0 (±4.9)	29.1 (±4.9)	70.6 (±3.5)

Note: For adolescents aged 12–17 years, current smokers were persons who reported smoking cigarettes during the preceding 30 days. For young adults aged 18–24 years, current smokers were persons who reported that they had smoked 100 cigarettes (about 5 packs) in their lifetime and smoked during the preceding 30 days. Current smokers may include nondaily smokers. Indicators of nicotine dependence were (1) “felt [they needed] or were dependent on cigarettes,” (2) “needed larger amounts [more cigarettes] to get the same effect,” (3) “felt unable to cut down on [their] use, even though [they] tried,” and (4) “had withdrawal symptoms, that is, felt sick because [they] stopped or cut down on cigarette use.” *The analysis of “unable to cut down” and “felt sick” was restricted to persons who reported trying to reduce their use of cigarettes during the preceding 12 months. In addition, for indicator “unable to cut down,” because of the question design, respondents who reported not trying to reduce any drug use during the preceding 12 months were excluded from this analysis.

†Current smokers who reported 1 of the 4 indicators of nicotine dependence.

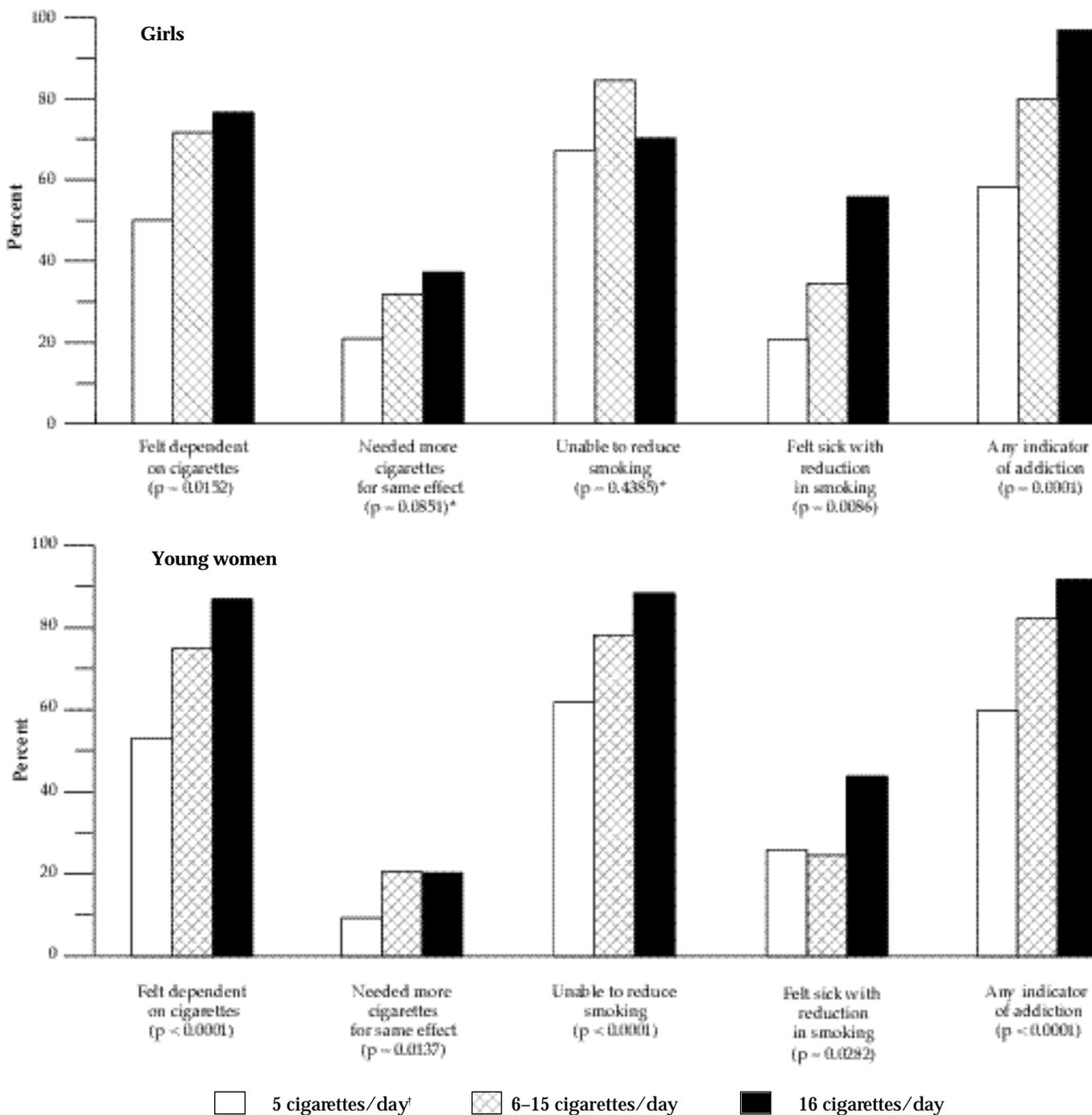
Sources: Alcohol, Drug Abuse, and Mental Health Administration, public use data tape, 1992; Substance Abuse and Mental Health Services Administration, public use data tapes, 1993, 1994-A.

women aged 18 through 24 years reported having one or both of the measures of nicotine dependence, and the prevalence of these measures increased as the intensity of smoking increased (data not shown) (SAMHSA, public use data tapes, 1997–1998).

In the 1992–1994-A NHSDA data, young women who smoked were more likely than girls to report one or more indicators of nicotine dependence (Table 2.23), but no age-specific difference was found when results were stratified by intensity of smoking (data not shown). This finding is consistent with studies showing that girls inhale cigarette smoke, even at very early stages of smoking (McNeill et al. 1989). In the 1997–1998 NHSDA, young women were more likely than girls to report one or more of these indicators of nicotine dependence, but differences for each measure alone were not statistically significant and no differences by age were noted after stratification by number of cigarettes smoked per day (data not shown) (SAMHSA, public use data tapes, 1997–1998).

For both TAPS and NHSDA data on nicotine dependence, the prevalence of reported indicators was similar among girls and boys (CDC, Office on Smoking and Health, public use data tape, 1993; Kandel et al. 1997a). In a study of 24 high schools, Sussman and colleagues (1998) found that girls were more likely than boys to report three measures of nicotine dependence. In the 1992–1994-A NHSDA data, among young adults who smoke, women were more likely than men to report one or more indicators of nicotine dependence. They were also more likely than young men to report feeling dependent on cigarettes and being unable to cut down on their smoking (Table 2.23). Although the differences were not always statistically significant, these patterns were also found when results were stratified by intensity of smoking (data not shown). For the 1997–1998 NHSDA data, however, no gender-specific differences were noted in the reporting of indicators of nicotine dependence (data not shown) (SAMHSA, public use data tapes, 1997–1998).

Figure 2.15. Percentage of girls aged 12–17 years and young women aged 18–24 years who were current smokers who reported selected indicators of nicotine dependence, by age and quantity of cigarettes smoked, National Household Survey on Drug Abuse, United States, 1992–1994, aggregate data



Note: For girls aged 12–17 years, current smokers were persons who reported smoking cigarettes during the preceding 30 days. For young women aged 18–24 years, current smokers were persons who reported that they had smoked 100 cigarettes (about 5 packs) in their lifetime and smoked during the preceding 30 days.

*NS = Not significant.

†Includes persons who did not smoke daily.

Sources: Alcohol, Drug Abuse, and Mental Health Administration, public use data tape, 1992; Substance Abuse and Mental Health Services Administration, public use data tapes, 1993, 1994-A.

Nicotine Withdrawal Symptoms and Smoking Cessation

In the 1993 TAPS II data, girls aged 10 through 17 years who had tried to quit smoking and failed (i.e., had smoked in the past 30 days) were significantly more likely than those who had successfully quit smoking to report having had one or more symptoms of nicotine withdrawal during previous attempts to quit smoking (82.0 ± 6.1 vs. 48.6 ± 8.9 percent) (NCHS, public use data tape, 1993). This pattern was also found for each withdrawal symptom. These symptoms were feeling sad, blue, or depressed; a strong need or urge to smoke; irritability; difficulty concentrating; restlessness; and hunger. Similar results were found for young women aged 18 through 22 years: current smokers (86.8 ± 3.5 percent) were significantly more likely than former smokers (50.2 ± 7.3 percent) to report any of the symptoms of nicotine withdrawal during previous attempts to quit smoking. Other researchers have reported that smokers who tried unsuccessfully to quit smoking were more likely to be nicotine dependent than were those who successfully quit smoking (Pirie et al. 1991; Breslau et al. 1993b). TAPS II data showed no gender-specific differences among current smokers or former smokers in the reporting of nicotine

withdrawal symptoms during previous attempts at smoking cessation (NCHS, public use data tape, 1993).

Summary

The quantity of cigarettes smoked per day is strongly associated with the level of nicotine dependence. When results are stratified by number of cigarettes smoked per day, girls and women who smoke appear to be equally dependent on nicotine, as measured by time to the first cigarette after awakening, smoking for a calming or relaxing effect, or reporting of withdrawal symptoms or other indicators of nicotine dependence. After stratification of the number of cigarettes smoked per day, black women appear to be more likely than white women to smoke within 30 minutes of awakening. Few gender-specific differences were found in indicators of nicotine dependence among adolescents, young adults, or adults overall. The gender-specific differences that were found in indicators of nicotine dependence occurred primarily among young adults: young women were more likely than young men to report that they smoked because it calmed or relaxed them, that they felt dependent on cigarettes, and that they were unable to cut down on their use of cigarettes.

Smoking Cessation

Although decreasing smoking initiation is critical to reducing tobacco use long term, reducing morbidity and mortality in the short term can only occur by increasing smoking cessation among current smokers. Smoking cessation has major and immediate health benefits for women of all ages (USDHHS 1990d).

National survey data are used here to estimate the percentage of women aged 18 years or older, young women aged 18 through 24 years, girls less than 18 years of age, and pregnant women and girls who have quit smoking. Besides these estimates, self-reported interest in quitting smoking, reasons for quitting, and reasons for relapse to smoking are also described. This section discusses the smoking continuum, which describes the current smoking status of women who had ever smoked, ranging from those who had never tried to quit smoking to those who had been abstinent

for 10 or more years. Other topics addressed are the number of attempts to quit smoking, physicians' advice about smoking, and methods used to quit smoking.

Interest in Quitting Smoking and Attempts to Quit

Women

Most smokers want to stop. The 1995 NHIS was used to examine interest in and attempts to quit smoking (see Appendix 2 for definitions) among women who were daily smokers. Of the women queried, 75.2 percent reported wanting to quit smoking completely, and 46.6 percent reported having tried to quit in the previous year (Table 2.24). Other studies also reported that most women want to quit smoking (USDHEW 1977; CDC 1993; Sandoval and Larsen 1995).

Table 2.24. Percentage (and 95% confidence interval) of current women smokers aged 18 years or older who reported an interest in quitting smoking or who recently attempted to stop smoking, by selected characteristics, National Health Interview Survey, United States, 1995

Characteristic	Wants to quit smoking*	Attempt to stop smoking in the past year [†]
Women	75.2 (±2.2)	46.6 (±2.7)
Age (years)		
18–24	76.4 (±7.0)	65.2 (±8.7)
25–44	78.7 (±2.9)	48.1 (±3.8)
45–64	73.9 (±4.1)	40.5 (±4.8)
65	58.0 (±6.9)	35.8 (±7.4)
Race/ethnicity		
White, non-Hispanic	75.6 (±2.5)	46.4 (±3.1)
Black, non-Hispanic	74.8 (±5.8)	50.0 (±7.3)
Hispanic	72.9 (±6.5)	42.9 (±9.3)
Education (number of years) [‡]		
8	72.6 (±7.6)	33.5 (±9.6)
9–11	78.3 (±5.9)	44.4 (±7.2)
12	74.4 (±3.5)	42.0 (±4.0)
13–15	75.1 (±4.9)	47.5 (±6.4)
16	74.2 (±7.0)	55.2 (±8.3)
Men	72.8 (±2.5)	45.1 (±2.8)

*Based on the question, "Would you like to completely quit smoking cigarettes?" Measured for current smokers. Current smokers were persons who reported smoking 100 cigarettes in their lifetime and who smoked every day or some days at the time of the survey.

[†]Based on the question, "During the past 12 months, have you stopped smoking for 1 day or longer?" Measured for current daily smokers. Current daily smokers were persons who reported smoking 100 cigarettes in their lifetime and smoked daily at the time of the survey.

[‡]For women aged 25 years.

Source: National Center for Health Statistics, public use data tape, 1995.

In NHIS data (Table 2.24), smokers 65 years or older were less interested in quitting smoking than were younger smokers, a finding also reported by others (Rimer et al. 1990; CDC 1993; Fortmann and Killen 1994). NHIS data showed that only 35.8 percent of women aged 65 years or older had tried to stop smoking in the previous year, which is significantly less than the 65.2 percent of women aged 18 through 24 years and the 48.1 percent of women aged 25 through 44 years who had tried to stop smoking in the previous year. Other data support these findings (Hatziafreu et al. 1990; Rimer et al. 1990; Derby et al. 1994). According to NHIS data, the percentage of women who wanted to or had tried to quit smoking did not differ by racial or ethnic group (Table 2.24). Desire to quit smoking did not differ significantly by

level of education, but women with 16 or more years of education were more likely to have attempted to quit smoking in the past year than were women with 8 years or fewer or with 12 years of education.

In the early 1980s, men were more likely than women to state that they wanted to quit smoking (Sorensen and Pechacek 1987; Blake et al. 1989). More recent data on gender-specific differences are more equivocal. In the 1993 NHIS (CDC 1994c) and in a study of heavy smokers (Fortmann and Killen 1994), women were more likely than men to want to completely quit smoking. In the 1995 NHIS data for daily smokers, however, no gender-specific differences were found in the proportion of persons who wanted to quit smoking (Table 2.24). This finding is consistent with other data (Royce et al. 1997). In 1998, 42.3 (±2.0)

percent of women reported that they had stopped smoking for more than one day in the previous 12 months because they were trying to quit smoking. No gender-specific differences were noted (NCHS, public use data tape, 1998).

Although earlier data suggested that women are less likely than men to be successful in their attempts to stop smoking (Pierce et al. 1989b), more recent data showed that women are equally or more likely to have attempted to stop smoking in the previous year and equally likely to have maintained abstinence (USDHHS 1980; CDC 1993; Derby et al. 1994; Rose et al. 1996; Whitlock et al. 1997). In the 1995 NHIS data, women and men were equally likely to report that they wanted to quit smoking or had tried to stop in the previous year. Only 17.0 (± 2.2) percent of women and 19.6 (± 2.3) percent of men reported that they had neither wanted to nor tried to quit smoking in the previous year (NCHS, public use data tape, 1995).

Girls

Data for high school senior girls in MTF Surveys were combined over several years, so that sample sizes were adequate for making estimates and evaluating trends (University of Michigan, Institute for Social Research, public use data tapes, 1976–1998). Current smokers were defined as having smoked cigarettes in the past 30 days. Daily smokers were defined as averaging one or more cigarettes per day in the past 30 days. In 1996–1998 (combined data), 42.0 (± 6.3) percent of high school senior girls who were current smokers and 43.5 (± 7.0) percent of those who were daily smokers wanted to quit smoking (University of Michigan, Institute for Social Research, public use data tapes, 1996–1998); comparable estimates have been reported by others (Sussman et al. 1998). In the 1999 NYTS, 54.7 (± 9.8) percent of girls in middle school and 57.9 (± 4.0) percent of girls in high school reported that they wanted to completely stop smoking cigarettes (CDC 2000b). For current smokers, the percentage who reported interest in quitting smoking was lower in 1996–1998 (combined data) (42.0 ± 6.3 percent) than in 1976–1979 (combined data) (53.9 ± 3.9 percent); for daily smokers, the percentage was similar for the years 1976–1979 (combined data) (46.7 ± 4.6 percent) and 1996–1998 (combined data) (43.5 ± 7.0 percent). In MTF Survey data and in other data (Pirie et al. 1991; Burt and Peterson 1998; Sussman et al. 1998; CDC 2000b), interest in quitting did not differ by gender (University of Michigan, Institute for Social Research, public use data tapes, 1976–1998).

Data from a 1975 ACS survey of 267 girls aged 13 through 17 years found that 58 percent of those who smoked expressed some eagerness to quit (USDHEW 1977). Data from the 1989 TAPS I (Moss et al. 1992; Allen et al. 1993) also suggested that most girls who smoked wanted to quit: 52.7 percent of girls aged 12 through 18 years who were current smokers did not expect to be smoking one year later. In a cohort with an eight-year follow-up period, Pirie and coworkers (1991) reported that 72.4 percent of young women (average age, 19.2 years) who were current smokers wanted to quit smoking.

In combined data from MTF Surveys for the years 1996–1998, 32.6 (± 5.2) percent of high school senior girls who were current smokers and 45.3 (± 6.8) percent of girls who were daily smokers had tried to stop smoking at some point but could not stop (University of Michigan, Institute for Social Research, public use data tapes, 1996–1998). Among both current and daily smokers, the percentage was the same in 1976–1979 (combined data) and 1996–1998 (combined data) (University of Michigan, Institute for Social Research, public use data tapes, 1976–1998). In the 1999 NYTS, 59.2 (± 5.0) percent of girls in middle school and 57.9 (± 3.3) percent of girls in high school who were current smokers reported that they had seriously tried to quit in the previous 12 months (CDC 2000b). In data from MTF Surveys and in other data (Pirie et al. 1991; Burt et al. 1998), the percentages of current smokers who tried to stop smoking but were unable to do so did not differ by gender. In a study by Sussman and colleagues (1998), however, high school boys were more likely than girls to report that they had ever really tried to quit smoking.

In the 1989 TAPS I data, 76.8 percent of girls aged 12 through 18 years who had ever smoked regularly and who were current smokers had made at least one serious attempt to quit smoking; 58.6 percent had attempted to quit in the previous six months (Moss et al. 1992). The proportion who had tried to quit smoking in the past six months varied inversely with age, from 75.2 percent among girls aged 12 through 13 years to 53.3 percent among girls aged 16 through 18 years. In the 1993 TAPS II data, 89 percent of girls aged 12 through 17 years who had ever smoked regularly and who were current smokers had ever tried to quit smoking. Among girls who had ever tried to quit, 81 percent had tried in the previous six months (NCHS, public use data tape, 1993); again, attempts to quit smoking decreased with age. The 1992 YRBS (a household survey) reported that 57.1 percent of girls and young women aged 12 through 21 years who

smoked had tried to quit smoking in the previous six months. Again, the proportion decreased as age increased, from 69.1 percent for girls aged 12 through 13 years to 61.5 percent for girls aged 14 through 17 years and 52.3 percent for young women aged 18 through 21 years (Adams et al. 1995).

These and other data (McNeill et al. 1986, 1987; Ershler et al. 1989; Pirie et al. 1991; Stanton et al. 1996a) suggest that more than one-half of adolescents and young adults who smoke try to quit smoking each year. Smoking cessation does not appear to be any easier for children, adolescents, or young adults than for older adults. Children and adolescents make frequent and unsuccessful attempts to quit smoking, and they report the same problems reported by adults. Study findings suggest that the patterns of relapse to smoking are similar for adolescents and adults. Hansen (1983) studied high school students who were current smokers but had tried to quit smoking; 65 percent had relapsed within one month of cessation and 82 percent within six months. These percentages are comparable to those for young adults (Moss 1979). Ershler and colleagues (1989) found that, of almost 100 girls and boys in grades 6 through 12 who had tried to quit smoking, 28.6 percent relapsed within one week and 53.1 percent relapsed within the first month; only 22.4 percent successfully abstained for six months. Study results suggest that reasons for relapse (withdrawal symptoms and social pressure) are similar for young persons and adults (Skinner et al. 1985; McNeill et al. 1986; Ershler et al. 1989; Flay et al. 1992).

Number of Cessation Attempts

Most smokers attempt to quit smoking multiple times before being successful (Hazelden Foundation 1998). The 1992 NHIS was used to assess, among current smokers, the mean number of attempts to quit smoking in the past 12 months and the mean number of attempts in a lifetime (Table 2.25). (In this survey, an attempt to quit smoking was defined as having stopped smoking for 1 day.) Respondents often remember only the most recent attempts to quit smoking; they frequently forget short-term attempts that took place more than a few months before the interview (Gilpin and Pierce 1994). Thus, these data probably underestimate the actual number of attempts to quit smoking.

In 1992, women had made, on average, 2.7 attempts to quit smoking in the previous 12 months (Table 2.25). No differences were noted by age, race, education, or gender in the mean number of attempts.

Women who were current smokers reported an average of 6.3 lifetime attempts to quit smoking. The

number of attempts tended to increase with age until age 64 years and then to decrease, but the differences were not statistically significant (Table 2.25). In a study of AARP members, 70.0 percent of smokers aged 50 through 102 years had made one or more attempts to quit smoking; most had tried to quit one to three times (Rimer et al. 1990). In the 1986 AUTS, little difference was found in history of smoking cessation by age, and the 1992 NHIS data showed no difference among racial and ethnic groups in the mean number of lifetime attempts to quit smoking (Table 2.25). In a population-based study of 2,626 persons in Minneapolis, Minnesota, the mean number of attempts to quit smoking was 3.0 among black women and 6.0 among white women (Hahn et al. 1990). (In this study, an attempt to quit smoking was defined as having quit smoking for 1 week.) In NHIS data, women with 9 to 11 years of education had made the fewest lifetime attempts to quit smoking (3.3), and women with 16 or more years of education had made the most attempts (9.3) (Table 2.25).

The number of lifetime attempts to quit smoking was greater among men (8.8) than among women (6.3) (Table 2.25). However, when the data were examined by age, the gender-specific difference was significant only among smokers aged 25 through 44 years (Table 2.25). Other reports noted that current smokers of both genders have made about the same number of attempts. For example, in national data from 1964, 1966, and 1970, no gender-specific differences were found in the proportion of smokers who had tried to quit smoking two or more times (Schuman 1977). In 1984 data from 10 worksites, the percentage of current smokers who had made at least one attempt to quit smoking and the mean number of attempts in the past year were about the same among women and men (Sorensen and Pechacek 1986).

Data from current smokers may underestimate the number of attempts to stop smoking. Although the mean number of lifetime attempts reported by current smokers in NHIS averages 7.6, the Hazelden Foundation (1998) found that, on average, former smokers took 18.6 years to quit smoking and tried an average of 10.8 times.

Cessation Methods

A variety of methods, both effective and ineffective, are used by smokers in their attempts to quit smoking (Fiore et al. 1996, 2000). Methods used by women (both current and former smokers) in the most recent attempt were examined by analyzing the 1992 NHIS data. Respondents could select more than one method. Because of the small sample size, the

Table 2.25. Mean number (and 95% confidence interval) of attempts to quit smoking among current smokers aged 18 years or older, by gender and selected characteristics, National Health Interview Survey, United States, 1992

Characteristic	Mean number of attempts to quit smoking in past 12 months*		Mean number of attempts to quit smoking in lifetime*	
	Women	Men	Women	Men
Overall	2.7 (±0.3)	3.2 (±0.6)	6.3 (±1.0)	8.8 (±1.4)
Age (years)				
18–24	2.9 (±0.8)	3.7 (±1.5)	4.7 (±1.0)	8.5 (±4.3)
25–44	2.6 (±0.4)	3.5 (±1.0)	5.9 (±1.0)	8.9 (±1.9)
45–64	2.8 (±0.6)	2.6 (±0.5)	8.1 (±3.2)	8.7 (±2.0)
65	2.8 (±1.0)	2.0 (±0.5)	4.9 (±1.8)	8.9 (±6.9)
Race/ethnicity				
White, non-Hispanic	2.5 (±0.3)	3.0 (±0.8)	6.1 (±1.2)	7.3 (±1.2)
Black, non-Hispanic	3.3 (±0.6)	3.7 (±0.8)	8.1 (±3.0)	16.1 (±6.3)
Hispanic	4.1 (±2.5)	3.0 (±0.8)	6.8 (±2.6)	8.5 (±3.2)
Education (number of years)†				
8	2.6 (±1.1)	1.4 (±0.3)	4.5 (±2.0)	7.9 (±8.2)
9–11	2.4 (±0.6)	2.9 (±1.3)	3.3 (±0.8)	5.1 (±1.2)
12	2.7 (±0.5)	3.2 (±1.2)	6.4 (±1.2)	8.9 (±2.2)
13–15	2.2 (±0.3)	2.2 (±0.5)	8.1 (±4.4)	8.0 (±2.0)
16	3.6 (±1.5)	4.7 (±1.7)	9.3 (±3.8)	15.4 (±6.3)

Note: Current smokers were persons who reported smoking 100 cigarettes in their lifetime and who smoked at the time of the survey.

*Any attempt to quit smoking for 1 day.

†For women aged 25 years.

Source: National Center for Health Statistics, Cancer Control Supplement, public use data tape, 1992.

results were not stratified by the number of cigarettes smoked per day. Because female smokers consume fewer cigarettes per day than do male smokers, any gender-specific differences might reflect differences in the amount smoked. Also, if heavy smokers are more likely to reduce the number of cigarettes smoked and light smokers are more likely to quit smoking abruptly, these differences could affect the apparent success of one method compared with the success of another.

In the 1992 NHIS data, of the women who had quit smoking, 88.1 percent stopped “cold turkey” (stopping all at once, without cutting down), 25.4 percent decreased the number of cigarettes smoked, 17.7 percent switched to a low-tar or low-nicotine cigarette, and 10.5 percent quit smoking along with friends (method not specified) (Table 2.26). (Results total >100 percent because respondents could select more than one method.) These were also the most common methods noted in the 1986 AUTS (Fiore et al.

1990) and the 1987 NHIS. A 1998 study commissioned by the American Lung Association reported that 49 percent of women quit smoking cold turkey and 13 percent slowly reduced the number of cigarettes smoked (Yankelovich Partners 1998). Reports suggest that methods used to stop smoking do not differ by race or ethnicity: Winkleby and coworkers (1995) found that Hispanic women and white women were equally likely to have quit smoking on their own, and Hahn and colleagues (1990) found that white women and black women were equally likely to consider decreasing the number of cigarettes they smoked as part of a strategy to stop smoking.

In the 1970s and 1980s, more than 90 percent of smokers who had quit smoking reportedly did so without using formal interventions for smoking cessation (USDHEW 1979b; Fiore et al. 1990). The 1992 NHIS data showed that only 3.4 percent of women former smokers used a formal smoking cessation program to

Table 2.26. Percentage (and 95% confidence interval) of women aged 18 years or older who used selected methods to quit smoking during most recent attempt, by smoking status, National Health Interview Survey, United States, 1987 and 1992

Methods used for most recent attempt to quit smoking	1987		1992	
	Former smokers	Current smokers	Former smokers	Current smokers*
"Stop cold turkey" [†]	87.4 (±1.4)	73.0 (±2.2)	88.1 (±2.2)	87.2 (±2.6)
Gradually decrease number of cigarettes smoked in a day	9.5 (±1.3)	17.9 (±1.8)	25.4 (±2.9)	53.0 (±3.5)
Switch to lower-tar or lower-nicotine cigarettes	4.1 (±0.9)	6.6 (±1.2)	17.7 (±2.6)	47.2 (±3.6)
Stop smoking along with friends or relatives	4.1 (±0.9)	5.8 (±1.1)	10.5 (±2.0)	15.1 (±3.0)
Follow instructions in book or pamphlet	1.0 (±0.4) [‡]	4.0 (±0.9)	3.9 (±1.5)	6.5 (±2.0)
Use a stop-smoking clinic or program	NA [§]	NA	3.4 (±1.3)	5.4 (±1.7)
Use Nicorette gum	2.0 (±0.7)	4.6 (±1.0)	2.4 (±1.2) [‡]	5.8 (±1.9)
Use special filters [¶]	2.2 (±0.7)	2.7 (±0.9)	NA	NA
Participate in Great American Smoke-Out	1.3 (±0.5) [‡]	2.7 (±0.7)	NA	NA
Use some other method	6.1 (±1.1)	7.1 (±1.4)	9.0 (±1.9)	9.1 (±2.3)

Note: Results total >100% because multiple responses were possible. Current smokers were persons who reported smoking 100 cigarettes in their lifetime and who smoked at the time of the survey. Former smokers had smoked 100 cigarettes in their lifetime and were not smoking at the time of the survey.

*Current smokers who had attempted to quit smoking for reasons other than sickness.

[†]Defined as "stopping all at once without cutting down."

[‡]Estimate should be interpreted with caution because of the small number of respondents.

[§]NA= Not available.

A prescription nicotine chewing gum.

[¶]To regulate amount of smoke inhaled.

Sources: National Center for Health Statistics, Cancer Control Supplements, public use data tapes, 1987, 1992.

help them in the most recent attempt to quit smoking (Table 2.26). In another survey, only 3 percent of smokers who recently quit smoking had participated in a cessation program during the year in which they stopped (Hahn et al. 1990). In a 1996 study in California, however, 22 percent of women used assistance in attempting to quit smoking (self-help materials, counseling

advice, or nicotine replacement therapy) (Zhu et al. 2000). A 1998 study commissioned by the American Lung Association found that 24 percent of women used nicotine replacement therapy on their last attempt to quit smoking and that 3 percent used another prescription medication; only 1 percent used counseling (Yankelovich Partners 1998).

Women unsuccessful in their efforts to quit smoking were significantly more likely than successful women to report having switched to a low-tar cigarette. This finding is consistent with the conclusion of the Drug Abuse Advisory Committee of the U.S. Food and Drug Administration (1994) that the amount of nicotine delivered by all currently marketed cigarettes is likely to lead to addiction in the typical smoker. Women unsuccessful in their efforts to quit smoking were also significantly more likely than those who were successful to report having decreased the number of cigarettes smoked as part of the attempt to quit smoking (Table 2.26) (Guilford 1967; Smith 1981; Fiore et al. 1990).

In the 1986 AUTS data, smokers who tried unsuccessfully to quit smoking were more likely than those who were successful to have used nicotine gum during the most recent attempt to quit smoking (Fiore et al. 1990). A similar pattern was found in the 1992 NHIS data, but the sample sizes were small, so the findings should be interpreted with caution (Table 2.26). More recent data, however, have shown that use of tobacco use treatments, (e.g., self-help materials, counseling advice, or nicotine replacement therapy) doubled cessation rates. This finding occurred even though heavy smokers were more likely than light smokers to use assistance. Women were more likely than men to use assistance, and the use of assistance increased with age. Whites were more likely than other racial and ethnic groups to use nicotine replacement therapy (Zhu et al. 2000).

Compared with the data from the 1986 AUTS and the 1987 NHIS, the 1992 NHIS data included many more women who had attempted to quit smoking by switching to low-tar or low-nicotine cigarettes and by decreasing the number of cigarettes smoked (Table 2.26). Significantly more women attempted to quit smoking along with friends in 1992 than in 1987. The proportion of women unsuccessful at smoking cessation who attempted to quit smoking cold turkey also increased between 1987 and 1992, but the proportion who used nicotine gum (Nicorette) was not significantly different. A small percentage of women who attempted to quit smoking in 1987 tried special cigarette filters, but those filters were no longer available in 1992. Otherwise, the percentage who used other methods remained the same or increased between 1987 and 1992. These patterns appear to be due to an increase in the number of methods of smoking cessation used by women who attempted to stop smoking. The mean number of methods used among women successful at smoking cessation increased from 1.1 (95 percent CI, 1.1–1.2) in 1987 to 1.6 (95 percent CI, 1.5–1.6) in 1992 (NCHS, public use data tapes, 1987, 1992).

The mean number of methods used among women unsuccessful at smoking cessation increased from 1.2 (95 percent CI, 1.2–1.3) to 2.1 (95 percent CI, 2.0–2.1). In 1992, however, women who successfully quit smoking cold turkey still used fewer methods (average, 1.6 ± 0.1 methods) than did women who quit by gradually decreasing the number of cigarettes smoked (2.6 ± 0.1 methods) or by switching to low-tar or low-nicotine cigarettes (2.9 ± 0.2 methods).

In the 1992 NHIS data, women (88.1 ± 2.2 percent) were significantly less likely than men (92.3 ± 1.7 percent) to have quit smoking cold turkey (NCHS, public use data tape, 1992), a finding consistent with the results of Blake and associates (1989). However, the percentage of persons who tried to quit smoking (successfully or unsuccessfully) by reducing the number of cigarettes smoked did not differ by gender. In contrast to that finding, Blake and colleagues (1989) reported that, in their survey of six Midwest communities in the Minnesota Heart Health Program, women were more likely than men to reduce the number of cigarettes smoked, rather than stop smoking completely. Both Blake and colleagues (1989) and Sorensen and Pechacek (1987) also found that, among persons planning to quit smoking, women were more likely than men to plan to reduce the number of cigarettes smoked, whereas men were more likely to plan to completely stop smoking. In the 1992 NHIS, women (10.5 ± 2.0 percent) were more likely than men (7.9 ± 1.6 percent) to quit smoking along with relatives and friends (NCHS, public use data tape, 1992); this finding is consistent with earlier data (Schoenborn and Boyd 1989). However, women and men were equally unlikely to have attended a smoking cessation clinic or program during a successful attempt to quit smoking (NCHS, public use data tape, 1992). In the 1998 study commissioned by the American Lung Association, women were more likely than men to have used nicotine replacement therapy on their last attempt to quit smoking (24 percent vs. 17 percent) and somewhat more likely to have used another prescription medication (3 percent vs. 1 percent). Women (1 percent) and men (0 percent) were equally unlikely to have used counseling during their last attempt to quit smoking (Yankelovich Partners 1998). No CIs were given. Although some smaller studies have suggested that women use a greater number and variety of cessation strategies, in the 1992 NHIS data, no gender-specific differences were found for the mean number of methods used or the combinations of cessation strategies used by persons who used more than one cessation strategy in the last attempt at cessation (successful or unsuccessful) (NCHS, public use data tape, 1992).

Smoking Cessation Among Women

Trends in Smoking Cessation

Smoking cessation is associated with major and immediate health benefits for women of all ages. Monitoring of smoking cessation is a critical element of tobacco surveillance. The 1955 Current Population Survey provided the first nationally representative data on smoking cessation among women; ongoing surveillance began in 1965. In 1955, 4 percent of women in the United States were former smokers (Haenszel et al. 1956; NCHS 1970). The 1959 CPS-I showed that 5.6 percent of predominantly white, middle-class women aged 30 years or older were former smokers (Hammond and Garfinkel 1961; Garfinkel and Silverberg 1990). In NHIS, 7 to 8 percent of women were former smokers in 1966 (NCHS 1970; Giovino et al. 1994), 18 percent in 1985 (NCHS 1985; Giovino et al. 1994), and 18.8 percent in 1998 (NCHS, public use data tape, 1998).

A more commonly used measure of smoking cessation is the percentage of persons who had ever smoked who have quit smoking (formerly known as the “quit ratio”) (see “Percentage of Smokers Who Quit Smoking” in Appendix 2). Several data sources showed an increase over time in the percentage of women smokers who have quit smoking. In the 1955 Current Population Survey, the percentage of women smokers who had quit was 11 percent (Haenszel et al. 1956); in the 1966 Current Population Survey, it was 16 percent (NCHS 1970). Similarly, the percentage of women smokers who had quit smoking was estimated at 19 percent in the 1964 AUTS and 22 percent in the 1966 AUTS (USDHEW 1969). The U.S. Nurses' Health Study (Myers et al. 1987) found that the percentage of smokers who had quit smoking increased threefold from the 1921–1926 through the 1942–1946 birth cohorts of women.

In NHIS data, the percentage of women smokers overall who had quit smoking increased steadily from 19.1 percent in 1965 to 46.0 percent in 1990 (Table 2.27). During 1990–1992, a decrease was observed in the reported percentage of women smokers who had quit smoking, probably because of the change in definition of current smokers to explicitly include intermittent smokers (see “Current Smoker” in Appendix 2). This change in definition resulted in more women who had ever smoked being classified as current smokers. The decrease in cessation was greatest among young women, blacks, Hispanics, and persons with a college education—the groups most likely to be intermittent smokers (Husten et al. 1998). The

percentage of women smokers who had quit smoking then increased during 1992–1998 (Table 2.27). In all years, the percentage of women smokers who had quit smoking increased with increasing age, a finding noted by others (Resnicow et al. 1991). This pattern also was evident in earlier data (Hammond and Garfinkel 1961). The association with age held, even after adjustment for other demographic factors (Freund et al. 1992). The increase with age in the percentage of smokers who have quit smoking occurs because, as smokers age, a greater percentage have quit smoking (Kirscht et al. 1987; Pierce et al. 1989b; Hatziaandreu et al. 1990; McWhorter et al. 1990; CDC 1993) and because continuing smokers are more likely than former smokers to die (differential mortality) (Pierce et al. 1989b; USDHHS 1990c).

NHIS data showed that the percentage of women smokers who quit smoking increased during 1965–1998 among all age groups (Table 2.27). The rate of increase was lowest among women aged 18 through 24 years and greatest among women aged 65 years or older, a pattern reported by others (Novotny et al. 1990). Among women of reproductive age (18 through 44 years), 34.5 percent of smokers had quit smoking in 1998, whereas 46.1 percent of women of all ages had (Table 2.27) (NCHS, public use data tape, 1998). During 1985–1998, the percentage of smokers who had quit smoking did not increase among women aged 18 through 44 years, but the percentage did increase significantly among women aged 45 years or older.

In NHIS data, the percentage of smokers who had quit smoking increased significantly among white women (from 19.6 percent in 1965 to 47.4 percent in 1998) and among black women (from 14.5 to 34.7 percent) (Table 2.27). The percentage of smokers who had quit smoking was higher among white women than among black women for all years. The rate of increase during 1965–1998 was also higher among white women (27.8 ± 1.8 percentage points) than among black women (20.2 ± 4.5 percentage points). The percentage of smokers who had quit smoking increased among Hispanic women (from 36.8 in 1979 to 48.1 in 1998). Other analyses also found a significant increase when data were combined for 1978–1980 and 1994–1995 (USDHHS 1998). Similar racial and ethnic patterns were noted for women of reproductive age (data not shown). Among American Indian or Alaska Native women, the percentage of smokers who had quit smoking was unchanged between 1978–1980 (36.5 percent) and 1994–1995 (37.2 percent). Among Asian or Pacific Islander women, the percentage of ever smokers who had quit smoking increased

between 1978–1980 (36.9 percent) and 1994–1995 (62.2 percent); this increase was of borderline statistical significance, probably because of small sample size (USDHHS 1998).

Among women overall, the percentage of smokers who had quit smoking increased over time for all levels of education (Pierce et al. 1989a; Giovino et al. 1994) (Table 2.27). However, among women of reproductive age, the percentage was unchanged from 1970 through 1998 for women with 12 or fewer years of education (data not shown) (NCHS, NHIS, public use data tapes, 1970–1998). Among women overall (Table 2.27) and among women of reproductive age (NCHS, public use data tapes, 1970–1998), the greatest increase in smoking cessation occurred among those with 16 or more years of education (Schuman 1977; Pierce et al. 1989a; Freund et al. 1992).

NHIS data showed that during 1985–1998, among women living below the poverty level, the percentage of smokers who had quit smoking changed little (from 27.3 to 28.9 percent), but among women living at or above the poverty level, it increased significantly (from 41.3 to 48.2 percent) (Table 2.27). In the 1955 Current Population Survey, employment status was associated with smoking cessation: housewives (13.0 percent) were more likely to have quit smoking than were employed women (8.2 percent) or unemployed women who were looking for work (6.6 percent) (Haenszel et al. 1956). In 1978–1990, the percentage of smokers who had quit smoking was highest among women who were not employed and not looking for work, and it was higher among employed women than among unemployed women who were looking for work. Being either employed or not employed and not looking for work was positively associated with smoking cessation, even after adjustment for demographic variables (Novotny et al. 1988; Waldron and Lye 1989).

Smoking Cessation by Demographic Characteristics

Smoking cessation among women varies by age, race and ethnicity, level of education, and income. Estimates of the percentage of women who had ever smoked who have quit smoking, by various demographic characteristics, were obtained from the 1997–1998 NHIS and the 1997–1998 NHSDA (combined data) (Table 2.28). In the 1997–1998 NHIS, the estimate was 46.2 percent; estimates were somewhat lower for NHSDA (42.4 percent). The percentage of women smokers who had quit smoking increased directly with age for both surveys, a finding reported by others (Giovino et al. 1995). Studies suggest that this pattern holds, even after adjustment for the number of

cigarettes smoked per day and for other demographic variables (McWhorter et al. 1990; Hibbard 1993). Older persons may be more motivated than younger persons to maintain abstinence when they try to quit smoking (Kirscht et al. 1987; Pierce et al. 1989b; Hatziaandreu et al. 1990; McWhorter et al. 1990; CDC 1993). This motivation may result from smoking-related diseases that occur primarily after age 40 years (Hatziaandreu et al. 1990; McWhorter et al. 1990; Resnicow et al. 1991). Garvey and colleagues (1983) found that, among healthy men, age did not significantly predict smoking cessation.

The data for both surveys showed that the percentage of smokers who had quit smoking was greater among white women than among black women (Table 2.28). Other studies found that, even after adjustment for the number of cigarettes smoked per day and demographic and socioeconomic factors, blacks were significantly less likely than whites to have quit smoking (Novotny et al. 1988; Fiore et al. 1990; Hatziaandreu et al. 1990; McWhorter et al. 1990). In the 1997–1998 NHIS, the percentage of smokers who had quit smoking was lowest among black non-Hispanic women (34.3 percent) and highest among white non-Hispanic women (47.7 percent) and Hispanic women (45.9 percent), a finding noted by others (USDHHS 1998). Among American Indian or Alaska Native women, the percentage of smokers who had quit smoking varied by region: it was highest among women in the Southwest (50.3 percent), Pacific Northwest (48.5 percent), and Oklahoma (47.1 percent) and lowest among women in the northern plains (30.3 percent) (USDHHS 1998). However, these differences were not statistically significant.

In both surveys (Table 2.28), the percentage of smokers who had quit smoking was lowest among women with 9 to 11 years of education, although this finding was statistically significant only for NHIS. The 1985 NHIS data showed that education had the strongest association with smoking cessation, even after adjustment for several demographic variables, including gender (Novotny et al. 1988). In a cohort study of women enrolled in a health maintenance organization, a case-control study conducted in six cities, and a study in 90 worksites, education was significantly associated with smoking cessation (Gritz et al. 1998), even after adjustment for the number of cigarettes smoked per day (Kabat and Wynder 1987; Hibbard 1993).

The 1997–1998 NHIS showed that the percentage of smokers who had quit smoking was higher among women living at or above the poverty level (48.1 percent) than among those living below the poverty level

Table 2.27. Percentage (and 95% confidence interval) of women smokers aged 18 years or older who have quit smoking, by selected characteristics, National Health Interview Survey, United States, 1965–1998

Characteristic	1965	1970	1974	1979
Women	19.1 (±0.8)	26.9 (±0.9)	28.3 (±1.1)	33.4 (±1.5)
Age (years)				
18–24	14.0 (±2.0)	19.7 (±1.8)	18.6 (±2.4)	22.8 (±2.5)
25–44	18.2 (±1.3)	27.4 (±1.2)	26.5 (±1.5)	31.2 (±2.1)
45–64	21.1 (±1.6)	27.0 (±1.3)	30.8 (±2.6)	36.5 (±2.6)
65	32.2 (±4.7)	41.0 (±3.1)	46.9 (±4.1)	51.3 (±4.2)
Race/ethnicity*				
White, non-Hispanic	19.6 (±0.8)	27.8 (±0.9)	29.6 (±1.3)	34.3 (±1.7)
Black, non-Hispanic	14.5 (±2.6)	18.4 (±2.1)	17.4 (±3.0)	24.4 (±3.7)
Hispanic	NA [†]	NA	NA	36.8 (±6.5)
Education (number of years) [‡]				
8	NA	26.3 (±1.9)	29.5 (±3.3)	35.8 (±3.6)
9–11	NA	22.6 (±1.6)	21.3 (±2.5)	26.9 (±3.0)
12	NA	28.7 (±1.4)	29.5 (±1.9)	34.2 (±2.4)
13–15	NA	30.9 (±3.1)	36.4 (±3.9)	38.4 (±3.2)
16	NA	42.8 (±3.6)	44.7 (±5.0)	49.0 (±3.6)
Socioeconomic status [§]				
Below poverty level	NA	NA	NA	NA
At or above poverty level	NA	NA	NA	NA
Unknown	NA	NA	NA	NA
Men	27.6 (±0.7)	37.4 (±1.0)	39.2 (±1.1)	43.1 (±1.3)

Note: Percentage of smokers who have quit smoking is the percentage of all persons in each demographic category who reported smoking 100 cigarettes in their lifetime who are former smokers.

*Ethnicity not determined in 1965, 1970, or 1974. Thus, estimates for whites and for blacks during these years likely include data for some persons of Hispanic origin.

(30.1 percent) (Table 2.28). McWhorter and colleagues (1990) reported that household income was a significant predictor of smoking cessation, even after adjustment for other demographic factors and the number of cigarettes smoked per day. Similarly, Novotny and coworkers (1988) found that living above the poverty level was significantly associated with smoking cessation, even after adjustment for sociodemographic factors.

Other studies have reported that, among employed women, the percentage of smokers who had quit smoking was highest among professional women and among women in management, intermediate among clerical and sales workers, and very low among women in blue-collar jobs (Sorensen and Pechacek

1986; Covey et al. 1992; Gritz et al. 1998). Even after adjustment for the number of cigarettes smoked per day and for education, women in professional or managerial positions were more likely to quit smoking than were women who were in service positions or who performed manual labor (Hibbard 1993).

Gender-Specific Differences in Smoking Cessation

In 1955, the percentage of persons who had ever smoked who had quit smoking was 10.8 percent among women and 11.4 percent among men (Haenszel et al. 1956). In 1965, 19.1 percent of women who had ever smoked and 27.6 percent of men who had ever smoked had quit smoking. Thus, the gender-specific difference widened over the 10-year period (Waldron

1985	1990	1992	1995	1998
39.4 (±1.3)	46.0 (±1.1)	43.0 (±1.6)	46.2 (±1.9)	46.1 (±1.4)
24.0 (±3.2)	30.6 (±3.5)	17.7 (±3.7)	28.7 (±6.5)	25.2 (±4.5)
36.1 (±1.7)	40.2 (±1.6)	36.7 (±2.2)	38.7 (±2.8)	36.7 (±2.0)
41.7 (±2.2)	49.7 (±2.1)	48.0 (±2.8)	49.4 (±3.2)	51.3 (±2.3)
61.1 (±2.8)	67.0 (±2.4)	65.9 (±3.4)	69.9 (±3.4)	70.7 (±2.7)
41.0 (±1.3)	46.9 (±1.2)	44.4 (±1.8)	47.6 (±2.1)	47.4 (±1.5)
27.9 (±3.3)	38.4 (±3.5)	31.9 (±4.0)	36.4 (±5.3)	34.7 (±3.7)
37.8 (±6.2)	46.4 (±5.1)	38.5 (±5.3)	43.4 (±5.5)	48.1 (±4.2)
41.6 (±3.5)	48.5 (±4.2)	44.1 (±5.6)	48.0 (±5.8)	49.3 (±5.4)
31.8 (±3.0)	36.0 (±3.0)	39.0 (±4.2)	38.0 (±4.9)	36.0 (±3.5)
38.1 (±1.8)	43.9 (±1.8)	40.9 (±2.3)	45.0 (±2.9)	44.1 (±2.3)
45.4 (±2.8)	51.8 (±2.4)	48.9 (±3.5)	51.0 (±3.7)	50.1 (±2.6)
60.1 (±3.2)	64.5 (±2.9)	59.7 (±3.8)	59.7 (±4.3)	64.3 (±3.3)
27.3 (±2.9)	27.5 (±2.8)	26.7 (±4.0)	30.1 (±4.1)	28.9 (±3.1)
41.3 (±1.4)	48.8 (±1.2)	45.2 (±1.8)	48.9 (±2.0)	48.2 (±1.7)
39.4 (±3.0)	42.8 (±3.9)	43.7 (±4.7)	40.1 (±6.9)	48.1 (±3.1)
48.7 (±1.3)	51.5 (±1.2)	50.1 (±1.5)	50.5 (±2.0)	50.9 (±1.3)

[†]NA = Not available.

[‡]For women aged 25 years. Data for five education categories were not available for 1965.

[§]Definition of poverty status changed in 1997. (See Appendix 2 for definitions.)

Sources: National Center for Health Statistics, public use data tapes, 1965, 1970, 1974, 1979, 1985, 1990, 1992, 1995, 1998.

1991). Data for 1956–1978 from the Framingham study also showed this pattern (Sorlie and Kannel 1990).

In NHIS data for 1965–1998, the percentage of smokers who had quit smoking was lower among women aged 18 years or older than among men of comparable age (Schuman 1977; USDHHS 1989, 1990d; Resnicow et al. 1991; Covey et al. 1992) (Table 2.27 and Figure 2.16); in 1998, 46.1 percent of women and 50.9 percent of men who had ever smoked had quit. Other studies showed that this gender-specific difference persisted even after adjustment for race, employment status, occupation, education, marital status, and poverty level (Novotny et al. 1988; Rogers et al. 1995). However, between 1965 and 1998, the increase in the

percentage of smokers who had quit smoking was slightly greater among women (27.0 ± 1.6 percentage points) than among men (23.3 ± 1.6 percentage points) (Table 2.27 and Figure 2.16) (Fiore et al. 1989; USDHHS 1989, 1990d; Fiore 1992; Giovino et al. 1994). Also, the gender gap narrowed from 8.5 ± 1.2 percentage points in 1965 to 4.8 ± 1.9 percentage points in 1998, a finding also reported by others (Ockene 1993). Moreover, the increase in the percentage of smokers who had quit smoking slowed during 1990–1998 for both women and men (Table 2.27 and Figure 2.16).

The gender-specific difference in the percentage of smokers who have quit smoking is due to several factors. Smoking prevalence peaked in the 1950s

Table 2.28. Percentage (and 95% confidence interval) of smokers aged 18 years or older who have quit smoking, by gender and selected characteristics, National Health Interview Survey (NHIS) and National Household Survey on Drug Abuse (NHSDA), United States, 1997–1998

Characteristic	NHIS, 1997–1998		NHSDA, 1997–1998	
	Women	Men	Women	Men
Overall	46.2 (±0.9)	50.1 (±0.9)	42.4 (±2.0)	47.5 (±2.0)
Age (years)				
18–24	23.8 (±2.9)	19.3 (±2.7)	15.4 (±2.5)	9.8 (±1.9)
25–44	36.9 (±1.4)	35.3 (±1.4)	33.2 (±2.6)	32.4 (±3.0)
45–64	52.7 (±1.6)	57.4 (±1.5)	49.4 (±3.9)	57.9 (±3.6)
65	70.0 (±1.9)	83.2 (±1.3)	64.3 (±5.1)	77.8 (±4.3)
Race/ethnicity				
White, non-Hispanic	47.7 (±1.1)	52.7 (±1.1)	43.8 (±2.3)	50.0 (±2.4)
Black, non-Hispanic	34.3 (±2.5)	35.8 (±2.6)	34.9 (±3.7)	34.5 (±4.0)
Hispanic	45.9 (±2.9)	42.8 (±2.5)	35.4 (±4.8)	41.0 (±3.9)
American Indian or Alaska Native	38.4 (±10.2)	33.3 (±11.3)	25.4 (±16.5)*	43.7 (±28.2)*
Asian or Pacific Islander	40.0 (±8.9)	51.2 (±6.3)	53.3 (±19.5)	40.1 (±13.4)
Education (number of years) [†]				
8	49.2 (±3.8)	56.3 (±2.9)	44.8 (±8.7)	55.8 (±6.7)
9–11	39.1 (±2.4)	43.6 (±2.4)	33.6 (±5.2)	36.5 (±5.7)
12	43.2 (±1.6)	48.1 (±1.7)	40.3 (±3.5)	46.9 (±3.8)
13–15	49.6 (±1.8)	52.6 (±1.8)	46.1 (±4.1)	53.4 (±4.5)
16	66.2 (±2.2)	69.8 (±1.9)	63.0 (±4.9)	64.9 (±4.8)
Socioeconomic status [‡]				
Below poverty level	30.1 (±2.1)	31.6 (±2.6)	NA [§]	NA
At or above poverty level	48.1 (±1.1)	51.5 (±1.1)	NA	NA
Unknown	49.0 (±2.2)	53.0 (±2.2)	NA	NA

Note: Percentage of smokers who have quit smoking in NHIS is the percentage of all persons in each demographic category who reported smoking 100 cigarettes in their lifetime who are former smokers. Prevalence for NHSDA is the percentage of all persons in each demographic category who reported smoking 100 days in their lifetime who are former smokers.

*Estimate should be interpreted with caution because of the small number of respondents.

[†]For women aged 25 years.

[‡]See Appendix 2 for definitions.

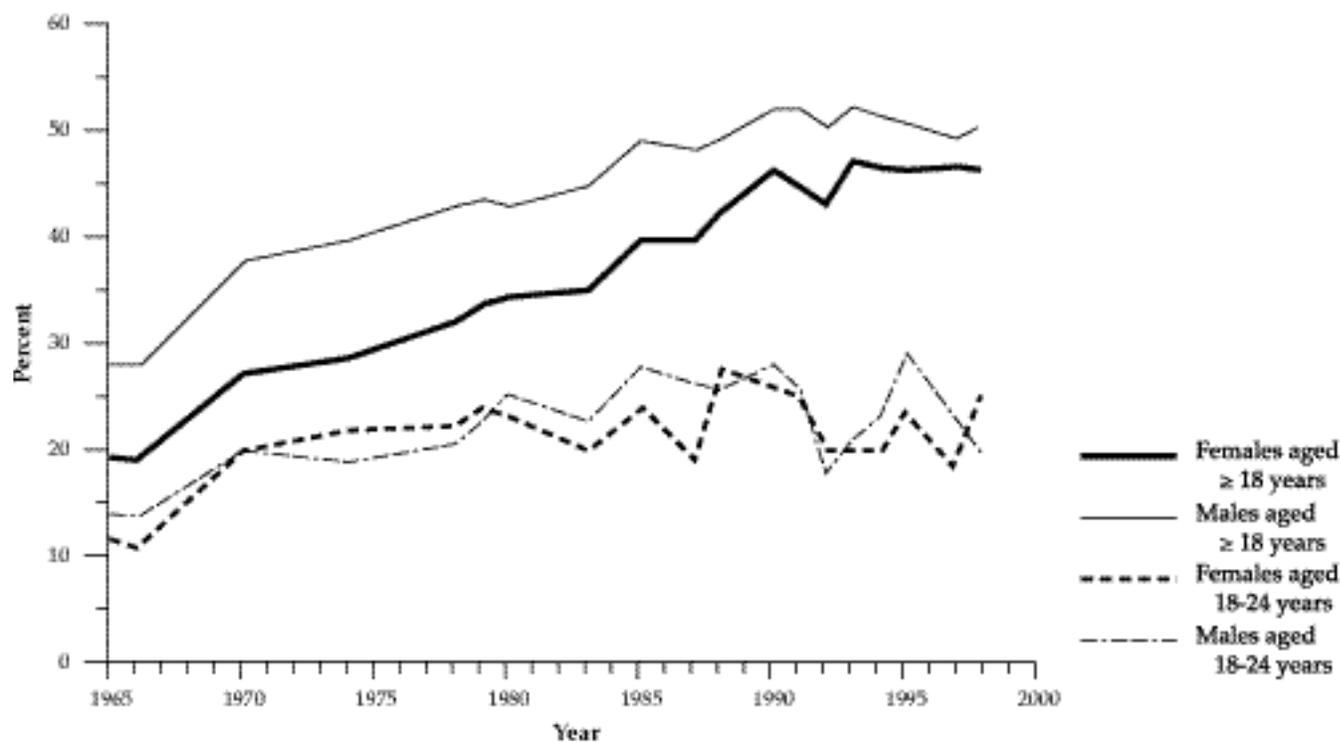
[§]NA= Not available.

Sources: NHIS: National Center for Health Statistics, public use data tapes, 1997, 1998. NHSDA: Substance Abuse and Mental Health Services Administration, public use data tapes, 1997, 1998.

among men but not until 1965 among women (Burns et al. 1997), and men preceded women in smoking cessation. The percentage of smokers who have quit smoking is cumulative over time; thus, the percentage is higher among men because they began to quit smoking earlier in this century than did women (Pierce et al. 1989b).

In two large prospective studies (the Framingham study and CPS-I), the percentage of smokers who quit smoking was substantially higher among men than among women in the late 1950s and 1960s (Hammond and Garfinkel 1968; Gordon et al. 1975). The 1971–1975 NHANES I data and the 1982–1984 follow-up data showed that, even after adjustment for demographic

Figure 2.16. Percentage of smokers who have quit smoking among adults aged 18 years or older and young adults aged 18–24 years, by gender, National Health Interview Survey, United States, 1965–1998



Note: Percentage of smokers who have quit smoking is the percentage of persons who reported smoking 100 cigarettes in their lifetime who are former smokers.

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

variables, women who had tried to quit smoking were more likely than men to relapse (McWhorter et al. 1990). Findings from several studies, however, suggested that, by the late 1970s or early 1980s, the probability of attempting to stop smoking and the probability of succeeding were equally high among women and men (USDHHS 1980; Kirscht et al. 1987; Orlandi 1987; Cohen et al. 1989; Fiore et al. 1989; Pierce et al. 1989b; Hellman et al. 1991; Coombs et al. 1992; Fiore 1992; Wagenknecht et al. 1993a; Derby et al. 1994; Whitlock et al. 1997; Gritz et al. 1998), even after adjustment for the number of cigarettes smoked per day and for demographic factors (Hatziaandreu et al. 1990; Fiore 1992; CDC 1993). In birth cohort data for persons aged 30 years or older, the cessation rate began to accelerate by 1960 among men but not until 1970 among women (Harris 1983). In NHIS data for birth cohorts, the cessation rate was lower among white

women than among white men in cohorts born before 1950; in later cohorts, the cessation rate was comparable for these two groups (Burns et al. 1997). However, not all studies have found an equally high rate of smoking cessation among women and men (Hubert et al. 1987; Bjornson et al. 1995; Hymowitz et al. 1997; Royce et al. 1997; Ward et al. 1997).

Another reason for findings of gender-specific differences in the percentage of smokers who have quit smoking is that this measure does not take into account other tobacco use. Men who quit smoking are more likely than women to switch to or to continue to use other tobacco products (pipes, cigars, or chewing tobacco). If users of other tobacco products are *not* counted as having quit, the gender gap narrows dramatically or disappears (Jarvis 1984; Jarvis and Jackson 1988; Schoenborn and Boyd 1989; USDHHS 1990d; Freund et al. 1992; Giovino et al. 1993; Ockene

1993). The percentage of smokers who have quit smoking is also affected by the duration of smoking, age at smoking initiation, socioeconomic status, and other parameters that have changed differently by gender over time (Gritz 1980).

In NHIS data for 1965–1998, the percentage of smokers who had quit smoking was lower among white women than among white men (NCHS, public use data tapes, 1965–1998). Rogers (1991) used NHIS data for 1985 and found that this gender-specific difference persisted after adjustment for demographic factors. Among Hispanics, the percentage of smokers who had quit smoking was comparable among women and men in 1979–1998 (NCHS, public use data tapes, 1979–1998). In another study, gender parity among Mexican Americans persisted even after adjustment for age, gender, and ethnicity (Rogers 1991). In 1965–1985, the percentage of black smokers who had quit smoking was lower among women than among men, but not significantly so (NCHS, public use data tapes, 1965–1985). Estimates for the mid-1980s that were adjusted for demographic factors also showed that black men were more likely than black women to be former smokers (Rogers 1991), but the unadjusted estimates for the percentage of smokers who have quit smoking were comparable among black women and black men in NHIS data for the 1990s (NCHS, public use data tapes, 1990, 1995, 1998).

Although the percentage of smokers who had quit smoking in 1998 was lower among women than among men (Table 2.28), patterns varied by age. The percentage was generally higher among women than among men aged 18 through 24 years, comparable among women and men aged 25 through 44 years, and generally lower among women than among men aged 45 years or older. Similar patterns were noted in other data (King et al. 1990). The gender- and age-specific differences in the percentage of persons who had ever smoked who have quit smoking probably reflect birth cohort differences.

Reported Reasons for Smoking Cessation

In the 1964 and 1966 AUTS (USDHEW 1969), the reasons most commonly given by female current smokers for trying to quit smoking were as follows: “wish to improve general physical condition,” “have had some symptoms that might be caused by smoking cigarettes,” “feel smoking may cause serious illness,” and “too expensive to smoke.” Prospective population studies and studies of women who entered smoking cessation programs reported similar reasons for wanting to quit smoking: concern about

health, someone important to them wanting them to quit, the belief that smoking is a dirty habit, and a desire for the benefits of a more active lifestyle (O’Hara and Portser 1994; Rose et al. 1996).

In the 1964 and 1966 AUTS, women former smokers were asked why they had quit smoking (USDHEW 1969). The most common reasons given in 1964 were as follows: “don’t really enjoy cigarettes” (35 percent), “wish to improve general physical condition” (34 percent), “have [had] some symptoms that might be caused by smoking cigarettes” (12 percent), “feel [felt] smoking may cause serious illness” (12 percent), “people who care about me [spouse] asked me to cut down” (11 percent), and “too expensive to smoke” (11 percent). In 1966, the reasons given for smoking cessation were as follows: “wish to improve physical condition” (31 percent), “don’t really enjoy cigarettes” (29 percent), “have [had] some symptoms that might be caused by smoking cigarettes” (28 percent), “too expensive to smoke” (15 percent), and doctor or physician “advised me to quit or cut down” (11 percent).

In the 1992 NHIS data, reasons for smoking cessation were obtained from women former smokers. The reason most commonly given was concern about health. In 1992, 55.9 (± 3.5) percent of women who were former smokers had stopped smoking because of concerns about future health, and 22.9 (± 2.9) percent stopped because of concerns about current health. The next most common reason given for smoking cessation was pressure from family or friends (18.3 \pm 2.6 percent). Other reasons given by more than 10 percent of respondents were pregnancy (11.2 \pm 2.1 percent) and cost (11.1 \pm 2.2 percent) (NCHS, public use data tape, 1992). Reports from the 1986 AUTS and the 1987 NHIS showed a similar ranking of concerns (NCHS, public use data tape, 1987; Gilpin et al. 1992; Orleans et al. 1994).

In the 1992 NHIS data, women and men both cited concern for health as the main reason for smoking cessation; no significant gender-specific differences were found in the reasons for cessation, except for pregnancy (NCHS, public use data tape, 1992). However, two studies (Pirie et al. 1991; Royce et al. 1997) reported that women were more likely than men to report feeling social pressure to stop smoking.

Few studies have been done on reasons for wanting to stop smoking among girls. In a study of 24 high schools in California and Illinois, Sussman and colleagues (1998) reported that requests to quit smoking by a boyfriend, health-related reasons (someone close died because of smoking and “to live longer”), a physician’s advice to quit, and cost were the primary

reasons cited by girls for wanting to stop smoking. No gender-specific differences were noted in the reasons for wanting to quit.

Reported Reasons for Relapse to Smoking

In the 1964 AUTS data, women who had made a serious but unsuccessful attempt to stop smoking were asked why they had relapsed to smoking. The reasons most commonly given were as follows: smoking is relaxing (23 percent), lack of willpower (20 percent), find smoking enjoyable (10 percent), and weight control (7 percent). Results from the 1966 AUTS data were similar (USDHEW 1969). In the 1986 AUTS data, the most frequent reasons given for relapse were irritability, weight gain, fear of weight gain, friction with family members, and inability to concentrate (USDHHS 1990a; Orleans et al. 1994).

Data from the 1987 NHIS were used to determine the reasons for relapse that were given by women current smokers who had made at least one attempt to quit smoking (see Appendix 2). Multiple reasons could be given by each respondent. The reason most frequently given by women for relapse was being nervous or tense (36.2 ± 2.4 percent). The next most common reasons were habit or being in a situation in which they used to smoke regularly, addiction or craving, a stressful life event, and the pleasure of smoking (each about 11 to 12 ± 1.6 –1.7 percent). Reasons reported by less than 10 percent of respondents were “others smoking around me” (9.6 ± 1.5 percent) and actual weight gain (7.7 ± 1.4 percent). Less than 5 percent of women reported “didn’t try hard enough” (4.6 ± 1.1 percent), “bored, blue, or depressed” (4.2 ± 0.9 percent), “fear of gaining weight” (3.6 ± 0.9 percent) and “not ready to stop smoking” (3.6 ± 1.0 percent) as reasons for relapse (NCHS, public use data tape, 1987).

The most frequent reasons given for relapse were generally similar for women and men. Women and men were equally likely to report addiction to or craving for cigarettes and the pleasure of smoking as the reason for relapse. Women were more likely than men to report fear of weight gain or actual weight gain as reasons for relapse, but the proportion of women citing fear of gaining weight (3.6 ± 1.0 percent) or actual weight gain (7.7 ± 1.4 percent) was small. Men (15.9 ± 2.1 percent) were more likely than women (12.0 ± 1.7 percent) to cite habit or being in a situation in which they used to smoke regularly as a reason for relapse, and women (36.2 ± 2.4 percent) were more likely than men (27.4 ± 2.5 percent) to cite being nervous or tense. Although other data suggested that having personal problems is a reason for relapse given by women

more often than men (Guilford 1972), the 1987 NHIS data suggested that women and men were equally likely to report a stressful life event as a reason for relapse (NCHS, public use data tape, 1987).

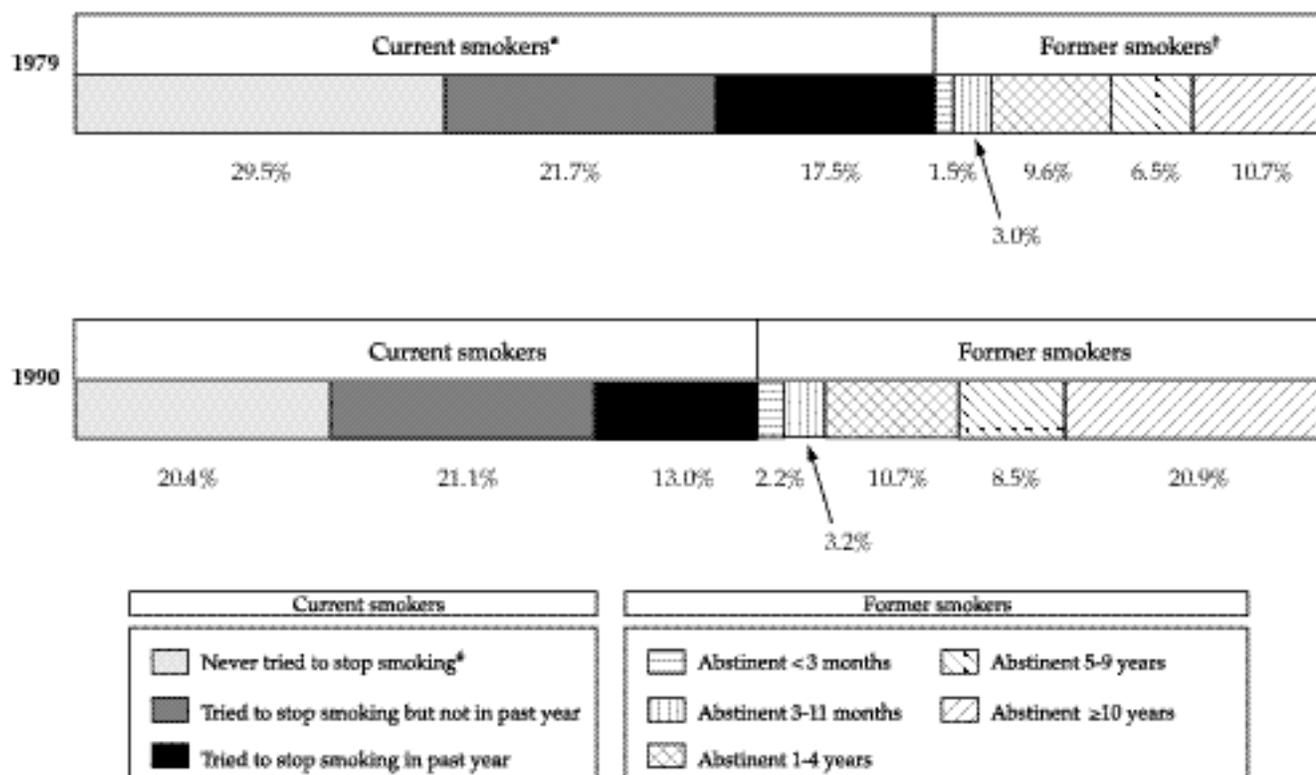
Trends in Smoking Continuum for Ever Smoking

A smoking continuum is used to more completely describe the dynamic process of smoking cessation (see “Smoking Cessation and Nicotine Addiction Treatment Methods” in Chapter 5). The continuum describes the timing and duration of attempts to stop smoking among all persons who had ever smoked cigarettes (Pierce et al. 1989b; USDHHS 1989, 1990d). Data from the 1979 and 1990 NHIS were used to construct a smoking continuum for women who had ever smoked cigarettes. The continuum included the proportions of female current smokers who had ever tried to stop smoking and of those who had tried to stop in the past year, as well as the duration of smoking cessation among female former smokers. Smoking continuums using the 1986 AUTS data have also been published (Pierce et al. 1989b; USDHHS 1989).

Women are moving through the smoking continuum over time. Among women who had ever smoked, the proportion who were current smokers who had never tried to stop smoking decreased from 29.5 percent in 1979 to 20.4 percent in 1990 (Figure 2.17). In both 1979 and 1990, a similar proportion of women who had ever smoked were current smokers who had tried to stop, but not in the past year. In 1979, however, 17.5 percent of women who had ever smoked were current smokers who had tried to stop smoking in the past year, whereas 13.0 percent in 1990 did so, and in 1990, a greater percentage (2.2 vs. 1.5 percent in 1979) who had ever smoked had quit smoking in the three months before the survey. In 1979, 6.5 percent of women who had ever smoked had quit for 5 to 9 years before the survey compared with 8.5 percent in 1990. The proportion who had quit smoking for 10 or more years before the survey doubled between 1979 and 1990 (from 10.7 to 20.9 percent). This finding is further evidence that women are moving through the continuum over time. Although NHIS data were not stratified by race, other studies showed that the mean number of years since quitting smoking was the same among white women and black women (Hahn et al. 1990) and among white women and Hispanic women (Winkleby et al. 1995).

NHIS data for 1979 showed that 30.1 (± 1.4) percent of all women who smoked in the year before the survey had tried to stop smoking during that year; in 1990, 30.7 (± 1.3) percent had tried to stop. The percentage

Figure 2.17. Smoking continuum among women aged 18 years or older who ever smoked, National Health Interview Survey, United States, 1979 and 1990



*Current smokers are persons who reported smoking 100 cigarettes in their lifetime and who smoked at the time of the survey.

†Former smokers are persons who reported smoking 100 cigarettes in their lifetime and who were not smoking at the time of the survey.

‡Based on the question, "Have you ever made a SERIOUS attempt to stop smoking cigarettes?"

Source: National Center for Health Statistics, public use data tapes, 1979, 1990.

still abstinent was significantly higher in 1990 (9.0 ± 0.8 percent) than in 1979 (6.2 ± 0.7 percent) (NCHS, public use data tapes, 1979, 1990).

Among persons who had ever smoked in 1979, women were significantly more likely than men to be current smokers who had never tried to stop smoking, but no gender-specific differences were noted in 1990 (NCHS, NHIS, public use data tapes, 1979, 1990). In this NHIS analysis and in a study by Pierce and colleagues (1989b), the major difference by gender related to long-term former smokers. In 1990, although women and men who had ever smoked were equally likely to be former smokers who had quit smoking for 1 through 9 years before the survey, women who had

ever smoked (20.9 ± 1.0 percent) were less likely than men (27.6 ± 1.1 percent) to be former smokers who had quit for 10 or more years (NCHS, public use data tape, 1990). Pierce and associates (1989b), using 1986 AUTS data, found that women were as likely as men to have quit smoking for 1 to 5 years before the survey but less likely than men to have quit smoking for 5 or more years before the survey. In 1986, these gender-specific differences began at 5 years of smoking cessation, but in 1990 they were only evident for 10 or more years of cessation. These findings are not surprising because the decline in smoking prevalence began later among women than among men (Hammond and Garfinkel 1961).

Table 2.29. Stages of smoking cessation (% and 95% confidence interval) among women smokers aged 18 years or older, by selected characteristics, National Health Interview Survey, United States, 1992

Characteristic	Ever quit smoking for 1 day*	Quit smoking for 1 day in past 12 months*	Seriously considering stopping smoking within next 6 months [†]	Planning to stop smoking within 30 days [†]
Women	80.8 (±2.7)	37.1 (±3.2)	45.4 (±3.3)	13.7 (±2.2)
Age (years)				
18–24	77.2 (±8.9)	48.9 (±9.6)	43.8 (±9.6)	12.9 (±6.0) [‡]
25–44	82.9 (±3.2)	36.8 (±4.1)	46.3 (±4.5)	13.7 (±3.2)
45–64	83.3 (±4.6)	36.4 (±5.9)	49.6 (±6.3)	15.2 (±4.3)
65	66.7 (±10.8)	23.5 (±8.2)	30.2 (±9.1)	10.2 (±6.3) [‡]
Race/ethnicity				
White, non-Hispanic	80.5 (±3.0)	35.1 (±3.5)	44.5 (±3.6)	12.9 (±2.3)
Black, non-Hispanic	82.2 (±6.2)	50.6 (±8.8)	52.5 (±9.2)	17.7 (±7.7)
Hispanic	87.4 (±6.5)	42.8 (±12.6)	54.0 (±13.3)	18.3 (±11.9) [‡]
Education (number of years) [§]				
8	74.8 (±11.8)	26.6 (±10.4) [‡]	24.9 (±10.0) [‡]	10.4 (±7.1) [‡]
9–11	74.5 (±6.5)	27.0 (±6.3)	40.4 (±7.3)	8.4 (±4.0) [‡]
12	82.3 (±3.7)	37.2 (±4.7)	46.6 (±5.2)	15.7 (±3.7)
13–15	82.6 (±5.8)	37.0 (±7.0)	48.3 (±8.0)	13.6 (±5.0) [‡]
16	91.3 (±5.3)	44.0 (±10.2)	63.5 (±10.5)	17.1 (±8.4) [‡]
Men	82.4 (±2.6)	37.3 (±3.1)	43.2 (±3.2)	12.8 (±2.3)

*Measured for daily smokers. Current smokers were persons who reported smoking 100 cigarettes in their lifetime and who smoked at the time of the survey. Daily smokers were current smokers who responded "every day" to the question, "Do you smoke every day, some days, or not at all?"

[†]Measured for current smokers. Current smokers were persons who reported smoking 100 cigarettes in their lifetime and who smoked at the time of the survey. Current smokers responded "every day" or "some days" to the question, "Do you smoke every day, some days, or not at all?"

[‡]Estimate should be interpreted with caution because of the small number of respondents.

[§]For women aged 25 years.

Source: National Center for Health Statistics, 1992 Cancer Control Supplement, public use data tape, 1992.

In the 1990 NHIS data, women who smoked in the past year (30.7 ± 1.3 percent) were as likely as men who smoked in the past year (28.5 ± 1.4 percent) to have tried to stop smoking and to still be abstinent at the time of the survey (both 9.0 percent) (NCHS, public use data tape, 1990). These findings were also true among women and men in the 1991 survey (CDC 1993).

Stages of Cessation Among Current Smokers

Readiness to quit smoking is commonly measured by using a stages-of-change model (precontemplation, contemplation, action, and maintenance) (DiClemente et al. 1991). Survey measures have been developed to measure these stages of change (Crittenden et al. 1994). The 1992 NHIS was used to assess the

stages of cessation among women who were current daily smokers (Table 2.29). Current daily smokers were asked if they had ever stopped smoking for 1 day or longer and if they had stopped smoking in the past 12 months for 1 day or longer; current smokers were asked whether they were seriously considering stopping smoking within the next 6 months, and whether they were planning to stop within the next 30 days. Of the women who were current daily smokers, 19.2 percent had never tried to stop smoking (precontemplation stage), 80.8 percent had quit smoking for at least 1 day in the past, and 37.1 percent had tried to stop smoking in the 12 months before the survey. In 1992, 45.4 percent of the women current smokers reported seriously considering stopping smoking in the next

6 months (contemplation stage), and 13.7 percent reported planning to stop smoking in the next 30 days.

Women aged 65 years or older were significantly less likely than women aged 25 through 64 years to have ever tried to quit smoking, less likely than women aged 18 through 44 years to have tried to quit smoking in the previous 12 months, and less likely than women aged 25 through 64 years to be seriously thinking about stopping smoking in the next 6 months. White women (35.1 percent) were less likely than black women (50.6 percent) to have tried to stop smoking in the past 12 months. No racial or ethnic differences were found among women planning to stop smoking, a finding consistent with other data (Kviz et al. 1994). Women with 16 or more years of education (44.0 percent) were more likely than women with less than 12 years of education (about 27 percent) to have stopped smoking for at least 1 day in the previous year (Table 2.29), a finding noted by others (Hatziaandreu et al. 1990). Women with 16 or more years of education were more likely than women with 12 or fewer years of education to be considering smoking cessation in the next 6 months.

Among adult current daily smokers, no gender-specific differences were found for persons who ever attempted to quit smoking for at least 1 day, quit for at least 1 day in the previous year, seriously considered stopping in the next six months, or planned to stop within 30 days (Table 2.29). Other studies have also shown that women are as likely as men to have ever tried to quit smoking (Sorensen and Pechacek 1986, 1987; Blake et al. 1989; Derby et al. 1994) or to have recently attempted to quit smoking (Sorensen and Pechacek 1986; Blake et al. 1989; Pierce et al. 1989b; Hatziaandreu et al. 1990; Fortmann and Killen 1994). Some studies found no differences in the percentages of women and men who planned to change their smoking behavior in the next year (Sorensen and Pechacek 1986; Blake et al. 1989), although one study reported that women were less likely than men to plan to stop smoking within the next three months (Kviz et al. 1994). In the 1992 NHIS data, the association between education and planning to stop smoking in the next six months was stronger for women than for men (data not shown). Among women with 16 or more years of education, 63.5 percent were planning to stop smoking in the next six months; only 24.9 percent of women with 8 or fewer years of education were planning to do so (Table 2.29). The comparable estimates for men were 48.4 (± 10.1) and 31.7 (± 12.5) percent, respectively (NCHS, public use data tape, 1992).

Smoking Cessation Among Young Women

Smoking cessation efforts historically have focused on middle-aged smokers because they are at greater risk for smoking-related diseases. However, other investigators have suggested that cessation efforts need to focus on young adults (Wechsler 1998; Everett et al. 1999a). Smoking cessation before age 35 years eliminates nearly all of the excess mortality attributed to smoking (Doll et al. 1994). The NHIS data for 1965–1966 through 1997–1998 were used to determine trends in the percentage of young women smokers aged 18 through 24 years who quit smoking (Table 2.30 and Figure 2.16). The percentage of young women who had ever smoked who had quit smoking increased 10.0 (± 3.0) percentage points, from 13.8 percent in 1965–1966 to 23.8 percent in 1997–1998 (Table 2.30) (Giovinio et al. 1994). The increase was significant from 1965–1966 (combined data) through 1970 and again from 1983/1985 (combined data) through 1990–1991 (combined data); from then through 1992–1993 (combined data) it declined significantly (possibly a result of the change in the question used to assess smoking status) and remained unchanged through 1997–1998. Patterns of cessation among black women and among Hispanic women must be interpreted with caution because of small sample sizes. However, the percentage of smokers who had quit smoking appears to be lower among young black women than among young white women from 1965–1966 through 1983/1985 and then comparable in the 1990s. The percentage of smokers who had quit smoking was generally higher among young women with more than 12 years of education than among those with fewer than 12 years of education. Young women who smoked were equally likely as young men who smoked to have quit smoking. These findings are consistent with other data (Breslau and Peterson 1996).

Smoking cessation among young women varies by demographic characteristics (Table 2.30). NHIS data showed that in 1997–1998, 23.8 percent of young adult women smokers had quit smoking. The estimates from the 1997–1998 NHSDA (combined data) were somewhat lower (data not shown). The percentage of smokers who had quit smoking was higher among young Hispanic women than among young non-Hispanic white women and young non-Hispanic black women, but this finding was not significant for young non-Hispanic black women. Similar patterns were noted for the 1997–1998 NHSDA, but the differences were not statistically significant (data not shown). The percentage of young female smokers

who had quit smoking was higher among those with more than 12 years of education than among those with fewer than 12 years of education. In the 1997–1998 NHSDA, the percentage of young female smokers who had quit smoking was higher among those with more than 12 years of education than among those with 12 or fewer years of education. The difference was statistically significant only among young women with 12 years of education, but not for young women with less than 12 years of education (data not shown). The percentage of smokers who had quit smoking was higher among young women than among young men in the 1997–1998 NHSDA and NHIS surveys, although the difference was not significant in NHIS (Table 2.30) (SAMHSA, public use data tapes, 1997, 1998).

Smoking Cessation Among Girls

Only 14 percent of high school girls who were ever daily smokers who had ever tried to quit smoking were former smokers at the time of survey (CDC 1998b). Similar findings have been reported by others (Johnston et al. 1995b). In MTF Surveys of 1976–1986, 44 percent of daily smokers believed that they would not be smoking in five years, but 73 percent remained daily smokers five to six years later (USDHHS 1994).

The percentage of high school senior girls who had smoked regularly at some time but had not smoked in the past 30 days was considered to be the percentage of smokers who had quit smoking. This percentage was assessed by using the 1976–1998 MTF Survey data (University of Michigan, Institute for Social Research, public use data tapes, 1976–1998). The percentage of smokers who had quit smoking increased from 16.3 (± 2.8) percent in 1976 to 20.9 (± 3.2) percent in 1981, then decreased to 13.0 (± 2.9) percent in 1998.

Gender-specific differences in smoking cessation have been small and inconsistent among adolescents. Generally, girls and boys were equally likely to be unsuccessful in their attempts to stop smoking (Ershler et al. 1989; Waldron et al. 1991). MTF Survey data confirm this finding. In 1976, the percentage of smokers who had quit smoking was 17.1 (± 2.4) percent among boys and 16.3 (± 2.8) percent among girls. In 1998, the percentage was 15.6 (± 2.5) percent among boys and 13.0 (± 2.9) percent among girls (University of Michigan, Institute for Social Research, public use data tapes, 1976–1998). An analysis based on 633 adolescent smokers in TAPS I (1989) who were followed up in TAPS II (1993) found no significant difference in quit rates by gender (16.1 percent for females and 15.0 percent for males) (Zhu et al. 1999).

Smoking Cessation Among Pregnant Women and Girls

Smoking cessation is particularly important during pregnancy. In the 1986 Linked Telephone Survey, white women aged 20 through 44 years who were respondents to the 1985 NHIS were interviewed again (Fingerhut et al. 1990). Of those who smoked before pregnancy, 39 percent stopped smoking while they were pregnant (27 percent on learning they were pregnant and 12 percent later during pregnancy). Smoking cessation increased as the level of education increased (Fingerhut et al. 1990).

In the 1991 NHIS, questions related to smoking cessation after learning of pregnancy were asked of women aged 18 through 44 years who had given birth within the past five years. In 1991, 30.8 (± 2.3) percent of women who were smoking when they became pregnant reported having quit smoking after learning of the pregnancy (NCHS, public use data tape, 1991). The percentage was 30.9 (± 2.6) among white women and 31.8 (± 5.8) among black women. As the level of education increased, the likelihood of quitting smoking also increased. In 1991, 21.1 (± 3.9) percent of women with fewer than 12 years of education, but 45.4 (± 10.5) percent of women with 16 or more years of education, quit smoking during pregnancy. This finding is consistent with previously published studies (O'Campo et al. 1992; Floyd et al. 1993).

In an analysis of data from the 1988 National Maternal and Infant Health Survey, Sugarman and colleagues (1994) reported that the percentage of smokers who reported having quit smoking for at least one week during the pregnancy was higher among American Indian mothers (64 percent) than among white mothers (57 percent) or black mothers (49 percent).

Pregnant women generally stopped smoking because of concerns about potential adverse outcomes during pregnancy or negative effects on infant health (O'Campo et al. 1992). Many pregnant women, however, consider smoking cessation during pregnancy to be a temporary abstinence. Although considerable efforts have been made to promote smoking cessation during pregnancy, pregnant women who stop smoking are typically abstinent for five to seven months and enter the postpartum period as likely to relapse to smoking as nonpregnant smokers who have just stopped smoking. Within one year of delivery, 70 percent of women who had quit smoking during pregnancy had relapsed. The majority of mothers resume smoking within six months after delivery (Fingerhut et al. 1990; Mullen et al. 1990; McBride et al. 1992;

Table 2.30. Percentage (and 95% confidence interval) of young women smokers aged 18–24 years who have quit smoking, by selected characteristics, National Health Interview Survey, United States, 1965–1998

Characteristic	1965–1966	1970	1974	1978–1980
Young women	13.8 (±1.4)	19.7 (±1.8)	18.6 (±2.4)	22.6 (±2.1)
Race/ethnicity*				
White, non-Hispanic	14.6 (±1.4)	20.7 (±1.9)	19.5 (±2.6)	23.9 (±2.3)
Black, non-Hispanic	5.9 (±3.1)	10.5 (±3.3)	8.8 (±5.4) [†]	13.1 (±5.6) [†]
Hispanic	NA [‡]	NA	NA	26.0 (±7.9)
Education (number of years) [§]				
<12	NA	15.1 (±3.4)	11.3 (±4.8) [†]	14.5 (±4.2)
12	NA	19.1 (±2.8)	23.0 (±4.3)	26.5 (±3.7)
>12	NA	31.0 (±4.7)	19.5 (±4.6)	29.5 (±5.1)
Young men	11.4 (±1.1)	19.5 (±1.6)	21.6 (±3.0)	23.0 (±2.0)

Note: Percentage of smokers who have quit smoking is the percentage of persons who reported smoking 100 cigarettes in their lifetime who are former smokers.

*Ethnicity not determined in 1965, 1966, 1970, or 1974. Thus, estimates for whites and for blacks during these years likely include data for some persons of Hispanic origin.

[†]Estimate should be interpreted with caution because of the small number of respondents.

Floyd et al. 1993; Stotts et al. 1996). Age, race, marital status, and education have not been significantly associated with postpartum relapse to smoking (Fingerhut et al. 1990; O'Campo et al. 1992). (See "Postpartum Smoking" in Chapter 5.)

Physicians' Advice About Smoking

Advice to Women

According to the 1991 NHIS data, 79 percent of women who smoked saw a physician in the year before the survey (NCHS, public use data tape, 1991); the percentage was comparable in the 1992 NHIS (NCHS, public use data tape, 1992). In a study using the 1988 NHIS data, 70 percent of female smokers who considered themselves to be in excellent health reported seeing a physician each year (Ockene 1993). Physicians, therefore, have many opportunities to advise women to quit smoking, and study findings showed that physicians' advice to quit smoking increases cessation rates (Fiore et al. 1996, 2000).

In the 1964 AUTS data, only 16.6 percent of women who smoked reported ever having received advice to quit smoking from a physician (USDHEW 1969; USDHHS 1990d). The percentage of smokers who had ever received such advice increased steadily over time. Still, in the 1975 AUTS data (USDHEW 1976), only 38 percent of women who smoked reported

that a physician had advised them to do something about their smoking. A 1975 ACS household survey of 559 young women aged 18 through 35 years reported that only 27 percent of the women had been cautioned by their health care provider about the dangers of smoking (USDHEW 1977). In a 1980–1983 survey of 1,652 adults in Michigan (Anda et al. 1987), 46 percent of women who smoked reported ever having been told by a physician to quit smoking. According to the 1987 NHIS data, 54 percent of women who smoked reported ever having received advice from a physician to quit smoking (Schoenborn and Boyd 1989; USDHHS 1990d). In the 1991 NHIS, 62.4 percent of women who smoked reported ever having received advice to quit smoking from a physician or other health professional. In the 1992 NHIS data, 69.4 percent of women smokers reported ever having received such advice from a physician or dentist (NCHS, public use data tapes, 1991, 1992).

The 1964 AUTS data reported that women (16.6 percent) and men (15.0 percent) who currently smoked were equally likely to report ever having received a physician's advice to quit smoking (USDHEW 1969; USDHHS 1990a). Over time, however, a gender-specific difference developed; women who smoked became more likely than men to report having received such advice. In 1980–1983 (combined data), women were slightly, but not significantly,

1983/1985	1990–1991	1992–1993	1994–1995	1997–1998
23.2 (±2.0)	27.9 (±2.4)	19.9 (±3.0)	25.7 (±3.9)	23.8 (±2.9)
23.8 (±2.3)	27.8 (±2.5)	19.3 (±3.3)	25.0 (±4.2)	23.1 (±3.3)
14.5 (±5.4)	26.5 (±7.8)	16.4 (±9.9) [†]	21.0 (±13.3) [†]	22.6 (±9.9) [†]
30.4 (±9.8)	29.5 (±9.7)	26.7 (±12.8) [†]	30.0 (±10.5) [†]	37.2 (±9.5)
17.7 (±4.5)	17.0 (±5.1)	7.7 (±4.2) [†]	14.1 (±7.9) [†]	17.0 (±6.8)
22.3 (±3.4)	28.1 (±4.0)	23.2 (±5.2)	28.0 (±7.2)	23.0 (±5.7)
32.3 (±4.5)	36.1 (±4.7)	23.7 (±5.9)	30.3 (±6.6)	30.0 (±5.1)
23.4 (±2.2)	25.5 (±3.1)	19.6 (±3.6)	21.5 (±3.7)	19.3 (±2.7)

[†]NA= Not available.

[§]For women aged 20–24 years. Data for these education categories were not available for 1965.

Sources: National Center for Health Statistics, public use data tapes, 1965–1966, 1970, 1974, 1978–1980, 1983, 1985, 1990–1995, 1997–1998.

more likely to report having received such advice (46 vs. 42 percent) (Anda et al. 1987; Ockene et al. 1987). The questions used to assess whether a person received a physician's advice to quit smoking were slightly different in the 1991 and 1992 NHIS, but in both years, women who smoked were significantly more likely than men to report having received such advice (69.4 vs. 60.7 percent in 1992) (NCHS, public use data tapes, 1991, 1992).

Data from the 1991 NHIS were used to assess the percentage of female smokers who, within the past year, had seen a physician and reported receiving advice to quit smoking from a physician or another health care professional (Table 2.31). The data indicated that 38.9 percent of these women reported that they had received such advice. A population-based study in Rhode Island from 1990 reported that 48 percent of women who had visited a health care setting in the previous year reported receiving advice to quit smoking (Goldstein et al. 1997). In the 1991 NHIS, physicians' advice to quit smoking was most common (44.5 percent) among women aged 45 through 64 years (Table 2.31). Of women aged 65 years or older, 34.9 percent reported having received advice to quit smoking within the previous year. Similarly, in a survey of AARP members, 39 percent of persons aged 50 through 102 years reported having been advised by their physician in the previous year to stop smoking (Rimer et al. 1990).

In the 1991 NHIS data, black women (38.1 percent) were as likely as white women (39.8 percent) to report having received a physician's advice to quit smoking in the previous year (Table 2.31). An earlier study using aggregated data from 1980 and 1983 in Michigan had reported that black women were less likely than white women to have received such advice (Anda et al. 1987). In NHIS, Hispanic women who smoked were less likely than white women to report having received advice to quit smoking (Table 2.31). This difference occurred despite a comparable number of visits to a physician by Hispanic women and white women (NCHS, public use data tape, 1991). In another study, 27 percent of Hispanic women and 67.7 percent of white women with fewer than 12 years of education reported ever having received a physician's advice to quit smoking (Winkleby et al. 1995). The difference by race and ethnicity was not explained by a difference in language barriers or by a difference in access to care, and the number of visits to physicians was comparable. Because of the fairly low prevalence of smoking among Hispanic women, clinicians may not have assessed smoking in this population. No difference by race or ethnicity was seen for women with 12 or more years of education.

Among all women, no significant difference was observed by education in reported physicians' advice to quit smoking in the previous year. The prevalence of reporting such advice increased as the number of

Table 2.31. Percentage (and 95% confidence interval) of persons aged 18 years or older who had smoked in the previous 12 months who reported receiving advice to quit smoking from a physician or other health care professional in the preceding 12 months, by gender and selected characteristics, National Health Interview Survey, United States, 1991

Characteristic	Women	Men
Overall	38.9 (± 1.6)	35.2 (± 1.8)
Age (years)		
18-24	35.9 (± 4.5)	16.9 (± 4.2)
25-44	37.6 (± 2.3)	33.4 (± 2.5)
45-64	44.5 (± 3.0)	43.1 (± 3.7)
65	34.9 (± 4.4)	43.3 (± 5.7)
Race/ethnicity		
White, non-Hispanic	39.8 (± 1.8)	36.3 (± 2.1)
Black, non-Hispanic	38.1 (± 4.0)	30.5 (± 4.8)
Hispanic	30.6 (± 6.7)	30.5 (± 7.7)
Education (number of years)*		
8	37.8 (± 6.5)	41.8 (± 6.5)
9-11	44.0 (± 4.4)	34.3 (± 5.1)
12	39.4 (± 2.6)	37.8 (± 3.0)
13-15	38.1 (± 3.6)	38.4 (± 4.3)
16	36.8 (± 4.5)	35.4 (± 4.8)
Number of visits		
1	29.2 (± 2.9)	27.2 (± 2.7)
2-3	36.6 (± 2.7)	35.8 (± 3.4)
4	46.4 (± 2.5)	43.9 (± 3.4)
Number of cigarettes/day		
<15	36.0 (± 2.7)	30.0 (± 3.3)
15-24	43.3 (± 2.7)	38.8 (± 3.2)
25	50.2 (± 4.2)	43.7 (± 3.8)

Note: 79.0 (± 1.2)% of women smokers and 62.0 (± 1.5)% of men smokers had visited a physician in the past year. Mean number of visits: 5.2 for women, 3.2 for men. Smokers receiving advice to quit smoking were among persons who had seen a physician or other health care professional in the past year.

*For women aged ≥ 25 years.

Source: National Center for Health Statistics, public use data tape, 1991.

visits to a physician increased (Table 2.31); this finding has also been reported by other investigators (Anda et al. 1987). In NHIS data, advice from a physician to quit smoking also increased as the number of cigarettes smoked per day increased (Table 2.31).

In the 1991 NHIS data, among smokers who had visited a physician in the past year, women (38.9 percent) were slightly more likely than men (35.2 percent) to report having received advice to quit smoking in the past year (Table 2.31), a pattern also reported in the population-based study in Rhode Island (Goldstein et al. 1997). In the 1992 NHIS, which had a much smaller sample size and which asked about advice

from a medical doctor, the gender-specific difference for those receiving advice from a medical doctor was much greater (53.4 percent for women vs. 49.7 percent for men) but was not statistically significant (NCHS, public use data tape, 1992; Tomar et al. 1996). Further analysis of the 1991 NHIS data for smokers showed that, in the previous year, women made more visits to physicians (5.2) than did men (3.2) (NCHS, public use data tape, 1991). No gender-specific difference was noted when having received advice was stratified by the number of visits. The finding of no difference by gender is consistent with other data (Royce et al. 1997).

In the 1991 NHIS data, young women aged 18 through 24 years who smoked were much more likely (35.9 percent) than their male counterparts (16.9 percent) to report having received advice from a physician to quit smoking (Table 2.31). This pattern was also true in combined data from 1980 and 1983 (Anda et al. 1987). The 1991 NHIS data showed that young women made a greater number of visits to a physician (6.5) than did young men (2.0), but when the data were stratified by the number of visits young women were still more likely to report having received a physician's advice to quit smoking (NCHS, public use data tape, 1991). This advice may have been given because of the types of visits made by young women (i.e., for contraceptive counseling or pregnancy). Anda and colleagues (1987) found, however, that women who used oral contraceptives were no more likely than those who did not use them to be advised to quit smoking.

Advice to Girls

In 1991, about 83 percent of girls had visited a physician within the previous year and 93 percent within the previous two years. Multiple visits were common—about four contacts with a physician per year (Adams and Benson 1992). Thus, physicians had multiple opportunities to advise girls on smoking prevention and cessation. A 1975 ACS survey of girls aged 13 through 17 years found, however, that only 30 percent reported having been cautioned by a health care provider about the dangers of smoking (USDHEW 1977). Similarly, in 1993, only 26.5 percent of girls and young women aged 10 through 22 years remembered that a health care provider had ever talked to them about smoking. White females (27.9 percent) were more likely than black (22.5 percent), Hispanic (23.5 percent), or Alaska Native and American Indian (15.7 percent) females to have been counseled by a health care provider on cigarette smoking. Sample sizes were too small to assess physicians' advice to Asians or Pacific Islander females (CDC 1995d). In the 1999 NYTS, among girls in middle school, 30.6 (± 3.1) percent of never smokers and 31.7 (± 5.9) percent of current smokers had talked to a doctor about the danger of tobacco use; among girls in high school, the percentages were 26.4 (± 3.5) and 31.2 (± 3.9), respectively (CDC 2000b). No gender-specific differences were noted.

Summary

In 1997–1998, the percentage of persons who had ever smoked who had quit smoking was lower

among women (46.2 percent) than among men (50.1 percent), probably because men began to quit smoking earlier in this century than did women and because these data do not take into account that men are more likely than women to switch to or to continue to use other tobacco products when they stop smoking cigarettes. Since the late 1970s or early 1980s, the probability of attempting to quit smoking and succeeding has been equally high among women and men.

In 1998, only 13.0 percent of high school senior girls who had ever smoked regularly had quit smoking. In 1997–1998, 23.8 percent of young women who had ever smoked had quit smoking. In 1998, 34.5 percent of women smokers of reproductive age (18 through 44 years) and 46.1 percent of women overall had quit smoking. The percentage of smokers who have quit smoking increases with age because of increases in the number of smokers who have quit and because of differential mortality between continuing smokers and those who have quit smoking.

In 1996–1998, 43.5 percent of high school senior girls who smoked daily wanted to quit smoking; 45.3 percent had tried at some point and could not quit. In 1995, 75.2 percent of women who were daily smokers wanted to quit smoking completely, and 46.6 percent had tried to quit smoking in the previous year. Women cited concern for health as the primary reason they wanted to quit smoking. The reason most frequently given by women for relapse to smoking was being nervous or tense.

Women are progressing through the smoking continuum over time. The proportion of women who had ever smoked who had quit smoking for 10 or more years doubled between 1979 (10.7 percent) and 1990 (20.9 percent). In 1992, among adult current daily smokers, no gender-specific differences were observed in ever attempting to quit smoking, attempts to quit in the previous 12 months, serious consideration of stopping within the next 6 months, or plans to stop within the next 30 days. Women smokers had made, on average, 6.3 lifetime attempts to quit smoking and 2.7 attempts in the previous 12 months.

In 1991, only 38.9 percent of women smokers who had seen a physician or other health care professional in the previous year reported having received advice to quit smoking. In 1993, only 26.5 percent of girls and young women aged 10 through 22 years remembered a health care provider ever having talked to them about smoking. Although women were slightly more likely than men to report having received such advice during the previous year, when

the results were stratified by the number of visits to a physician, no gender-specific difference was found. Hispanic women were less likely than white women to have received advice to quit smoking, even though the number of physicians' visits was comparable.

In 1992, most women smokers who had successfully quit smoking (88.1 percent) cited abrupt cessation (cold turkey) as one of the methods used. Only 3.4 percent of women former smokers used a formal cessation program in their last attempt to quit

smoking. However, new therapies, particularly pharmacotherapies, have been introduced in recent years, and recent studies suggested that a substantial minority of smokers are using these therapies. From 1987 through 1992, the average number of methods women used during their last attempt to quit smoking increased. Women who quit smoking cold turkey used fewer methods than did women who quit by gradually decreasing the number of cigarettes smoked or by switching to low-tar cigarettes.

Other Tobacco Use

Smokeless tobacco is causally associated with oral leukoplakia and oral cancer and may increase the risk for cancer at other anatomic sites (USDHHS 1986a). Study findings suggest that it also increases the risk of tooth loss, periodontitis, and gingival recession (Novotny and Giovino 1998). In studies limited to men, some evidence suggests that the use of smokeless tobacco may also increase the risk of cardiovascular disease (Benowitz 1992; Bolinder et al. 1994). Results of other studies indicate that the use of a pipe or cigar increases the risk for laryngeal, oral, esophageal, and lung cancers (USDHHS 1982), although again, analyses are limited to men. More recent reviews have concluded that cigar smoking causes cancer of the lung, oral cavity, larynx, esophagus, and probably the pancreas. Persons who smoke cigars heavily and those who inhale cigar smoke deeply are at increased risk for coronary heart disease, aortic aneurysm, and chronic obstructive pulmonary disease (Shanks and Burns 1998). Recent evidence suggests that teens use cigars as "blunts" (i.e., replacing all or part of the tobacco with marijuana) (USDHHS 1999b).

Other tobacco products, such as bidis and kreteks, are being smoked in the United States. Bidis are small, brown, hand-rolled cigarettes from India and other Southeast Asian countries consisting of tobacco wrapped in a tendu or temburni leaf and tied at one end with a string. Bidis are available in different flavors (e.g., cherry, chocolate, mango). When tested on a standard smoking machine, bidis produce higher levels of carbon monoxide, nicotine, and tar than do cigarettes. Because of the low combustability

of the wrapper, bidi smokers inhale more often and more deeply than do cigarette smokers (CDC 1999a). Studies suggest that bidi users are at increased risk for coronary heart disease and several cancers (oral cavity, lung, pharynx, larynx, esophagus, stomach, and liver). Kreteks are clove cigarettes made in Indonesia that contain clove extract and tobacco.

Cigars

Women

National data from the 1964 and 1966 APTS indicated that 0.2 to 0.4 percent of women smoked cigars (USDHEW 1969). Data from the 1970, 1987, 1991, 1992, and 1998 NHIS data indicated that ever smoking and current smoking of cigars by women remained low, but increased during 1970–1998 (ever smoking, from 0.44 percent in 1970 to 5.9 percent in 1998; current smoking, from 0.19 percent in 1970 to 0.7 percent in 1998) (Table 2.32). Results from the 1986 APTS are comparable (APTS, public use data tape, 1986). In the 1998 NHIS, cigar use among women was inversely associated with age (Table 2.32). From 1992 through 1998, the percentage of women who had ever smoked a cigar increased; this increase occurred primarily among women 18 through 44 years of age but not among older women. Other data also suggested that cigar smoking is increasing in popularity among women (Martin and Elkin 1995; Somasundaram 1996). Surveys of tobacco use that were conducted among adults in California in both 1990 and 1996 included questions about current use of cigars. The prevalence of current cigar use among women increased fivefold between 1990 (0.2 ±

Table 2.32. Prevalence (% and 95% confidence interval) of ever and current cigar smoking among women aged 18 years or older, by selected characteristics, National Health Interview Survey, United States, 1970–1998

Characteristic	1970	1987	1991	1992	1998
Ever smoking					
Women	0.44 (±0.08)	3.6 (±0.4)	3.1 (±0.3)	3.7 (±0.5)	5.9 (±0.4)
Aged 18–24 years	0.43 (±0.16)*	4.5 (±1.3)	2.7 (±0.7)	5.0 (±1.7)	9.6 (±1.7)
Aged 25–44 years	0.51 (±0.14)	4.3 (±0.6)	3.6 (±0.4)	4.0 (±0.8)	7.2 (±0.7)
Aged 45–64 years	0.42 (±0.14)	3.3 (±0.7)	3.4 (±0.5)	3.7 (±1.0)	5.0 (±0.7)
Aged 65 years	0.35 (±0.18)*	1.6 (±0.6)	1.7 (±0.4)	2.2 (±0.9)*	1.7 (±0.5)
Men	32.16 (±0.95)	36.3 (±1.3)	35.5 (±1.0)	40.2 (±1.7)	35.1 (±1.0)
Current smoking					
Women	0.19 (±0.05)	0.06(±0.03)*	0.05(±0.03)*	0.02(±0.05)*	0.7 (±0.1)
Men	16.22 (±0.56)	5.3 (±0.4)	3.5 (±0.3)	3.3 (±0.5)	8.4 (±0.5)

Note: Prevalence of ever cigar smoking is the percentage of all persons in each demographic category who reported that they ever smoked cigars. For 1970, prevalence of current cigar smoking is the percentage of all persons in each demographic category who smoked at the time of the survey. For 1987, 1991, and 1992, prevalence of current cigar smoking is the percentage of all persons in each demographic category who reported smoking 50 cigars in their lifetime and who smoked at the time of the survey. For 1998, prevalence of current cigar smoking is the percentage of all persons in each demographic category who reported that they ever smoked cigars and smoked cigars at the time of the survey.

*Estimate should be interpreted with caution because of the small number of respondents.

Sources: National Center for Health Statistics, public use data tapes, 1970, 1987, 1991, 1992, 1998.

0.1 percent) and 1996 (1.1 ± 0.3 percent). Although prevalence of cigar smoking among men increased at a slower rate, it nearly doubled during this period and remained significantly higher (8.9 ± 0.7 percent in 1996) than prevalence among women (Gerlach et al. 1998).

In all years, women were considerably less likely than men to have ever smoked a cigar or to be a current cigar smoker. Although overall use of cigars among women has traditionally been low, it has been higher among some demographic groups of women. Aggregate data from the 1987 and 1991 NHIS showed that cigar use was somewhat higher among American Indian and Alaska Native women (0.2 percent) than among women of other racial and ethnic groups (0.1 percent) (USDHHS 1998). Data from the 1995–1996 Current Population Survey also showed a somewhat higher prevalence of cigar use among American Indian and Alaska Native women (0.5 percent) (Gerlach et al. 1998).

The 1998 NHSDA data reported cigar use over a lifetime and in the past month, by age and gender. Lifetime cigar use ranged from 24.5 (±2.2) percent among women aged 18 through 25 years to 14.5 (±1.5) percent among women aged 35 years or older. Current cigar use (in the past month) decreased from 4.6

(±1.0) percent among women aged 18 through 25 years to 1.5 (±0.5) percent among women aged 35 years or older (SAMHSA, public use data tape, 1998). This finding is in contrast to the results of the 1995–1996 Current Population Survey, which found no age pattern (Gerlach et al. 1998). In the 1998 NHSDA data, lifetime cigar use among women aged 18 through 25 years was 46 percent of that among men in the same age group, and among women aged 35 years or older it was only 24 percent of that among men of comparable age. Current cigar use among women aged 18 through 25 years was one-fourth that among men in the same age group, and among women aged 35 years or older it was one-seventh that among men of comparable age (SAMHSA, public use data tape, 1998).

Girls

The prevalence of cigar use appears to be higher among adolescent girls than among women. The 1998 NHSDA data showed that 14.8 (±1.9) percent of girls aged 12 through 17 years had ever smoked a cigar. This prevalence of ever smoking was about two-thirds that among boys. In the 1999 NYTS, 10.9 (±2.0) percent of middle school girls and 31.9 (±2.8) percent

Table 2.33. Prevalence (% and 95% confidence interval) of current cigar smoking among adolescents less than 18 years of age, by gender and selected characteristics, National Household Survey on Drug Abuse (NHSDA) and Youth Risk Behavior Survey (YRBS), United States, 1998–1999

Characteristic	1998 NHSDA* (ages 12–17)		1999 YRBS† (grades 9–12)	
	Girls	Boys	Girls	Boys
Overall	3.7 (±1.0)	7.5 (±1.3)	9.8 (±2.4)	24.3 (±2.2)
Age (years)				
12–14	2.1 (±1.0)	2.0 (±0.9)	8.6 (±3.3)	15.8 (±5.8)
15–17	5.4 (±1.6)	13.4 (±2.5)	9.9 (±2.7)	25.4 (±2.2)
Race/ethnicity				
White, non-Hispanic	4.2 (±1.4)	8.5 (±1.8)	8.8 (±2.9)	27.3 (±3.3)
Black, non-Hispanic	2.3 (±1.3)‡	4.7 (±2.1)‡	12.3 (±4.3)	14.5 (±3.3)
Hispanic	3.9 (±1.7)	6.6 (±2.3)	10.7 (±2.7)	22.4 (±3.8)

Note: NHSDA is a household survey that includes adolescents 12–17 years of age; 67.0% were 14–17 years of age. YRBS is a school-based survey that includes high school students in grades 9–12; these analyses were restricted to those less than 18 years of age; of these, 99.8% were 14–17 years of age. Data are not comparable across surveys due to differences in ages surveyed and survey methods.

*For NHSDA, prevalence of current cigar smoking is the percentage of all persons in each demographic category who reported smoking cigars in the 30 days preceding the survey.

†For YRBS, prevalence of current cigar smoking is the percentage of all persons in each demographic category who reported smoking cigars on one or more days in the 30 days preceding the survey.

‡Estimate should be interpreted with caution because of the small number of respondents.

Sources: NHSDA: Substance Abuse and Mental Health Services Administration, public use data tape, 1998. YRBS: Centers for Disease Control and Prevention, Division of Adolescent and School Health, public use data tape, 1999.

of high school girls had ever smoked cigars, compared with 20.1 (±2.2) percent of middle school boys and 51.1 (±3.1) percent of high school boys (CDC 2000b).

In the 1999 YRBS data, 9.8 percent of high school girls less than 18 years of age and 9.9 percent of all high school girls had smoked a cigar in the month preceding the survey (Table 2.33) (Kann et al. 2000). Estimates were somewhat lower for NHSDA; the 1998 NHSDA data showed that 3.7 (±1.0) percent of girls aged 12 through 17 years had smoked a cigar in the past month. No racial or ethnic differences in prevalence were found. Prevalence of cigar smoking did not vary by age for girls in YRBS, although higher prevalence at age 15 years was noted in NHSDA. In contrast, prevalence increased with age for boys in both surveys. Girls were significantly less likely than boys to be current cigar users (Table 2.33) (Kann et al. 2000). A 1996 national survey conducted by The Robert Wood Johnson Foundation estimated that 16.0 percent (1.7 million) of adolescent girls aged 14 through 19 years had smoked a cigar in the past year;

the prevalence among boys was 37.0 percent (CDC 1997a). Among girls, the prevalence of cigar smoking in the past month was about one-half that among boys (SAMHSA, public use data tape, 1998). In the 1999 NYTS, 4.4 (±1.3) percent of girls in middle school and 10.2 (±1.6) percent of girls in high school reported smoking cigars in the previous month. Girls were about half as likely as boys to be current cigar users (CDC 2000b).

Pipes

Women

National data from the 1964 and 1966 AUTS indicated that 0.3 percent of women smoked a pipe (USDHEW 1969). In the 1986 AUTS and the 1970, 1987, 1991, and 1992 NHIS, pipe smoking among women was low (0.0 to 0.1 percent) (NCHS, public use data tapes, 1970, 1987, 1991, 1992; USDHHS, public use data tape, 1986; Giovino et al. 1993; Nelson et al. 1996). Aggregate data from the 1987 and 1991 NHIS showed that pipe use was low among white women

(0.1 percent) and among women of other racial and ethnic groups (0.0 percent) (USDHHS 1998). In all years, women were much less likely than men to smoke a pipe (NCHS, public use data tapes, 1970, 1987, 1991, 1992; USDHHS, public use data tape, 1986).

Girls

In the 1999 NYTS, 1.4 (± 0.6) percent of girls in middle school and 1.4 (± 0.5) percent of girls in high school reported that they had smoked a pipe in the preceding month. Current pipe use among girls was 33 to 40 percent that of boys (CDC 2000b).

Smokeless Tobacco

Women

Data from the 1964 and 1966 AUTS indicated that about 2.0 percent of women used snuff and about 0.4 percent used chewing tobacco (USDHEW 1969). In the 1985 NHSDA data, 3 percent of women aged 21 years or older reported ever using smokeless tobacco, whereas 1 percent reported use in the past year. Among women who reported ever using smokeless tobacco, 26 percent reported use almost every day in the past year (Rouse 1989).

In NHIS data, current use of smokeless tobacco is defined as reported use of snuff or chewing tobacco at least 20 times and at the time of the survey. Because of the small sample size, multiple years of data were combined to derive some estimates. Use of smokeless tobacco by women decreased significantly from 1970 through 1991–1992 and 1994 (1991/1992/1994, combined data), and the decline was significant among women in almost all demographic groups (Table 2.34). Further declines occurred through 1998 among women 65 years of age or older. Declines that were borderline statistically significant were found among women overall, black non-Hispanic women, and women who reside in the South. In 1998 data, use of smokeless tobacco was more prevalent among older women than among younger women. Other surveys have also found a higher prevalence of smokeless tobacco use among older women (Bauman et al. 1989; Giovino et al. 1995).

In NHIS data for 1998, black women (1.0 percent) were more likely than white women (0.2 percent) to use smokeless tobacco (Table 2.34). This finding holds for all regions of the country (NCHS, public use data tape, 1998) and is consistent with the results of other surveys (Bauman et al. 1989; Marcus et al. 1989; Giovino et al. 1995). In the 1970 NHIS data, 24.5 percent of black women aged 65 years or older currently used smokeless tobacco (NCHS, public use data tape, 1970).

The 1985 NHSDA data found a high prevalence of use among black women aged 55 years or older: 19 percent had used smokeless tobacco in their lifetime, and 12 percent were current daily users (Rouse 1989). A 1985 study of current use of smokeless tobacco in 10 areas of the Southeast also reported prevalence to be particularly high among black women aged 70 years or older (18.6 percent) (Bauman et al. 1989). This prevalence was higher than that for any other age, race (black or white), or gender group.

Aggregated data from the 1987 and 1991 NHIS showed that use of smokeless tobacco was reported by 2.9 percent of black women, 1.2 percent of American Indian or Alaska Native women, 0.3 percent of white women, 0.1 percent of Hispanic women, and 0 percent of Asian or Pacific Islander women (Giovino et al. 1994; USDHHS 1998). Two studies have examined use of smokeless tobacco among American Indian women in the Lumbee tribe in southeastern North Carolina and in the Cherokee tribe in western North Carolina (CDC 1995b; Spangler et al. 1997a,b). They found that a significant percentage of the women reported current use of smokeless tobacco (23 and 8 percent, respectively). In both studies, use was higher among older women, women with fewer than 12 years of education, and women with a low income level. The study of Lumbee women found that 28 percent of the women who had ever used smokeless tobacco started using it by the age of 6 years (CDC 1995b). In other studies, smokeless tobacco use was low (2 percent) among American Indian women in Montana (Nelson et al. 1997) but relatively high among Navajo women (10 percent) (Strauss et al. 1997). Alaska Native women have a higher prevalence of smokeless tobacco use (11 percent) than do American Indian women in the continental United States (1 percent) (Kaplan et al. 1997). Although Glover and Glover (1992) reported that gender is not a predictor of smokeless tobacco use among American Indian or Alaska Natives, national data suggested that among American Indian or Alaska Natives, women were less likely than men to use smokeless tobacco (USDHHS 1998).

In NHIS data, women with 12 or more years of education were less likely than women with less than 12 years of education to use smokeless tobacco (Table 2.34). Less than 1 percent of women with 12 or more years of education were users of smokeless tobacco. For all women except for those with 9 to 11 years of education, the use of smokeless tobacco decreased during 1970–1998. Use of smokeless tobacco among women was more likely in rural areas than in urban areas and more likely in the South than in other

Table 2.34. Prevalence (% and 95% confidence interval) of current use of smokeless tobacco among adults aged 18 years or older, by gender and selected characteristics, National Health Interview Survey, United States, 1970 and 1991, 1992, 1994 (aggregate data) and 1998

Characteristic	1970		1991/1992/1994		1998	
	Women	Men	Women	Men	Women	Men
Overall	1.8 (±0.3)	5.2 (±0.6)	0.5 (±0.1)	5.6 (±0.4)	0.3 (±0.1)	5.1 (±0.5)
Age (years)						
18–44	0.6 (±0.2)	2.9 (±0.4)	0.1 (±0.1)	6.3 (±0.6)	0.1 (±0.1)*	6.4 (±0.7)
45–64	2.3 (±0.5)	5.8 (±0.8)	0.5 (±0.2)	4.3 (±0.6)	0.4 (±0.3)*	3.2 (±0.6)
65	4.8 (±0.9)	12.7 (±1.6)	1.5 (±0.3)	4.9 (±0.9)	0.6 (±0.3)	3.5 (±0.9)
Race/ethnicity [†]						
White, non-Hispanic	1.2 (±0.3)	5.0 (±0.6)	0.3 (±0.1)	6.6 (±0.5)	0.2 (±0.1)*	6.3 (±0.6)
Black, non-Hispanic	7.5 (±2.0)	7.4 (±1.4)	2.2 (±0.8)	2.9 (±0.7)	1.0 (±0.4)	0.8 (±0.4) [‡]
Education (number of years) [‡]						
8	6.5 (±1.2)	12.9 (±1.1)	3.7 (±0.8)	8.9 (±1.4)	2.6 (±1.2)	6.1 (±1.9)
9–11	1.2 (±0.3)	4.5 (±0.7)	0.8 (±0.4)	7.1 (±1.4)	1.2 (±0.6)*	7.7 (±1.8)
12	0.3 (±0.1)	2.4 (±0.4)	0.1 (±0.0)	4.6 (±0.4)	0.1 (±0.0)*	4.4 (±0.5)
Region						
South	5.0 (±1.0)	9.2 (±1.5)	1.2 (±0.3)	8.8 (±1.0)	0.7 (±0.2)	7.0 (±0.9)
Other	0.4 (±0.1)	3.4 (±0.5)	0.1 (±0.0)	4.1 (±0.4)	0.1 (±0.0)*	4.0 (±0.5)
Residence						
Rural	3.7 (±0.8)	9.8 (±0.9)	1.2 (±0.4)	11.3 (±1.4)	0.7 (±0.3)*	9.9 (±1.3)
Urban	0.8 (±0.3)	2.7 (±0.4)	0.3 (±0.1)	4.0 (±0.4)	0.2 (±0.1)	3.7 (±0.5)

Note: In 1970, prevalence of current use of smokeless tobacco was the percentage of all persons in each demographic category who reported that they used snuff or chewing tobacco at the time of the survey. In 1991/1992/1994 and 1998, prevalence of current use of smokeless tobacco was the percentage of all persons in each demographic category who reported that they used snuff or chewing tobacco 20 times during their lifetime and who used snuff or chewing tobacco at the time of the survey.

*Estimate should be interpreted with caution because of the small number of respondents.

[†]Ethnicity was not determined in 1970. Thus, estimates for whites and for blacks for that year likely include data for some persons of Hispanic origin.

[‡]For women aged 25 years.

Sources: National Center for Health Statistics, public use data tapes, 1970, 1991, 1992, 1994, 1998.

regions (Table 2.34). In the 1995–1996 Current Population Survey, smokeless tobacco use among women was low overall and did not exceed 2.1 percent in any state. A clear pattern of higher use, however, was observed in the Southeast (data not shown) (U.S. Bureau of the Census, public use data tape, 1995–1996).

A 1995 survey of the U.S. Department of Defense reported that 0.7 percent of military women used smokeless tobacco (Bray et al. 1996). Use was highest among women in the U.S. Marine Corps (1.6 ± 0.8 percent) and lowest among women in the U.S. Navy (0.3 ± 0.3 percent).

Gender-specific differences in smokeless tobacco use are long-standing. In AUTS data for 1964, the same proportion of men as women (2 percent) used snuff, but in the 1966 AUTS data, 3.1 percent of men and 2.1 percent of women used snuff. In both survey years, the proportion of women who used chewing tobacco was considerably lower than that for men (0.5 vs. 5.1 percent in 1964, and 0.4 vs. 7.1 percent in 1966) (USDHEW 1969). Data from the 1985 NHSDA showed that 3 percent of women had ever used smokeless tobacco and 1 percent had used it in the past year, whereas 20 percent of men had ever used smokeless tobacco and 12 percent had used it in

the past year. However, women who had ever used smokeless tobacco were as likely as men to have used it almost daily in the past year (Rouse 1989). In the 1991/1992/1994 NHIS data, women were significantly less likely than men to use smokeless tobacco (0.5 vs. 5.6 percent) (Table 2.34).

NHIS data showed a decline in use of smokeless tobacco between 1970 and 1991/1992/1994 among women, but the prevalence of use of all types of smokeless tobacco (chewing tobacco and snuff combined) among men did not change during this period (Table 2.34). From 1970 through 1991/1992/1994, women and men aged 45 years or older showed declines in smokeless tobacco use. During this period, use declined among women aged 18 through 44 years and increased significantly among men in the same age group. Smokeless tobacco use by women was higher for women aged 65 years or older than for women of younger ages. Use by men was higher among those 65 years or older in 1978, but higher for those aged 18 through 44 years in the 1990s. In addition, although smokeless tobacco use was more prevalent among black women than among white women in all years, the reverse was true among men in the 1990s. Among all racial and ethnic groups except blacks, women were much less likely than men to use smokeless tobacco (USDHHS 1998).

Girls

Findings in a study using cohort data from the 1989 TAPS I and the 1993 TAPS II suggested that about 1.7 percent of females aged 11 through 19 years experiment with smokeless tobacco use each year but that few of them become regular users (Tomar and Giovino 1998). However, results of more recent school-based surveys (MTF Survey) suggested that the prevalence of smokeless tobacco use among girls may be increasing (Johnston et al. 1995b). In the 1999 NYTS, 3.3 (± 0.8) percent of middle school girls and 7.6 (± 1.5) percent of high school girls reported ever using smokeless tobacco (CDC 2000b).

In the 1998 MTF Survey, 1.5 percent of 8th-grade girls, 1.8 percent of 10th-grade girls, and 1.5 percent of 12th-grade girls reported using smokeless tobacco in the preceding month (University of Michigan, Institute for Social Research, public use data tape, 1998). In an analysis of 1999 YRBS data for high school students less than 18 years of age, 1.4 (± 0.6) percent of girls had used smokeless tobacco in the past month (CDC, Division of Adolescent and School Health, public use data tape, 1999). Similarly, in the NYTS, 1.3 (± 0.5) percent of girls in middle school and 1.5 (± 0.6) percent of girls in high school had used smokeless

tobacco in the previous month (CDC 2000b). Published data from the 1999 YRBS found that 1.4 (± 0.6) percent of all girls in grades 9 through 12 used smokeless tobacco in the past month; white girls were more likely than black girls to have used smokeless tobacco (Kann et al. 2000).

Although the prevalence of smokeless tobacco use is low for girls overall, it is higher for girls in specific geographic regions (e.g., the Southeast and rural Alaska) (CDC 1987a) and in certain racial and ethnic groups (American Indian or Alaska Native). For example, a 1987 study found that 15.3 percent of adolescent girls in the Southeast had tried smokeless tobacco. The rate of trying smokeless tobacco was highest among American Indian girls (20.2 percent) and lowest among black girls (10.8 percent) (Riley et al. 1990). A 1987–1988 study of use of smokeless tobacco among sixth-grade students reported that 28.7 percent of girls at three Indian Health Service sites currently used smokeless tobacco (Backinger et al. 1993). Similarly, 30 percent of American Indian girls who lived on or near reservations in Montana used smokeless tobacco (Nelson et al. 1997). However, a representative 1991 household survey of Navajo females aged 12 through 19 years reported a prevalence of smokeless tobacco use of only 3 percent (Freedman et al. 1997), and the 1997 YRBS survey of high schools that are funded by the Bureau of Indian Affairs found a 16-percent prevalence of smokeless tobacco use (Bureau of Indian Affairs 1997).

Use of smokeless tobacco is much lower among girls than among boys (USDHHS 1994; CDC 2000b). In the 1998 MTF Survey, 1.5 percent of high school senior girls, but 15.7 percent of high school senior boys, used smokeless tobacco in the past month (University of Michigan, Institute for Social Research, public use data tape, 1998). The 1999 YRBS found that 1.3 (± 0.5) percent of high school girls less than 18 years of age but 14.2 (± 3.8) percent of their male counterparts used smokeless tobacco in the past month (CDC, Division of Adolescent and School Health, public use data tape, 1999). Similar patterns were noted among all high school students (Kann et al. 2000).

Other Tobacco Products

Bidis

In the 1999 NYTS, 4.1 (± 1.1) percent of girls in middle school and 11.5 (± 2.5) percent of girls in high school had ever smoked bidis (CDC 2000b). No gender differences were noted for middle school students, but high school girls (11.5 \pm 2.5 percent) were less likely than high school boys (16.6 \pm 2.5 percent) to

have ever smoked bidis. In the 1999 NYTS, 1.8 (± 0.6) percent of girls in middle school and 3.8 (± 1.0) percent of girls in high school reported smoking bidis in the preceding month; use may be higher in some urban areas (CDC 1999a). Girls were less likely than boys to have smoked bidis in the past month.

Kreteks

In the 1999 NYTS, 1.7 (± 0.7) percent of girls in middle school and 5.3 (± 1.5) percent of girls in high school reported smoking kreteks in the previous month (CDC 2000b). No gender-specific differences in kretek use were noted.

Summary

Although cigar use is lower among women than among men, the fivefold increase in current use

among women in California from 1990 through 1996 and the high prevalence of use among girls in other surveys suggested that cigar smoking is becoming more prevalent among women and girls. Pipe smoking among women is low, and women are much less likely than men to smoke a pipe.

The prevalence of use of smokeless tobacco among girls and women is low and remains considerably lower than that among boys and men. Use of smokeless tobacco is higher among black women and American Indian or Alaska Native women, women with fewer than 12 years of education, and women who live either in rural areas or in the South. Among girls, use may be highest among American Indian or Alaska Native girls. For "other" tobacco use among high school girls, cigar use is the most common, bidi use and kretek use are intermediate, and pipe use and smokeless tobacco use are the least common.

Exposure to Environmental Tobacco Smoke

Exposure to environmental tobacco smoke (ETS) has emerged as a public health problem. In 1992, the U.S. Environmental Protection Agency (EPA) released a report concluding that ETS is a group A (known human) carcinogen responsible for about 3,000 lung cancer deaths per year in nonsmokers (EPA 1992). Although this finding was set aside by a judicial verdict, other organizations have concluded that ETS is a human carcinogen (National Cancer Institute 1999). Other studies suggest that ETS increases the risk of cardiovascular disease as well as adverse reproductive outcomes. (See "Environmental Tobacco Smoke" in Chapter 3 for a review of effects of ETS exposure on health.) A national study (Pirkle et al. 1996) found that 88 percent of non-tobacco users 4 years of age or older had detectable cotinine levels, a finding that indicated widespread exposure of the U.S. population to ETS.

Respondents to the 1966 AUTS were asked whether it was annoying to be near a person who is smoking (USDHEW 1969); 55.0 percent of women said yes. Women who had never smoked (71.3 percent) were more likely to agree with this statement than were women current smokers (27.2 percent) or former smokers (56.9 percent). Women (55 percent) were more likely than men (41 percent) to report being annoyed by being near a person who is smoking. Two decades

later, the 1987 NHIS determined whether respondents believed that smoke from someone else's cigarette was harmful to them; 82.9 percent of women and 79.7 percent of men believed so (Schoenborn and Boyd 1989).

Home

In a 1963 household survey in Maryland, 64.2 percent of women who were nonsmokers reported being exposed to ETS in the home (Sandler et al. 1989). Exposure decreased with increasing age and educational attainment. Married women were more likely than unmarried women to be exposed to ETS at home, and women living in households having more than one adult were also more likely to be exposed to ETS at home. Women (64.2 percent) were considerably more likely than men (30.0 percent) to report exposure to ETS, a finding that most likely reflects the higher prevalence of smoking among men than among women in the early 1960s.

Among Hispanic nonsmoking girls and women who participated in the 1982–1983 HHANES, the proportion who reported ETS exposure at home ranged from 31 percent (among Puerto Rican American women aged 40 through 49 years) to 62 percent (among Mexican American girls and young women aged 12 through 19 years) (Pletsch 1994). Among both

Mexican Americans and Puerto Rican Americans, adolescents had significantly higher levels of exposure in the home than did older groups.

A study of cardiovascular risk factors among urban young adults assessed exposure to ETS (Wagenknecht et al. 1993b). In 1985–1986, 28.7 percent of nonsmoking white women and 34.6 percent of nonsmoking black women with a high school education or less had a detectable cotinine level, indicating exposure to ETS. Among white women and black women with more than a high school education, the percentages were 21.3 percent and 27.5 percent, respectively.

A 1986 study of exposure to ETS in the home and workplace among adults attending a screening clinic found that 75.1 percent of nonsmoking women were exposed to ETS in the home sometime in their adult lifetime; 66 percent of these women reported ETS exposure from their spouse (Cummings et al. 1989). Thus, most of the women who reported a history of ETS exposure in the home as an adult were exposed to ETS by their husbands. Nonsmoking women in older age groups reported higher lifetime exposure to ETS in the home. This finding probably reflects the higher prevalence of smoking among older cohorts of men. Women (75.1 percent) were more likely than men (51.1 percent) to report lifetime exposure to ETS in the home.

In NHANES data for 1988–1991, 18.3 percent of nonsmoking females 17 years of age or older lived in homes where a member of the household smoked in the home (Pirkle et al. 1996). Exposure was greatest among females aged 17 through 19 years (31.9 percent). However, this same study reported that although only 37 percent of all nonsmokers reported home or work exposure to ETS, 88 percent of nonsmokers in the sample had detectable levels of cotinine, a fact that indicated widespread exposure to ETS.

In NHIS data for 1994, 13.2 (± 0.9) percent of women who were currently nonsmokers reported that someone living in the home smoked inside the home; exposure to ETS was highest among women nonsmokers aged 18 through 24 years (19.3 \pm 3.7 percent) and lowest among those aged 65 years or older (7.6 \pm 1.4 percent) (NCHS, public use data tape, 1994). Consistent with other data (Matanoski et al. 1995), ETS exposure decreased with increasing level of education; only 7.1 (± 1.5) percent of women nonsmokers with 16 or more years of education reported exposure to ETS. Black women reported the highest exposure to ETS (16.2 \pm 3.1 percent), and Hispanic women reported the lowest exposure (10.2 \pm 2.5 percent). Aggregate NHIS data for 1991–1993 found that the percentage of women nonsmokers exposed to ETS in the home on three or more days per week was highest among

American Indians or Alaska Natives (17.8 percent), intermediate among Asians or Pacific Islanders (15.5 percent) and blacks (15.1 percent), and lowest among whites (13.1 percent) and Hispanics (13.0 percent), but these differences were not statistically significant (USDHHS 1998). No gender-specific differences were noted overall, but among persons 65 years of age or older, women (7.6 \pm 1.4 percent) were less likely than men (12.1 \pm 2.1 percent) to report exposure by someone living in the home (NCHS, public use data tape, 1994).

In the 1994 NHIS, among women nonsmokers who reported ETS exposure in the home, 86.2 (± 1.3) percent reported that smoking, either by someone living in the home or by visitors, occurred frequently (4 days per week) (NCHS, public use data tape, 1994). Women aged 65 years or older were less likely to report frequent smoking in the home than were women aged 25 through 64 years. Women with 16 or more years of education were less likely than women with 9 to 12 years of education to report frequent exposure to ETS in the home. Hispanic women were less likely than white women to report frequent exposure to ETS at home. Men nonsmokers were as likely as women nonsmokers to report that smoking frequently occurred in the home.

In a 1993 California survey, 52 percent of the women reported a complete ban on smoking in their homes, and 21 percent reported a partial ban (Pierce et al. 1994a). Hispanic women and Asian or Pacific Islander women were more likely than white women or black women to have a total ban on smoking in the home. Women with 16 or more years of education were also more likely to report a total ban than were women with less education.

Workplace

The National Institute for Occupational Safety and Health (NIOSH) has concluded that the risk for lung cancer and possibly heart disease is increased among workers who are occupationally exposed to ETS, and NIOSH has recommended that ETS be classified as a potential occupational carcinogen (NIOSH 1991). A 1997 study among nurses suggested that regular exposure to ETS at work increases the risk of heart disease among women (Kawachi et al. 1997) (see “Environmental Tobacco Smoke and Coronary Heart Disease” in Chapter 3). Many state and local governments have passed legislation to limit exposure to ETS in the workplace. Many businesses have also established their own policies to promote smoke-free indoor air. In the 1992–1993 Current Population Survey, 51 percent of women

reported a smoke-free policy in the workplace, 19 percent had a smoke-free policy in work areas only, and 30 percent either had a workplace that allowed smoking anywhere or had no policy on smoking in the workplace (Gerlach et al. 1997).

A 1986 survey of persons who had never smoked found that 75.0 percent of working women reported current exposure to the tobacco smoke of others in the workplace (Cummings et al. 1989). Women younger than 40 years of age were more likely than those aged 40 through 79 years to report such exposure. Younger women also reported significantly more hours of exposure at work per week than did the older women. However, women (75.0 percent) were less likely than men (93.0 percent) to report ETS exposure at work.

In NHANES data for 1988–1991, 19.7 percent of females aged 17 years or older reported work exposure to ETS (Pirke et al. 1996). Exposure was greatest for women aged 20 through 29 years (31.1 percent). However, this same study reported that although only 37 percent of all nonsmokers 17 years of age or older reported home or work exposure to ETS, 88 percent

of nonsmokers in the sample had detectable levels of cotinine, indicating widespread exposure to ETS.

The 1992 NHIS asked whether smoking had occurred in the immediate work area in the two weeks before the survey; workers who reported exposure were then asked if they were bothered by smoking in the immediate work area in those two weeks. In 1992, 16.6 percent of nonsmoking women reported that smoking had occurred in the immediate work area (Table 2.35). This finding is consistent with a 1993 statewide survey from California, which found that 17.2 percent of women nonsmokers were exposed to ETS in indoor workplaces (Pierce et al. 1994a). In NHIS data, women aged 18 through 44 years were somewhat more likely than older women to be exposed, but this finding was not statistically significant (Table 2.35). No differences were found by race, but women with 12 or fewer years of education and workers in service or blue-collar positions were more likely to report recent ETS exposure in the immediate work area. Women were less likely than men to report ETS exposure in the immediate work area.

Table 2.35. Percentage (and 95% confidence interval) of nonsmoking women aged 18 years or older who reported that anyone smoked in their immediate work area and the proportion of those exposed who reported being bothered by cigarette smoke in their immediate work area, by selected characteristics, National Health Interview Survey, United States, 1992

Characteristic	Exposed to smoking in immediate work area*	Bothered by cigarette smoke in immediate work area [†]
Women	16.6 (±1.8)	60.0 (±5.6)
Age (years)		
18–44	18.0 (±2.2)	60.7 (±6.7)
45	13.4 (±3.0)	57.5 (±12.1)
Race/ethnicity		
White, non-Hispanic	16.6 (±2.2)	59.5 (±6.8)
Black, non-Hispanic	21.3 (±5.8)	55.8 (±13.0)
Education (number of years) [‡]		
12	21.6 (±3.4)	54.4 (±8.5)
>12	10.4 (±1.8)	64.0 (±9.8)
Occupational category		
White collar	14.1 (±1.9)	61.9 (±6.9)
Service or blue collar	28.4 (±5.1)	56.3 (±10.5)
Men	26.1 (±3.1)	46.9 (±6.3)

*Based on the question, “During the past 2 weeks, has anyone smoked in your immediate work area?”

[†]Based on the question, “During the past 2 weeks, have you ever been bothered by cigarette smoke in your immediate work area?” Analysis was restricted to those who reported that someone had smoked in their immediate work area.

[‡]For women aged 25 years.

Source: National Center for Health Statistics, Cancer Control Supplement, public use data tape, 1992.

A 1993 statewide survey from California found that ETS exposure was reported by 8.1 percent of female nonsmokers whose workplaces prohibited smoking in all areas, 28.8 percent whose workplaces banned smoking in work areas but allowed it in common areas, and 79.1 percent whose workplaces allowed smoking in some or all work areas (Pierce et al. 1994a). Female nonsmokers whose workplaces prohibited smoking either in all areas or in work areas were less likely to report exposure than were male nonsmokers working under similar policies. However, female nonsmokers whose workplaces had few or no restrictions were more likely to report exposure than were male nonsmokers whose workplaces had few or no restrictions.

In the 1992 NHIS, among women nonsmokers who reported exposure to ETS at work in the previous two weeks, 60.0 percent reported being bothered by exposure to smoke (Table 2.35). No differences were noted by age, education, race, or occupational category, but CIs were large. Nonsmoking women were more likely than nonsmoking men to report being bothered by smoke in the immediate work area. In particular, nonsmoking women with 12 or fewer years

of education (54.4 ± 8.5 percent) were more likely than nonsmoking men with comparable educational attainment (36.3 ± 4.3 percent) to report being bothered by ETS in the immediate work area (NCHS, public use data tape, 1992) (data not shown). Hispanic nonsmoking women (85.5 ± 13.0 percent) were more likely than Hispanic nonsmoking men (40.6 ± 19.2 percent) to report being bothered by ETS exposure. White nonsmoking women (59.5 ± 6.8 percent) were more likely than white nonsmoking men (46.7 ± 7.0 percent) to report being bothered, but the differences were not statistically significant. No significant gender-specific differences were noted by age or occupational category (NCHS, NHIS, public use data tape, 1992).

Summary

In 1994, 13.2 percent of women who did not smoke reported that someone living in the home smoked inside the home. Among nonsmoking women who were exposed to ETS in the home, 86.2 percent reported frequent exposure (4 days per week). In 1992, 16.6 percent of women who did not smoke reported that smoking had occurred in the immediate work area in the two weeks before the survey.

Other Issues

Other issues related to women and smoking include body weight, other drug use, and mental health. The focus here is on prevalence data from large-scale, nationally representative surveys. Other chapters discuss some of these topics in depth (see “Body Weight and Fat Distribution” and “Depression and Other Psychiatric Disorders” in Chapter 3 and “Weight Control” and “Depression” in Chapter 5).

Smoking and Body Weight

Several studies of adolescents and adults found relationships between smoking and body image, body weight, and dieting behavior (USDHHS 1988b; Fisher et al. 1991; Gritz and Crane 1991; Klesges et al. 1991; Croft et al. 1992; Klesges and Klesges 1993; Page et al. 1993; French et al. 1994; Welch and Fairburn 1998). Women’s concerns about weight may encourage smoking initiation, may be a barrier to smoking cessation, and may increase relapse rates among women who stop smoking (Sorensen and Pechacek

1987; Klesges and Klesges 1988; Gritz et al. 1989; Klesges et al. 1989, 1997; USDHHS 1990a; Pirie et al. 1991; French et al. 1992, 1994; Gritz and St. Jeor 1992; Weekley et al. 1992; Camp et al. 1993; French and Jeffery 1995; Welch and Fairburn 1998). However, two prospective studies in working populations found that weight concerns did not predict cessation (French et al. 1995; Jeffery et al. 1997). Although smokers weigh less than nonsmokers and gain weight after they quit smoking, changes in body weight with changes in smoking status are generally small, and the health benefits of smoking cessation greatly outweigh any risks associated with weight gain (Williamson et al. 1991; Colditz et al. 1992; Audrain et al. 1995; Flegal et al. 1995).

Smoking and Attempted Weight Loss Among Girls

Data from the 1999 school-based YRBS indicated that most girls (66.4 percent) in grades 9 through 12 (and <18 years of age) who currently smoked were

Table 2.36. Percentage (and 95% confidence interval) of adolescents in grades 9–12 and less than 18 years of age who were attempting to lose weight, by gender and smoking status, Youth Risk Behavior Survey, United States, 1999

Characteristic	Girls	Boys
Overall		
Current smokers*	66.4 (±3.6)	25.5 (±4.0)
Noncurrent smokers [†]	59.4 (±3.6)	30.2 (±4.4)
Never smoked [‡]	52.4 (±4.3)	25.5 (±4.0)
White, non-Hispanic		
Current smokers	66.2 (±4.8)	25.0 (±5.6)
Noncurrent smokers	62.4 (±6.8)	28.9 (±6.4)
Never smoked	56.6 (±6.4)	24.6 (±4.0)
Black, non-Hispanic		
Current smokers	59.8 (±10.7)	23.8 (±5.2)
Noncurrent smokers	44.7 (±7.1)	26.7 (±12.3)
Never smoked	47.9 (±7.9)	16.4 (±5.0)
Hispanic		
Current smokers	76.6 (±6.3)	39.0 (±8.6)
Noncurrent smokers	65.6 (±6.4)	42.2 (±8.5)
Never smoked	51.1 (±7.5)	34.3 (±10.3)

Note: Estimates of the percentage of those attempting to lose weight are based on response to the question, “Which of the following are you trying to do about your weight?” Those answering “lose weight” were included.

*Current smokers are persons who reported smoking in the past 30 days.

[†]Noncurrent smokers are persons who reported trying cigarette smoking, even one or two puffs, but did not smoke in the past 30 days.

[‡]Never smokers are persons who never smoked a cigarette, not even one or two puffs.

Source: Centers for Disease Control and Prevention, Division of Adolescent and School Health, public use data tape, 1999.

attempting to lose weight (Table 2.36). This percentage is significantly higher than that for girls who never smoked (52.4 percent); the percentage of girls who had smoked previously who were attempting weight loss (59.4 percent) is intermediate. The differences between the percentages of girls who currently smoked and girls who had never smoked and between the percentages of girls who had previously smoked and girls who had never smoked were statistically significant among Hispanic girls. Among current smokers, Hispanic girls were more likely than black girls to be trying to lose weight; this finding was of borderline statistical significance. In contrast, no relationship between smoking and attempted weight loss was found among boys. Regardless of smoking status or racial or ethnic group, adolescent girls were much more likely than adolescent boys to be trying to lose weight. In the 1989 TAPS I data, both girls and boys who smoked were more likely than nonsmokers to believe that smoking helps to keep weight down

(Moss et al. 1992). Several local school-based studies reported similar relationships between smoking and weight (see “Concerns About Weight Control” in Chapter 4).

Smoking and Perception of Body Weight Among Women

The relationship between perceived weight and smoking status among women was examined in the 1991 NHIS data. Women who were overweight (for women aged <20 years, a body mass index [BMI] 25.7; for women aged 20 years, a BMI 27.3) on the basis of self-reported weight and height (USDHHS 1995) were excluded from the analysis. Among normal weight and underweight women, former smokers were the most likely to perceive themselves as overweight, and current smokers were more likely than women who had never smoked to perceive themselves as overweight (Table 2.37). However, the relationship between smoking status and perceived

Table 2.37. Perception of overweight (% and 95% confidence interval) among normal and underweight women aged 18 years or older, by smoking status and selected characteristics, National Health Interview Survey, United States, 1991

Characteristic	Current smokers*	Former smokers [†]	Never smoked [‡]
Women	37.9 (±1.5)	42.8 (±1.8)	33.2 (±1.0)
Age (years)			
18–24	35.9 (±4.6)	31.2 (±7.7)	27.0 (±2.7)
25–44	40.4 (±2.2)	41.9 (±2.9)	36.4 (±1.6)
45–64	40.3 (±3.0)	51.4 (±3.5)	40.4 (±2.4)
65	21.9 (±3.9)	36.2 (±3.7)	24.6 (±1.9)
Race/ethnicity			
White, non-Hispanic	38.5 (±1.7)	43.2 (±1.9)	34.7 (±1.2)
Black, non-Hispanic	29.7 (±4.5)	33.7 (±7.3)	28.3 (±3.1)
Hispanic	45.0 (±7.6)	43.6 (±8.8)	33.2 (±3.6)
Men	18.9 (±1.4)	27.8 (±1.7)	17.8 (±1.1)

Note: Perception of overweight is determined by the question, “Do you consider yourself overweight, underweight, or just about right?” This analysis excludes those who were actually overweight (body mass index ≥ 25.7 for women <20 years of age; body mass index ≥ 27.3 for women ≥ 20 years of age) based on self-reported weight and height.

*Current smokers reported smoking ≥ 100 cigarettes in their lifetime and smoked at the time of the survey.

[†]Former smokers reported smoking ≥ 100 cigarettes in their lifetime but did not smoke at the time of the survey.

[‡]Never smokers did not smoke ≥ 100 cigarettes in their lifetime.

Source: National Center for Health Statistics, public use data tape, 1991.

weight varied substantially by age. Among young women aged 18 through 24 years, current smokers were more likely than those who had never smoked to perceive themselves as overweight. Among women aged 25 through 44 years, both former smokers and current smokers were more likely than those who had never smoked to perceive themselves as overweight. For the older age groups (45 through 64 years and 65 years or older), former smokers were more likely than those who had never smoked and current smokers to view themselves as overweight. In contrast, for all age groups, self-reported body weight adjusted for height was similar among former smokers and those who had never smoked and lowest among current smokers (NCHS, public use data tape, 1991).

When examined by race and ethnicity, the overall relationship between smoking status and perceived weight was found among white women only (Table 2.37). No statistically significant difference in perceived weight by smoking status was observed among black women, and regardless of smoking status, black women were the least likely to perceive themselves as overweight. Among Hispanic women, current smokers were more likely than those who had never smoked to view themselves as overweight.

In the 1991 NHIS, women were much more likely than men, regardless of smoking status, to perceive themselves as overweight (Table 2.37). In contrast to women, similar percentages of men current smokers and men who had never smoked perceived themselves as overweight, and men former smokers were the most likely to perceive themselves as overweight. This pattern was true for all racial and ethnic groups. However, no differences in perception of being overweight were found among men aged 18 through 24 years, regardless of smoking status. Among men aged 45 through 64 years, current smokers were less likely than those who had never smoked to perceive themselves as overweight (NCHS, public use data tape, 1991).

When overweight women were included in the analysis of the 1991 NHIS data, perception of weight among smokers was not associated with attempts to quit smoking: 39.7 (±2.1) percent of women who perceived themselves as overweight and 37.6 (±2.5) percent of those who perceived their weight as “just about right” had quit smoking for at least one day in the previous year (NCHS, public use data tape, 1991). In addition, no difference by self-perceived weight was found in the number of attempts to quit smoking in the past year (average, 2.8 ± 0.2 attempts) (NCHS, public use data tape, 1991). No gender-specific differences in

these relationships were observed. NHIS did not assess concern about postcessation weight gain, but such concern has been associated with decreased smoking cessation in some studies (Sorensen and Pechacek 1987; Gritz et al. 1989; Weekley et al. 1992; French and Jeffery 1995) but not others (French et al. 1995; Jeffery et al. 1997).

Smoking and Actual Body Mass Index Among Women

Despite self-perceptions of body weight, data from NHANES III (1988–1996) showed that BMI among women was significantly less among current smokers than among former smokers or among those who had never smoked; BMI was calculated from weight and height at examination (Table 2.38). (This table includes data on overweight women.) Among women aged 45 years or older and among all three racial and ethnic groups, significant differences in BMI were found by smoking status. However, among white women and Mexican American women, differences in BMI between current smokers and those who had never smoked were not statistically significant.

The relationship between smoking status and body weight was similar for women and men, although the difference among former smokers and those who had never smoked was statistically significant

among men (Table 2.38). Similar patterns were found for all ages and racial and ethnic groups among men, except that among men aged 25 through 44 years, current smokers had significantly lower BMIs than did former smokers or those who had never smoked and that among men aged 45 through 64 years and among whites, differences between former smokers and those who had never smoked were statistically significant (NCHS, public use data tapes, 1988–1996).

A study of all U.S. Air Force Basic Military Training recruits also observed no relationship between current smoking and body weight among young women (Klesges et al. 1998). Using data from NHANES III, phase I (1988–1991), Flegal and colleagues (1995) found that current smokers, both women and men, had the lowest age-adjusted prevalence of overweight and the lowest mean BMI. In addition, persons who had quit smoking within the previous 10 years had gained, over the 10 years, significantly more weight than did current smokers or those who had never smoked. However, no difference in mean BMI or in the prevalence of overweight was observed between former smokers who had quit smoking more than 10 years earlier and those who had never smoked. This finding suggested that weight gain occurs shortly after smoking cessation and that former smokers do not continue to gain weight at a higher rate than those who had never smoked.

Table 2.38. Average body mass index (and 95% confidence interval) among women aged 18 years or older, by smoking status and selected characteristics, National Health and Nutrition Examination Survey III, United States, 1988–1994

Characteristic	Current smokers*	Former smokers [†]	Never smoked [‡]
Women	25.5 (±0.4)	27.1 (±0.6)	26.5 (±0.4)
Age (years)			
18–24	24.1 (±1.0)	24.4 (±1.9)	23.8 (±0.6)
25–44	25.5 (±0.5)	26.5 (±1.2)	26.2 (±0.5)
45–64	26.8 (±0.8)	28.7 (±0.8)	28.3 (±0.5)
65	24.7 (±0.9)	27.1 (±0.6)	26.7 (±0.4)
Race/ethnicity			
White, non-Hispanic	25.2 (±0.5)	26.9 (±0.6)	26.0 (±0.5)
Black, non-Hispanic	27.2 (±0.7)	29.7 (±0.8)	29.0 (±0.5)
Mexican American	27.5 (±0.8)	29.2 (±0.7)	27.7 (±0.4)
Men	25.7 (±0.3)	27.5 (±0.3)	26.5 (±0.3)

Note: Body mass index (weight in kilograms divided by height in meters squared) is based on height and weight measured during physical examination. Table includes data on all women, including overweight women.

*Current smokers reported smoking 100 cigarettes in their lifetime and smoked at the time of the survey.

[†]Former smokers reported smoking 100 cigarettes in their lifetime but did not smoke at the time of the survey.

[‡]Never smokers did not smoke 100 cigarettes in their lifetime.

Sources: National Center for Health Statistics, public use data tapes, 1988–1994.

Smoking and Other Drug Use Among Girls and Young Women

The consumption patterns for the combined use of cigarettes and alcohol, marijuana, or cocaine among girls and women have been examined in several studies using different methods (USDHHS 1988b, 1994; Willard and Schoenborn 1995; Everett et al. 1998). Local and national surveys have consistently shown that girls and women who smoke are more likely than those who do not smoke to use alcohol, marijuana, or cocaine (Kandel et al. 1992; Schorling et al. 1994; Willard and Schoenborn 1995; Escobedo et al. 1997; Emmons et al. 1998; Everett et al. 1998).

National data indicate that, for most young women who have ever smoked, cigarette smoking occurs before use of these other drugs (Johnston et al. 1994b). The prevalence of alcohol and drug use has remained lower among girls than among boys during the past 20 years (Johnston et al. 2000a).

Data from the 1998 NHSDA among adolescents aged 12 through 17 years and the 1999 YRBS among high school students less than 18 years of age indicated that adolescent girls who smoke are much more likely than girls who do not smoke to use alcohol or marijuana or to engage in binge drinking (Table 2.39). Differences in the prevalence of drug use between the surveys are most likely due to YRBS surveying older

Table 2.39. Prevalence (% and 95% confidence interval) of other drug use among girls and boys less than 18 years of age, by gender and smoking status, National Household Survey on Drug Abuse (NHSDA) and Youth Risk Behavior Survey (YRBS), United States, 1998–1999

Substance used/smoking status	NHSDA 1998 (ages 12–17)		YRBS 1999 (grades 9–12)	
	Girls	Boys	Girls	Boys
Alcohol use*				
Current smokers [†]	65.1 (±8.6)	71.6 (±7.2)	77.7 (±4.8)	82.3 (±5.7)
Noncurrent smokers [‡]	19.3 (±14.0) [§]	53.7 (±18.3) [§]	40.6 (±4.5)	47.8 (±5.0)
Never smoked	13.8 (±1.9)	13.4 (±1.8)	18.3 (±2.9)	19.9 (±3.0)
Binge drinking[¶]				
Current smokers	39.3 (±9.3)	45.4 (±8.5)	56.8 (±5.0)	63.9 (±5.6)
Noncurrent smokers	3.9 (±4.8) [§]	19.4 (±15.3) [§]	16.8 (±3.3)	26.8 (±5.2)
Never smoked	3.4 (±0.9)	4.9 (±1.1)	6.0 (±1.9)	7.4 (±1.6)
Marijuana use**				
Current smokers	44.3 (±9.0)	45.8 (±8.3)	49.6 (±5.3)	59.7 (±6.1)
Noncurrent smokers	13.2 (±12.4) [§]	18.4 (±15.6) [§]	12.2 (±2.7)	23.7 (±5.6)
Never smoked	3.9 (±0.9)	4.6 (±1.0)	3.0 (±1.6)	4.8 (±2.0)

Note: NHSDA is a household survey that includes adolescents 12–17 years of age; 67.0% were 14–17 years of age. YRBS is a school-based survey that includes high school students in grades 9–12; analyses were restricted to those less than 18 years of age—among this group, 99.8% were 14–17 years of age. Data are not comparable across surveys due to differences in ages and survey methods.

*Prevalence of alcohol use is the percentage of all persons in each demographic category who reported any use of alcohol during the past month.

[†]Current smokers are persons who reported that they smoked in the past 30 days.

[‡]Noncurrent smokers are persons who reported that they smoked previously, but not in the past 30 days.

[§]Estimate should be interpreted with caution because of the small number of respondents.

Never smokers are persons who reported that they never smoked a cigarette.

[¶]Prevalence of binge drinking is percentage of all persons in each demographic category who reported that they drank 5 drinks in a row on 1 day in the past month.

**Prevalence of marijuana use is the percentage of all persons in each demographic category who reported any use of marijuana during the past month.

Sources: NHSDA: Substance Abuse and Mental Health Services Administration, public use data tape, 1998. YRBS: Centers for Disease Control and Prevention, Division of Adolescent and School Health, public use data tape, 1999.

adolescents and to different survey methods. YRBS, a school-based survey, provides more privacy than NHSDA, a household survey (Gfroerer et al. 1997a).

The 1999 YRBS showed that high school girls less than 18 years of age who were current smokers were more than four times as likely than girls who had never smoked to have used alcohol during the past month (Table 2.39). Most girls (77.7 percent) who smoked in the past month had used alcohol, and one-half (56.8 percent) had engaged in binge drinking or had used marijuana during the past month (49.6 percent). In comparison, 18.3 percent of girls who had never smoked had used alcohol, 6.0 percent had engaged in binge drinking, and 3.0 percent had used marijuana. In addition, 7.7 (± 2.4) percent of girls who smoked had used cocaine (CDC, Division of Adolescent and School Health, public use data tape, 1999). Because of small sample size, estimates of cocaine use among girls who had never smoked could not be calculated. Using data from the 1995 YRBS for all high school girls, Everett and colleagues (1998) observed a significant dose-response relationship between smoking and the odds of binge drinking or current alcohol, marijuana, or cocaine use.

In both the 1998 NHSDA and the 1999 YRBS data, girls who were noncurrent smokers were also more likely than girls who had never smoked to have used alcohol, participated in binge drinking, and used marijuana in the past month; these differences were statistically significant for YRBS (Table 2.39). In NHSDA, the prevalence of alcohol use, binge drinking, and marijuana use was lower among current smokers, noncurrent smokers, and girls who had never smoked, but the data are consistent with YRBS data in that girls who smoked were most likely, noncurrent smokers were intermediate, and nonsmokers were the least likely to have used alcohol or marijuana. Similar relationships between smoking status and use of alcohol, marijuana, and cocaine were observed among boys.

Data from the 1998 MTF Survey showed similar patterns of substance use among high school senior girls. Current smokers were much more likely than noncurrent smokers and girls who had never smoked to have used marijuana or alcohol in the past month or to have participated in binge drinking in the past two weeks (Figure 2.18). Use of cocaine and inhalants was also higher among current smokers than among noncurrent smokers and girls who had never smoked (University of Michigan, Institute for Social Research, public use data tape, 1998). Among high school seniors, the relationship between smoking status and use of alcohol and other drugs was similar among girls and boys.

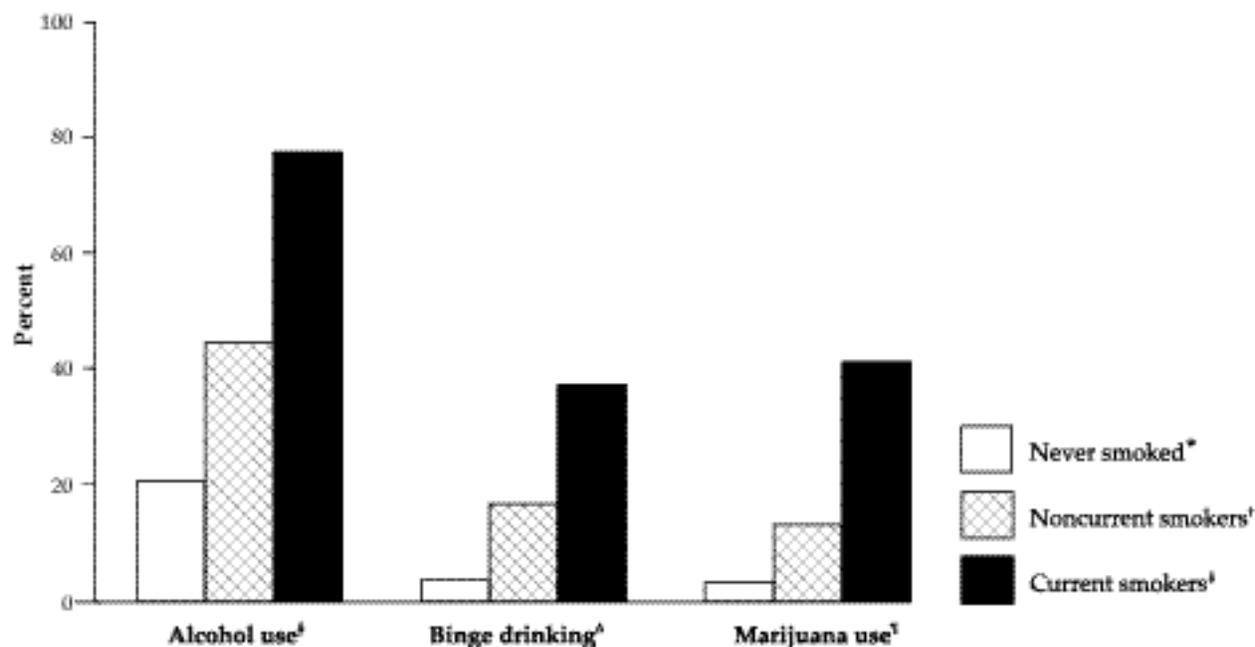
Patterns similar to those among girls were found among young women aged 18 through 24 years and among women aged 25 years or older in the 1997–1998 NHSDA (Table 2.40). Among both age groups, current smokers were more likely than former smokers or women who had never smoked to use alcohol, to engage in binge drinking, or to use marijuana. Among both age groups, former smokers were more likely than women who had never smoked to engage in alcohol use, but former smokers and women who never smoked were equally likely to engage in binge drinking and marijuana use. Except for alcohol use among former smokers and women who had never smoked, regardless of smoking status, the maximum prevalence of use of substances other than tobacco occurred among women aged 18 through 24 years.

In NHSDA data, the relationship between smoking status and other substance use was generally similar among women and men. However, the difference in the prevalence of alcohol use between former smokers and persons who had never smoked was statistically significant among women but not among men (Table 2.40). Regardless of smoking status or age, however, women were less likely than men to engage in these behaviors except that among former smokers, the prevalence of alcohol use was similar among young women and young men.

Data from the 1997–1998 NHSDA were used to examine the relationship between the initiation of cigarette smoking and the start of other drug use among adults aged 18 through 24 years (Table 2.41). Among most young women, smoking initiation preceded or was concurrent with the start of other drug use. The proportion of women for whom smoking preceded drug use ranged from 47.9 percent among those who had also tried alcohol to 90.3 percent among those who had also tried cocaine. Smoking initiation was concurrent with the start of alcohol use among 23.8 percent of the women, marijuana use among 18.4 percent, and cocaine use among 6.1 percent. In contrast, the proportion of women for whom drug use preceded smoking ranged from 3.6 percent for cocaine use to 28.4 percent for alcohol use. Young women were slightly less likely than young men to have tried alcohol before trying cigarettes.

These patterns are reflected in the mean age at which young adults began to use cigarettes, alcohol, and other drugs, as shown in data from the 1997–1998 NHSDA (Table 2.42). Among young women who had both smoked and used alcohol, the mean age at smoking initiation (14.3 years) was significantly lower than the mean age at first use of alcohol (15.3 years). Among

Figure 2.18. Prevalence (%) of alcohol and marijuana use among high school senior girls, by smoking status, Monitoring the Future Survey, United States, 1998



*Never smokers are persons who never smoked a cigarette.

†Noncurrent smokers are persons who smoked previously, but not in the past 30 days.

‡Current smokers are persons who smoked in the past 30 days.

§Prevalence of alcohol use is the percentage of all persons who reported any use of alcohol in the past month.

¶Prevalence of binge drinking is the percentage of all persons who reported that they drank 5 alcoholic drinks at one time in the past 2 weeks.

‡Prevalence of marijuana use is the percentage of all persons who reported any use of marijuana in the past month.

Source: University of Michigan, Institute for Social Research, public use data tape, 1998.

young women who had used both, the mean age at first use of cigarettes was also lower than the mean age at first use of marijuana or cocaine. On average, women reported using cigarettes 1.0 years before using alcohol, 2.0 years before using marijuana, and 4.3 years before using cocaine. The average age at smoking initiation was 13.3 years for women who had both smoked cigarettes and used cocaine and 15.6 years for women who had used cigarettes only. These and other data (Kandel et al. 1992; USDHHS 1994; Willard and Schoenborn 1995) demonstrate that cigarette smoking generally occurs at an earlier age than other drug use. Among young men who had smoked and used alcohol, marijuana, or cocaine, the mean age at smoking initiation was also younger than the mean age at first use of those substances.

Smoking and Mental Health Among Women and Girls

The prevalence of cigarette smoking tends to be higher among persons with psychiatric disorders such as schizophrenia, mania, personality disorders (Hughes et al. 1986), depression (Anda et al. 1990; Glassman et al. 1990; Pérez-Stable et al. 1990b; Breslau et al. 1991; Kendler et al. 1993), and panic disorders (Breslau et al. 1991; Pohl et al. 1992). The causal direction of these associations is unclear. Depressed smokers are also less likely to quit smoking (Anda et al. 1990; Glassman et al. 1990), and smokers with a history of depression have a greater risk of relapse to smoking after a cessation attempt (Fiore et al. 1996). Covey and associates (1990) reported that smoking

Table 2.40. Prevalence (% and 95% confidence interval) of alcohol and marijuana use among adults aged 18 years or older, by gender, smoking status, and age, National Household Survey on Drug Abuse, United States, 1997–1998

Substance used/smoking status	Aged 18–24 years		Aged 25 years	
	Women	Men	Women	Men
Alcohol use*				
Current smokers [†]	72.6 (±3.6)	85.3 (±2.5)	58.8 (±2.7)	70.8 (±2.7)
Former smokers [‡]	53.8 (±8.6)	64.4 (±9.6)	52.2 (±3.3)	60.1 (±3.1)
Never smoked [§]	41.9 (±2.3)	54.5 (±2.7)	40.8 (±1.8)	59.1 (±2.3)
Binge drinking				
Current smokers	35.5 (±3.9)	59.0 (±3.6)	16.8 (±2.0)	35.4 (±2.9)
Former smokers	12.9 (±5.6)	35.0 (±9.6)	5.3 (±1.6)	16.8 (±2.4)
Never smoked	12.2 (±1.7)	30.3 (±2.6)	3.7 (±0.6)	17.9 (±1.8)
Marijuana use[¶]				
Current smokers	22.9 (±3.4)	33.9 (±3.5)	6.3 (±1.3)	10.7 (±1.9)
Former smokers	3.5 (±2.4)**	15.3 (±6.8)	0.8 (±0.5)	2.5 (±1.1)
Never smoked	4.9 (±1.0)	8.3 (±1.4)	0.7 (±0.2)	2.4 (±0.6)

*Prevalence of alcohol use is the percentage of all persons in each demographic category who reported that they drank 1 alcoholic drink in the 30 days before the survey.

[†]Current smokers were persons who reported that they had smoked for 100 days in their lifetime and smoked at the time of the survey.

[‡]Former smokers were persons who reported that they had smoked for 100 days in their lifetime but did not smoke at the time of the survey.

[§]Never smokers were persons who reported that they had never smoked for 100 days.

Prevalence of binge drinking is the percentage of all persons in each demographic category who reported that they drank 5 alcoholic drinks in a row on 1 day in the 30 days before the survey.

[¶]Prevalence of marijuana use is the percentage of all persons in each demographic category who reported that they used marijuana in the 30 days before the survey.

**Estimate should be interpreted with caution because of the small number of respondents.

Sources: Substance Abuse and Mental Health Services Administration, public use data tapes, 1997, 1998.

Table 2.41. Patterns of initiation of smoking and use of other substances (% and 95% confidence interval) among young adults aged 18–24 years who ever used cigarettes and another substance, by gender, National Household Survey on Drug Abuse, United States, 1997–1998

Substance used	Young women			Young men		
	Initiation of cigarette use preceded substance use	Initiation of cigarette use concurrent with substance use	Initiation of substance use preceded cigarette use	Initiation of cigarette use preceded substance use	Initiation of cigarette use concurrent with substance use	Initiation of substance use preceded cigarette use
Alcohol*	47.9 (±2.6)	23.8 (±2.2)	28.4 (±2.4)	44.3 (±2.6)	21.7 (±2.2)	33.9 (±2.5)
Marijuana [†]	69.9 (±3.1)	18.4 (±2.6)	11.7 (±2.2)	66.2 (±3.0)	20.2 (±2.5)	13.6 (±2.1)
Cocaine [‡]	90.3 (±5.0)	6.1 (±4.4)	3.6 (±2.7) [§]	92.8 (±3.2)	5.0 (±2.9)	2.1 (±1.5) [§]

Note: Initiation of smoking is based on response to the question, “About how old were you when you first tried a cigarette?”

*Respondents were asked, “About how old were you the first time you had a glass of beer or wine or a drink of liquor, such as whiskey, gin, scotch, etc.? Do not include childhood sips that you might have had from an older person’s drink.”

[†]Respondents were asked, “About how old were you the first time you actually used marijuana or hash, even once?”

[‡]Respondents were asked, “About how old were you the first time you actually used cocaine, in any form, even once?”

[§]Estimate should be interpreted with caution because of the small number of respondents.

Sources: Substance Abuse and Mental Health Services Administration, public use data tapes, 1997, 1998.

Table 2.42. Mean age (years and 95% confidence interval) at first use of cigarettes and other substances among young adults aged 18–24 years who had ever smoked cigarettes, by gender, National Household Survey on Drug Abuse, United States, 1997–1998

Other substance used	Young women		Young men	
	Age first used cigarettes*	Age first used other substance	Age first used cigarettes	Age first used other substance
None	15.6 (±1.1)	—	14.9 (±1.0)	—
Alcohol [†]	14.3 (±0.2)	15.3 (±0.2)	14.3 (±0.2)	14.9 (±0.2)
Marijuana [‡]	14.1 (±0.2)	16.1 (±0.2)	14.1 (±0.2)	15.9 (±0.2)
Cocaine [§]	13.3 (±0.5)	17.6 (±0.3)	13.1 (±0.4)	17.9 (±0.3)

Note: Persons who ever smoked cigarettes were those who smoked 100 days in their lifetime.

*Respondents were asked, “About how old were you when you first tried a cigarette?”

[†]Respondents were asked, “About how old were you the first time you had a glass of beer or wine or a drink of liquor, such as whisky, gin, scotch, etc.? Do not include childhood sips that you might have had from an older person’s drink.”

[‡]Respondents were asked, “About how old were you the first time you actually used marijuana or hash, even once?”

[§]Respondents were asked, “About how old were you the first time you actually used cocaine, in any form, even once?”

Sources: Substance Abuse and Mental Health Services Administration, public use data tapes, 1997, 1998.

cessation caused more intense depressed mood among smokers with a history of depression and that these symptoms were related to lower success rates for cessation. The prevalence of depression among women is twice that among men (Weissman et al. 1991; APA 1994), indicating that these associations may be particularly important among women. Similar patterns have been noted among adolescents. In a longitudinal study, Kandel and Davies (1986) reported that depressed adolescents were more likely than nondepressed adolescents to report daily smoking nine years later. Other data have shown an association between heavy smoking and depression among adolescents (Covey and Tam 1990) (see “Depression and Other Psychiatric Disorders” in Chapter 3).

The 1991 NHIS included questions on the emotional and mental health of respondents. Questions were specifically related to experiences of boredom, restlessness, depression, loneliness, and upset in the two weeks preceding the survey. Substantial proportions of women reported the following feelings: 11.4 percent depression, 11.2 percent boredom, 10.3 percent restlessness, 5.8 percent loneliness, and 4.5 percent upset (Schoenborn and Horm 1993). Current smokers were more likely than those who had never smoked to report feelings of boredom (17.1 vs. 9.5 percent), restlessness (15.4 vs. 8.7 percent), depression (15.9 vs. 9.6 percent), loneliness (8.7 vs. 4.8 percent), and upset (2.9 vs. 1.4 percent) (Table 2.43). Overall, women who were former smokers were similar to those who had never smoked in their reporting of all categories of negative moods. However, the

prevalences of feelings of boredom and restlessness were significantly higher among women who were abstinent (self-reported) fewer than 12 months than among women who were abstinent for 12 or more months. Women abstinent fewer than 12 months reported feelings similar to those of current smokers, whereas women abstinent 12 or more months reported feelings similar to those of women who had never smoked. Across all smoking categories, women were more likely than men to report feelings of boredom, depression, and loneliness but equally likely to report feeling restless; data were less clear for feeling upset.

Schoenborn and Horm (1993) analyzed the same data and controlled for age, race, education, income, marital status, and health status. They reported that the relative risk (RR) for smoking was higher among women who reported feelings of depression (RR, 1.5; 95 percent CI, 1.4 to 1.7), loneliness (RR, 1.6; 95 percent CI, 1.4 to 1.9), restlessness (RR, 1.7; 95 percent CI, 1.5 to 1.9), or boredom (RR, 1.7; 95 percent CI, 1.5 to 1.9) than among those who did not report negative moods.

Analyses of data from the 1989 TAPS I resulted in similar findings among girls aged 12 through 17 years (NCHS, public use data tape, 1989). Respondents were asked if they had experienced certain negative emotions—specifically, feelings of depression, nervousness, or hopelessness—in the year preceding the survey. Current smokers were more likely than those who had never smoked to report that they often had feelings of unhappiness, sadness, or depression (32.9 ± 4.7 vs. 13.7 ± 1.5 percent), nervousness or tension

Table 2.43. Prevalence (% and 95% confidence interval) of selected feelings* during the 2 weeks before the survey among adults aged 18 years or older, by gender and smoking status, National Health Interview Survey, United States, 1991

Smoking status	Felt bored		Felt restless [†]		Felt depressed or very low		Felt very lonely or abandoned		Felt upset	
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
Current smokers [‡]	17.1 (±1.2)	14.1 (±1.1)	15.4 (±1.1)	15.0 (±1.2)	15.9 (±1.1)	10.4 (±0.9)	8.7 (±0.8)	5.3 (±0.6)	2.9 (±0.5)	1.4 (±0.3)
Former smokers [§]	9.1 (±1.0)	7.6 (±0.8)	9.0 (±0.9)	9.3 (±0.9)	11.2 (±1.0)	6.0 (±0.7)	5.2 (±0.7)	3.1 (±0.5)	1.4 (±0.4)	1.0 (±0.3)
Abstinent										
<12 months	15.8 (±4.2)	14.7 (±4.6)	16.0 (±4.1)	13.4 (±4.3)	13.0 (±3.6)	8.0 (±3.4)	5.8 (±2.3)	3.2 (±1.8)	1.5 (±1.1)	2.4 (±1.7)
Abstinent										
12 months	8.5 (±1.1)	7.2 (±0.8)	8.4 (±1.0)	9.0 (±1.0)	11.1 (±1.0)	6.0 (±0.8)	5.1 (±0.7)	3.2 (±0.6)	1.5 (±0.5)	0.8 (±0.3)
Never smoked [¶]	9.5 (±0.7)	7.5 (±0.7)	8.7 (±0.6)	9.4 (±0.8)	9.6 (±0.6)	5.7 (±0.6)	4.8 (±0.4)	2.2 (±0.3)	1.4 (±0.2)	0.7 (±0.2)

*Possible responses included “never,” “rarely,” “sometimes,” “often,” “very often”; percentages include those who responded “often” or “very often.”

[†]Defined as “so restless that you could hardly sit still.”

[‡]Current smokers were persons who reported that they smoked 100 cigarettes in their lifetime and smoked at the time of the survey.

[§]Former smokers were persons who reported that they smoked 100 cigarettes in their lifetime but did not smoke at the time of the survey.

Estimate should be interpreted with caution because of the small number of respondents.

[¶]Never smokers were persons who reported that they never smoked 100 cigarettes.

Source: National Center for Health Statistics, public use data tape, 1991.

(33.8 ± 4.5 vs. 16.2 ± 1.5 percent), or hopelessness (18.2 ± 3.8 vs. 6.3 ± 1.0 percent). Among current or former smokers, girls were more likely than boys to report feelings of unhappiness, hopelessness, or nervousness. A longitudinal analysis using the 1989 TAPS I and the 1993 TAPS II found that smoking status at baseline was the most significant predictor of depressive symptoms among girls (Choi et al. 1997). Girls who were current smokers at baseline were twice as likely as girls who had never smoked to develop depressive symptoms. However, a study of substance use and psychiatric disorders among 1,285 adolescents aged 9 through 18 years in three states and Puerto Rico did not find a significant increase in anxiety or mood disorders among females who were daily smokers (Kandel et al. 1997b).

In data from the 1996 NHSDA among girls aged 12 through 17 years, 37.4 percent of those with high scores for psychosocial problems, but 14.0 percent of those with low scores, were smokers (SAMHSA 1998a). Similarly, 30.3 percent of girls with high scores for emotional problems were smokers, whereas 16.9 percent of girls with low scores were smokers. Among girls with high scores for behavioral

problems, 42.0 percent were smokers, but only 12.7 percent of those with low scores were smokers. Among girls and boys with high scores in any of the three problem areas, girls were more likely to be smokers, although CIs were not provided. Among girls and boys with low scores in any of the three problem areas, no gender-specific differences were noted in smoking prevalence.

Summary

Women who are current smokers weigh less than women who had never smoked. However, among normal weight and underweight women, current smokers are more likely than those who had never smoked to perceive themselves as overweight. Adolescent girls who are current smokers are also more likely than those who had never smoked to be trying to lose weight. These findings suggest that body weight, body image, and concerns about weight are related to smoking among women. Girls and women who smoke are more likely than those who do not smoke to use alcohol or other drugs, and the initiation of cigarette smoking generally occurs before the start of other substance use. Cigarette smoking may,

therefore, be considered a “gateway” drug in the sequence of drug use among women because it frequently precedes, and is associated with, the use of other drugs.

Adult current smokers were more likely than those who had never smoked and former smokers who have been abstinent 12 months or more to report negative moods or emotions, including boredom,

restlessness, depression, or loneliness. The association between cigarette smoking and these moods was found across age groups. Further research is needed to explore these relationships, the direction of causality, and implications for smoking initiation and cessation. (See “Depression and Other Psychiatric Disorders” in Chapter 3 for a review of evidence of an association between depression and smoking cessation.)

International Patterns of Smoking Prevalence Among Women

Because of increased concern about the hazards of tobacco use, many countries and international organizations have attempted to collect data on smoking prevalence. In most developed and some developing countries, smoking behavior is measured through sample surveys of the population, and occasionally, questions on smoking are included on census questionnaires, but the frequency and coverage of such surveys is far from systematic. Depending on how a smoker is defined (e.g., by the number of cigarettes smoked per day, frequency of smoking, or cumulative lifetime consumption of cigarettes), the percentage of the population classified as regular smokers can vary significantly. Differences in sampling procedures (e.g., survey of specific population groups only) or in interview methods can seriously affect the degree to which the results of smoking prevalence surveys are representative and comparable. Therefore, reported differences in smoking prevalence among countries may not, in fact, indicate real differences in prevalence. In countries where smoking among women is socially unacceptable, prevalence estimates for women that are based on direct interviews may substantially underestimate true smoking behavior because of misrepresentation of smoking status. Thus, international comparisons of smoking prevalence must be made with caution.

The smoking epidemic may be a cohort phenomenon. Typically, initiation of smoking has increased first among young men and boys, followed several decades later by an increase among young women and girls. Social norms and customs have acted to discourage smoking among women and girls, and prevalence only begins to rise when these taboos are weakened. This weakening usually occurs first among younger, more educated women (Borras et al. 2000) because they are more likely to question traditional social values. Subsequently, smoking spreads to other

socioeconomic groups and, with the aging of cohorts, to older age groups. In general, better educated persons are more responsive to health education messages about smoking hazards; hence, this group is more likely to have higher rates of smoking cessation than less educated persons. Populations in which smoking prevalence is common at all ages and in both genders and in which smoking cessation is also relatively widespread might be considered to be populations with a “mature” smoking epidemic.

Overall smoking prevalence at any point in time reflects the balance between increased smoking initiation and smoking cessation in different age groups. Assessing the current phase of the tobacco epidemic in a population requires data on age-specific trends in both initiation and cessation of smoking. Unfortunately, detailed, reliable, and comparable data on these trends are not available for most countries.

The different smoking histories of women and men reflect different sociocultural constraints, which have acted—at different times in different countries—to discourage tobacco use among women. However, these constraints have weakened in many countries, and smoking prevalence among women has risen, often accelerated by aggressive advertising campaigns targeted directly to women. In some countries, the prevalence of smoking among women is still increasing. This pattern, which was seen in many industrialized countries throughout the twentieth century, seems likely to be repeated in developing countries during this century unless effective tobacco control measures are implemented. Thwarting an increase in tobacco use among women in developing countries represents one of the greatest opportunities for disease prevention in the world today (World Bank 1999; WHO 1999).

Current Prevalence

About one-third of all regular smokers in developed countries are women, but in the developing world, only one in eight women is a regular smoker. (All of Europe [including the newly independent states of the former USSR] and North America, as well as Australia, Japan, and New Zealand, are considered developed regions and countries; all other regions are classified as developing.) Globally, an estimated 12 percent of women smoke. Overall, smoking prevalence among women is 24 percent in developed countries and 7 percent in developing countries (WHO 1997). Although in some areas of the world women have traditionally practiced some forms of tobacco use, cultural norms have served as a powerful deterrent to women's smoking in most developing countries. By World Bank region, the prevalence of cigarette smoking among females aged 15 years or older in 1995 was estimated to be 1 percent in south Asia, 4 percent in east Asia and the Pacific, 5 percent in the Middle East and North Africa, 10 percent in sub-Saharan Africa, 21 percent in the Caribbean and Latin America, and 26 percent in central Asia and Eastern Europe. In addition, approximately 3 percent of women in south Asia smoked bidis, a traditional hand-rolled tobacco product (World Bank 1999). An estimated 200 million women worldwide were smokers in 1995, 100 million in developed countries and 100 million in developing countries (*WHO Tobacco Alert* 1996). By the year 2025, if current patterns continue, approximately 500 million women worldwide will be smokers (Judith Mackay, e-mail to Leslie Norman, September 22, 2000).

Even within regions, the prevalence of smoking among women often varies substantially across countries (Table 2.44). For example, within Europe, prevalence is high in Denmark (37.0 percent), Norway (35.5 percent), and the Czech Republic (31.0 percent) but relatively low in Portugal (15.0 percent). Although smoking prevalence is generally high in industrialized countries, it is relatively low among women in Japan (14.8 percent) and Singapore (2.7 percent) (WHO 1997).

These overall estimates may conceal important differences within subgroups. In New Zealand, 57 percent of Maori women and two-thirds of pregnant Maori women smoked in 1991 (New Zealand Public Health Commission 1994). In 1991, 57 percent of native Canadian Indian women smoked (Health Canada 1994). Although overall smoking prevalence among South African women in 1995 was 17 percent, marked differences were noted among subgroups.

For example, 59 percent of "colored" women smoked (Reddy et al. 1996). Overall estimates of smoking prevalence may also conceal important differences by age group. For example, the WHO MONICA survey in Catalonia, Spain, indicated that 48 percent of the women aged 25 through 34 years, but 4 percent of the women aged 55 through 64 years, were regular smokers (Molarius et al. 2001).

The pattern by which smoking first becomes most prevalent among young women is reflected in data for European countries bordering the Mediterranean Sea. In 1994, the prevalence of smoking by age for women in France, Greece, and Italy was similar to that in Spain. The prevalence of smoking was much lower among older women than among younger women, which indicates that the tobacco epidemic is still maturing. Thus, in the European countries around the Mediterranean Sea, where the epidemic is in mid-development, smoking among women is confined primarily to young and middle-aged women.

In some nonindustrialized countries, patterns of smoking by age differ from those in industrialized countries. These patterns may reflect differences in the acceptability of tobacco use, including traditional tobacco products, by women in different age groups. Overall, smoking prevalence among women is low in most developing countries. For example, among the black population of the Cape Peninsula in South Africa, overall smoking prevalence among women was 8.4 percent. However, prevalence was much higher among women aged 55 through 64 years (12.2 percent) than among women aged 20 through 24 years (6.6 percent) (Steyn et al. 1994). Similarly, this distinct pattern is seen in some Asian countries where tobacco use by older women has traditionally been tolerated. For example, in China, Korea, and Thailand, the overall prevalence of smoking among women is about 4 to 8 percent; prevalence is 10 to 20 times higher among women aged 50 years or older than among younger women. This unique pattern does not detract from the pattern of broader diffusion outlined earlier, whereby as the modern tobacco epidemic takes root, smoking is initially more common among younger women than among older women (Liu et al. 1998).

The pattern of smoking in Japan illustrates how East Asian countries could soon progress to the pattern of Mediterranean European countries. In the late 1960s, smoking prevalence among Japanese women aged 60 years or older was about 20 percent, which was twice that among women aged 20 through 29 years. By 1999, the prevalence for all age groups was 13.4 percent, but by then it was over threefold higher among women aged 20 through 29 years (23.2

Table 2.44. Estimated smoking prevalence among females and males aged 15 years or older, by country and gender, latest available year (ranked in order of female smoking prevalence)

Rank	Country (year of survey)	Females	Males	Rank	Country (year of survey)	Females	Males
1	Denmark (1993)	37.0	37.0	45	Bulgaria (1989)	17.0	49.0
2	Norway (1994)	35.5	36.4	45	South Africa (1995)	17.0	52.0
3	Czech Republic (1994)	31.0	43.0	47	Bangladesh (1990)	15.0	60.0
4	Fiji (1988)	30.6	59.3	47	Portugal (1994)	15.0	38.0
5	Israel (1989)	30.0	45.0	49	Japan (1994)	14.8	59.0
5	Russian Federation (1993)	30.0	67.0	50	Mexico (1990)	14.4	38.3
7	Canada (1991)	29.0	31.0	51	Tonga (1991)	14.0	65.0
7	The Netherlands (1994)	29.0	36.0	52	Dominican Republic (1990)	13.6	66.3
7	Poland (1993)	29.0	51.0	53	Jamaica (1990)	13.0	43.0
10	Greece (1994)	28.0	46.0	53	Peru (1989)	13.0	41.0
10	Iceland (1994)	28.0	31.0	55	El Salvador (1988)	12.0	38.0
10	Ireland (1993)	28.0	29.0	55	Kuwait (1991)	12.0	52.0
10	Papua New Guinea (1990)	28.0	46.0	55	Latvia (1993)	12.0	67.0
14	Austria (1992)	27.0	42.0	58	Honduras (1988)	11.0	36.0
14	France (1993)	27.0	40.0	59	Seychelles (1989)	10.3	50.9
14	Hungary (1989)	27.0	40.0	60	Algeria (1980)	10.0	53.0
17	Uruguay (1990)	26.6	40.9	60	Lithuania (1992)	10.0	52.0
18	Cook Islands (1988)	26.0	44.0	62	Morocco (1990)	9.1	39.6
18	Italy (1994)	26.0	38.0	63	Philippines (1987)	8.0	43.0
18	Luxembourg (1993)	26.0	32.0	63	Swaziland (1989)	8.0	33.0
18	Slovakia (1992)	26.0	43.0	65	Albania (1990)	7.9	49.8
18	Switzerland (1992)	26.0	36.0	66	Cyprus (1990)	7.2	42.5
18	United Kingdom (1994)	26.0	28.0	67	China (1984)	7.0	61.0
24	Brazil (1989)	25.4	39.9	67	Mongolia (1990)	7.0	40.0
25	Chile (1990)	25.1	37.9	69	Republic of Korea (1989)	6.7	68.2
26	Spain (1993)	25.0	48.0	69	Nigeria (1990)	6.7	24.4
27	Cuba (1990)	24.5	49.3	71	Bahrain (1991)	6.0	24.0
28	Estonia (1994)	24.0	52.0	72	Paraguay (1990)	5.5	24.1
28	Sweden (1994)	24.0	22.0	73	Iraq (1990)	5.0	40.0
28	Turkey (1988)	24.0	63.0	74	Pakistan (1980)	4.4	27.4
31	Argentina (1992)	23.0	40.0	75	Indonesia (1986)	4.0	53.0
31	Slovenia (1994)	23.0	35.0	75	Malaysia (1986)	4.0	41.0
33	United States of America (1993)	22.5	27.7	75	Thailand (1995)	4.0	49.0
34	New Zealand (1992)	22.0	24.0	78	Bahamas (1989)	3.8	19.3
35	Germany (1992)	21.5	36.8	79	Mauritius (1992)	3.7	47.2
36	Bolivia (1992)	21.4	50.0	80	India (1980s)	3.0	40.0
37	Australia (1993)	21.0	29.0	81	Singapore (1995)	2.7	31.9
38	Costa Rica (1988)	20.0	35.0	82	Egypt (1986)	1.0	39.8
39	Colombia (1992)	19.1	35.1	82	Lesotho (1989)	1.0	38.3
40	Belgium (1993)	19.0	31.0	82	Uzbekistan (1989)	1.0	40.0
40	Finland (1994)	19.0	27.0	85	Sri Lanka (1988)	0.8	54.8
42	Samoa (1994)	18.6	53.0	86	Turkmenistan (1992)	0.5	26.6
43	Malta (1992)	18.0	40.0	87	Saudi Arabia (1990)	NA*	52.7
44	Guatemala (1989)	17.7	37.8				

*NA= Not available.

Source: World Health Organization 1997.

percent) than among women aged 60 through 69 years (7.2 percent) (Ministry of Health and Welfare 2000).

Trends

Large numbers of women first began to smoke in Great Britain and the United States during the 1920s and 1930s. In other industrialized countries, widespread smoking by women occurred some years later. By the 1960s, smoking prevalence had reached 25 to 35 percent in most industrialized countries, although in a few such countries (e.g., Japan and Portugal), overall smoking prevalence among women still does not exceed about 15 percent. Smoking among women never attained the prevalence of 60 percent or greater seen among men in Great Britain immediately after World War II and more recently in China, Japan, and Korea.

In many industrialized countries, smoking prevalence among women remained at about 30 to 40 percent until the 1970s to early 1980s, when a gradual decline began in some countries (Table 2.45). From the early 1970s to the early 1990s, prevalence declined by about 10 percentage points in Ireland, the Netherlands, New Zealand, Sweden, and the United Kingdom and by smaller amounts in Australia, Canada, and the United States. Prevalence remained relatively unchanged in Denmark, Finland, and Japan and, until more recently, in France. Conversely, prevalence rose among women in Greece, Portugal, and Spain. WHO sponsored community-based surveys over a 10-year period in 36 populations, primarily European; the initial surveys generally occurred in the mid-1980s and the final surveys in the mid-1990s (Molarius et al. 2001). Among women, overall smoking prevalence increased over time by more than 5 percentage points in 6 (17 percent) of the 36 populations and decreased in 9 (25 percent) of the 36. In many of the populations, prevalence increased among the younger age groups. Populations of women with low baseline prevalence tended to experience increases in smoking prevalence over time (e.g., in Poland, Russia, and Spain), whereas populations with higher baseline prevalence, especially among the younger age group(s), experienced decreases (e.g., in Australia, the United Kingdom, and the United States).

Because it is generally younger women who begin smoking first in a population, the ratio of prevalence among young women to that among older women is a good indicator of the "maturity" of the smoking epidemic in a population. Smoking among younger women is also an indicator of the probable

extent of smoking attributable deaths in the future and of the effectiveness of strategies for preventing smoking initiation. Trends in smoking among young women have varied from country to country. In Norway, smoking prevalence among girls and women aged 16 through 24 years was about 40 percent in the mid-1970s; it steadily decreased to about 25 percent in 1994. In Great Britain, the prevalence among girls and women aged 16 through 24 years peaked at just over 50 percent in 1970 and declined to about 30 percent by 1992 (Thomas et al. 1994). Similarly, in Ireland, the prevalence of smoking among girls and women aged 16 through 24 years declined from 42 percent in 1972 to 27 percent in 1993 (Shelley et al. 1996). In Spain, almost 40 percent of women aged 18 through 24 years smoked in 1993; in Greece, the prevalence among women and girls aged 15 through 24 years was 41 percent in 1994. Only about 15 percent of young Portuguese women smoked in 1977, whereas 31 percent smoked in 1988, although more recent surveys suggested that the prevalence may have fallen slightly. In China, according to a 1996 survey, 4.2 percent of women aged 15 years or older smoked, but in the age group 15 through 19 years, 10 percent of women were smokers (Tomlinson 1998). For many countries, particularly developing countries, population-based data on smoking prevalence are sparse or nonexistent. For example, relatively little is known about recent trends in smoking prevalence among young women in Asian countries, where cigarette marketing targeted to women has increased markedly (Mackay 1989).

Other Tobacco Use

In most industrialized countries, women have smoked manufactured cigarettes; very few have smoked pipes, cigars, or roll-your-own cigarettes, nor have they been consumers of other forms of tobacco such as snuff or chewing tobacco. However, in Denmark, about 10 percent of women smoked cigars, cigarillos, or pipes in 1970, although the prevalence by the early 1990s was only about 2 percent. In 1989–1990, the overall prevalence of snuff use among Swedish women and girls aged 16 years or older was 2 percent, ranging from 0 percent among women aged 55 years or older to 5 percent among those aged 16 through 24 years.

In central, south, and Southeast Asia, smokeless tobacco use includes *nass*, *naswar*, *khaini*, *mishri*, *gudakhu*, and *betelquid*. The prevalence of smokeless tobacco is relatively high among women in some developing countries, where its use is considered more socially acceptable than smoking for women. Surveys

suggested that, in certain areas of India, about 57 percent of women use smokeless tobacco, which is similar to the pattern of use among men (55.6 percent) (Gupta et al. 1992; Gupta 1996). Data from other countries in south Asia suggested that many women in the region regularly chew tobacco. These patterns correlate with the incidence of oropharyngeal cancer, which is found among women of this region to be the highest in the world (Coleman et al. 1993).

The use of smokeless tobacco in South Africa is common not only among Indian women but also among black women of the Cape Peninsula area. Among black women in South Africa aged 45 through 54 years, the prevalence of snuff use has been reported to be as high as 67.5 percent and the prevalence of chewing tobacco use is 12.0 percent. Snuff use accounts for 23.3 percent of tobacco use among black women and only 0.4 percent among black men (Steyn et al. 1994). In Sudan, toombak, a form of oral snuff, is also widely used. The reported prevalence of toombak use

is much lower among women than among men (1.7 vs. 23.0 percent) and is more common among older women than among younger women (Idris et al. 1998).

Summary

The prevalence of smoking and trends in smoking among women over time vary markedly across countries, even across industrialized countries for which the most reliable data exist. With notable exceptions, smoking prevalence among females has generally been highest in developed countries and lowest in less developed countries. Prevalence appears to have peaked and to have begun to decline in many industrialized countries, while increases are occurring in several industrialized countries and many less developed areas of the world. Thwarting an increase in tobacco use among women, especially in countries where prevalence is still relatively low, represents one of the greatest disease prevention opportunities in the world today.

Table 2.45. Smoking prevalence (%) among women in selected countries, 1970–1994

	Australia	Canada	Denmark	Finland	France	Greece	Ireland	Japan
1970		35	36					16
1971							42	
1972	29	35						
1973	29							
1974	30	34					36	17
1975	29	34	38			10		15
1976	29			17				
1977	29	34			29		33	
1978	29							
1979		33		18				
1980	26		38	17			32	14
1981		32	38	19				
1982			38	16				
1983	25	31	38	19	29			
1984			39	17	33			14
1985			37	14				
1986		28		18	30			
1987				21		25		
1988				20		24		
1989		31		19	33	27		
1990				20		26	29	14
1991	21	29	39	22	35	26	27	
1992				20	33	24	26	13
1993	21		37	19	27		28	
1994		29		19		28		15

Sources: Nicolaidis-Bouman et al. 1993; Joossens et al. 1994; World Health Organization database 1996, unpublished data; World Health Organization 1997.

The Netherlands	New Zealand	Norway	Portugal	Spain	Sweden	United Kingdom	United States
42		37				44	31
		35				42	
40		38				41	
		38				43	
	31	37				41	31
36		39				43	29
	32	38			34	38	33
		40	3			41	31
		40		17		37	30
38		39				39	29
		39	1		29	37	30
	29	38				36	
		39		20		33	
37		41	9			35	29
		40	10		28	32	
	30	39	9			34	28
			5	23			
			12				
				21			
31	27	33			26	29	23
30	25						24
31	22	31				28	24
		33		25			23
29		26	15		24	26	

Conclusions

1. Cigarette smoking became prevalent among women after it did among men, and smoking prevalence has always been lower among women than among men. The gender-specific difference in smoking prevalence narrowed between 1965 and 1985. Since 1985, the decline in prevalence has been comparable among women and men.
2. The prevalence of current smoking among women increased from less than 6 percent in 1924 to 34 percent in 1965, then declined to 22 to 23 percent in the late 1990s. In 1997–1998, smoking prevalence was highest among American Indian or Alaska Native women (34.5 percent), intermediate among white women (23.5 percent) and black women (21.9 percent), and lowest among Hispanic women (13.8 percent) and Asian or Pacific Islander women (11.2 percent). By educational level, smoking prevalence is nearly three times higher among women with 9 to 11 years of education (30.9 percent) than among women with 16 or more years of education (10.6 percent).
3. Much of the progress in reducing smoking prevalence among girls in the 1970s and 1980s was lost with the increase in prevalence in the 1990s: current smoking among high school senior girls was the same in 2000 as in 1988. Although smoking prevalence was higher among high school senior girls than among high school senior boys in the 1970s and early 1980s, prevalence has been comparable since the mid-1980s.
4. Smoking declined substantially among black girls from the mid-1970s through the early 1990s; the decline among white girls for this same period was small. As adolescents age into young adulthood, these patterns are now being reflected in the racial and ethnic differences in smoking among young women. Data are not available on long-term trends in smoking prevalence among high school seniors of other racial and ethnic groups.
5. Smoking during pregnancy appears to have decreased from 1989 through 1998. Despite increased knowledge of the adverse health effects of smoking during pregnancy, estimates of women smoking during pregnancy range from 12 percent based on birth certificate data to as high as 22 percent based on survey data.
6. Historically, women started to smoke at a later age than did men, but beginning with the 1960 cohort, the mean age at smoking initiation has not differed by gender.
7. Nicotine dependence is strongly associated with the number of cigarettes smoked per day. Girls and women who smoke appear to be equally dependent on nicotine when results are stratified by number of cigarettes smoked per day. Few gender-specific differences have been found in indicators of nicotine dependence among adolescents, young adults, or adults overall.
8. The percentage of persons who have ever smoked and who have quit smoking is somewhat lower among women (46.2 percent) than among men (50.1 percent). This finding is probably because men began to stop smoking earlier in this century than did women and because these data do not take into account that men are more likely than women to switch to or to continue to use other tobacco products when they stop smoking cigarettes. Since the late 1970s or early 1980s, the probability of attempting to quit smoking and to succeed has been equally high among women and men.
9. Prevalence of the use of cigars, pipes, and smokeless tobacco among women is generally low, but recent data suggested that cigar smoking among women and girls is increasing.
10. Smoking prevalence among women varies markedly across countries; the percentages range from an estimated 7 percent in developing countries to 24 percent in developed countries. Thwarting further increases in tobacco use among women is one of the greatest disease prevention opportunities in the world today.

Appendix 1: Sources of Data

Data in Chapter 2 were obtained primarily from national surveys (Table 2.1). For primary data analyses, when sample sizes for a single year were too small for estimating the prevalence of smoking in a particular subgroup, data for several years were combined. This approach increased the reliability and stability of the prevalence estimates (Frazier et al. 1992).

Adult Use of Tobacco Survey

The Adult Use of Tobacco Survey (AUTS) was conducted in 1964, 1966, 1970, 1975, and 1986 by the Office on Smoking and Health, formerly the National Clearinghouse for Smoking and Health (U.S. Department of Health, Education, and Welfare [USDHEW] 1969, 1973, 1976; U.S. Department of Health and Human Services [USDHHS] 1990a). The 1966 and 1970 surveys included interviews of respondents to previous surveys. The 1964 and 1966 surveys were conducted through in-person household interviews. Beginning in 1970, the surveys were conducted by telephone. Respondents were drawn from the U.S. civilian, noninstitutionalized, adult population and were asked about their knowledge, attitudes, and practices regarding tobacco use. Data were collected from a national probability sample of adults aged 21 years or older in 1964, 1966, 1970, and 1975 and adults aged 17 years or older in 1986. A two-stage, cluster-sampling procedure was used, and data were weighted to provide national estimates.

Behavioral Risk Factor Surveillance System

Since 1981, the National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention (CDC), has coordinated state surveillance of behavioral risk factors through the Behavioral Risk Factor Surveillance System (BRFSS) (Gentry et al. 1985; Remington et al. 1985, 1988; Frazier et al. 1992; Powell-Griner et al. 1997; Nelson et al. 1998). Each state that participates in BRFSS provides estimates of risk behaviors for its population aged 18 years or older. A multistage cluster design is used to select households from which an adult is selected for a telephone interview. Fifty states, the District of Columbia, and Puerto Rico participated in 1999. Data were weighted to provide state-specific estimates.

Current Population Survey

The U.S. Bureau of the Census has conducted the Current Population Survey for more than 50 years to assess employment in the United States (U.S. Bureau of the Census 1995, 1996a,b). Households are selected on the basis of area of residence to represent the nation as a whole and individual states. The sample is drawn from the U.S. civilian, noninstitutionalized, population aged 15 years or older. Data are collected monthly through household interviews by using a stratified cluster design. Questions on tobacco use were added as a special National Cancer Institute Tobacco Use Supplement to the monthly Current Population Survey for three months in 1995 and 1996 (September 1995, January 1996, and May 1996) (U.S. Bureau of the Census 1995, 1996a,b). For this report, these data were combined and used to produce state and national estimates for the period. The estimates include both self-reported and proxy-reported data.

Monitoring the Future Survey

Supported by grants from the National Institute on Drug Abuse (NIDA), the University of Michigan's Institute for Social Research has surveyed nationally representative samples of high school seniors in the spring of each year since 1975 as part of the Monitoring the Future (MTF) Survey (Bachman et al. 1980a,b, 1981, 1984, 1985, 1987, 1991a, 1993a,b; Johnston et al. 1980a,b, 1982, 1984, 1986, 1991, 1992, 1993, 1994a, 1995a,b, 1996, 1997, 1999, 2000a). Beginning in 1991, surveys were also conducted among 8th- and 10th-grade students. Multistage sampling designs were used to randomly select students in public and private schools within the 48 contiguous states. Self-administered questionnaires were distributed to students in classrooms by trained personnel, and standardized procedures were followed. Between 123 and 146 high schools were selected each year; 51 to 72 percent of selected schools participated, and 79 to 87 percent of sampled students participated (Johnston et al. 1997, 2000a; Patrick O'Malley, e-mail to Linda Pederson, December 14, 2000). (Nonparticipation was primarily due to absenteeism.) This report uses MTF Survey data from public use data tapes for 1976–1998 and from published reports for 1999 and 2000. The data were weighted to provide national estimates,

and confidence intervals were calculated by using formulas provided by the Institute for Social Research (Johnston et al. 2000a). Confidence intervals for MTF Survey data are asymmetric; the numbers presented in this chapter reflect the larger value for each confidence interval to provide the most conservative estimates. Trends in current smoking prevalence by race are calculated by using two-year rolling averages to generate more stable estimates.

Since 1980, NIDA has also surveyed a nationally representative sample of college students who were part of the previous MTF surveys. College students are defined as full-time students, one to four years after high school, enrolled in a two- or four-year college in March during the year of the survey. This definition generally encompasses more than 70 percent of all undergraduate college students enrolled full time. The survey does not use a cluster-sample design, because the heterogeneity in the student populations is greater in postsecondary institutions than in high schools (Johnston et al. 2000b).

Natality Statistics

In this report, the data on smoking among women who gave birth are from birth certificates for 1989, 1991, 1993, 1995, 1997, and 1998. These data are provided to the National Center for Health Statistics (NCHS) through the Vital Statistics Cooperative Program. Although the birth data are not subject to sampling error, they may be affected by random variation in the number of births. The 1989 revision of the U.S. Standard Certificate of Live Birth included several new items on medical and lifestyle risk factors of pregnancy and birth, including tobacco use and the number of cigarettes smoked per day by the mother. Data on tobacco use during pregnancy were available for 43 states and the District of Columbia in 1989 and for 46 states and the District of Columbia in 1991–1994. In 1995–1998, 46 states, the District of Columbia, and New York City were included; the reporting area excluded California, Indiana, the rest of New York, and South Dakota and accounted for 81.0 percent of U.S. births. All information was provided as a check mark on the certificate and certified by an attendant (Tolson et al. 1991; NCHS 1992, 1994a; Ventura et al. 1995, 1997, 1999, 2000; Matthews 1998).

National Health and Nutrition Examination Survey

NCHS conducted the third National Health and Nutrition Examination Survey (NHANES III) (NCHS 1994b) in 1988–1994. A stratified, multistage probability

design was used to obtain a sample that was representative of the total noninstitutionalized U.S. civilian population aged two months or older. Persons aged two months to 5 years, persons aged 60 years or older, blacks, and Mexican Americans were oversampled (i.e., sampled in greater numbers than their proportion in the population, to obtain adequate sample size). The survey was conducted in two phases; each phase comprised a national probability sample. Data were weighted to provide national estimates, and confidence intervals were calculated by using standard errors generated by the software Survey Data Analysis (SUDAAN) (Shah et al. 1997).

Between 1982 and 1983, NCHS also conducted the Hispanic Health and Nutrition Examination Survey (HHANES), which was a probability-based survey of Mexican Americans residing in the Southwest; Cuban Americans residing in Dade County (Miami), Florida; and Puerto Ricans residing in the greater New York City area. This survey was conducted in either English or Spanish and included civilian, non-institutionalized persons aged six months to 74 years (Haynes et al. 1990).

National Health Interview Survey

NCHS has been collecting health data on tobacco from a probability sample of the U.S. civilian, non-institutionalized, adult population since 1965 (NCHS 1975; Kovar and Poe 1985; Schoenborn 1988; Schoenborn and Marano 1988; Massey et al. 1989; USDHHS 1999a). To determine cigarette smoking trends among adults (aged 18 years), data were used from the National Health Interview Survey (NHIS) for 1965, 1966, 1970, 1974, 1978, 1979, 1980, 1983, 1985, 1987, 1988, 1990, 1991, 1992, 1993, 1994, 1995, 1997, and 1998. Proxy responses were allowed in the 1965, 1966, and 1970 surveys. The sample design was changed in 1985 to oversample blacks and thereby produce more precise estimates. Most interviews were conducted in the home; telephone interviews were conducted when respondents could not be interviewed in person. The sample was weighted to provide national estimates. For 1965, confidence intervals were calculated by using variance curves (NCHS 1978). For later years, confidence intervals were calculated by using standard errors generated by SUDAAN (Shah et al. 1997).

National Household Survey on Drug Abuse

Since 1974, first NIDA (Alcohol, Drug Abuse, and Mental Health Administration) then the Substance Abuse and Mental Health Services Administration (SAMHSA) has conducted the National Household

Survey on Drug Abuse (NHSDA), a periodic household survey of the civilian, noninstitutionalized population aged 12 years or older, to measure the prevalence of use of illicit drugs, alcohol, and tobacco (Abelson and Atkinson 1975; Abelson and Fishburne 1976; Abelson et al. 1977; Miller et al. 1983; USDHHS 1988a, 1990b, 1991; SAMHSA 1993, 1995a,b, 1996, 1997, 1998a,b, 2000). Data from 1974, 1976, 1977, 1979, 1982, 1985, 1988, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, and 1998 were used in this report. A multistage sampling design was used to randomly sample household units. The 48 contiguous states were included through 1990; since 1991, the survey has also included Alaska and Hawaii. Respondents were interviewed in person in their homes by trained interviewers. The response rate averaged 80 percent across survey years (J. Gfroerer, e-mail to Alyssa Easton, December 9, 1999), and the data were weighted to provide national estimates. Starting in 1994, information on sensitive topics, such as tobacco use and illicit drug use, was collected through a personal interview with a self-administered answer sheet to increase the privacy of responses. This change in method also resulted in the elimination of skip patterns (see definition for “skip pattern” in Appendix 2), and the initial response was edited to be consistent with later answers (Brittingham et al. 1998). In 1994, both the old and new methods were used in a split-sample design. The 1994-A data were obtained through personal interviews, and the 1994-B data were obtained by using a self-administered answer sheet. Since 1995, only the self-administered format was used. These data were also weighted to provide national estimates, and confidence intervals were calculated by using SUDAAN (Shah et al. 1997).

National Teenage Tobacco Survey

USDHEW conducted the National Teenage Tobacco Survey (NTTS) (USDHEW 1972, 1979b) in 1968, 1970, 1972, 1974, and 1979 to obtain information on the prevalence of smoking and related factors among adolescents. A three-stage, stratified, random probability sample was used to obtain a representative sample of persons aged 12 through 18 years. The 1968 survey was conducted by telephone interview or by in-person interview in households not having a telephone. Surveys in subsequent years were conducted by telephone interview only. Results were not weighted.

National Youth Tobacco Survey

The American Legacy Foundation conducted the National Youth Tobacco Survey (NYTS) (CDC 2000b)

in 1999 to obtain information on the prevalence of tobacco use and related factors and to provide data to support the design, implementation, and evaluation of comprehensive tobacco control interventions. Similar state Youth Tobacco Surveys, conducted by CDC, began in 1998. Published data from the National Youth Tobacco Survey are used in this report. A three-stage cluster sample design produced a nationally representative sample of students in grades 6 through 12 in public and private schools in the United States. This self-administered school questionnaire was distributed in the classroom by trained data collectors. The data were weighted to provide national estimates, and confidence intervals were calculated by using standard errors generated by SUDAAN (Shah et al. 1997).

Teenage Attitudes and Practices Survey

In 1989 and 1993, the U.S. Public Health Service (Office on Smoking and Health and NCHS) used the Teenage Attitudes and Practices Survey (TAPS) to collect self-reported data on tobacco use by adolescents (Allen et al. 1991, 1993; Moss et al. 1992; NCHS, public use data tape, 1993; CDC 1994a,d). The 1989 TAPS I collected information from a national household sample of young persons aged 12 through 18 years. Adolescents were selected from households that had been sampled in the 1988–1989 NHIS. TAPS I was conducted by computer-assisted telephone interview; a questionnaire was mailed to persons who could not be reached by telephone. The 1993 TAPS II was also a telephone survey, but it included household interviews of persons who could not be contacted by telephone. The TAPS II sample had two components: a longitudinal component consisting only of the respondents to the 1989 TAPS I telephone interview (aged 15 through 22 years in 1993), and a new probability sample of persons aged 10 through 15 years, obtained from the last half of the 1991 NHIS and the first three months of the 1992 NHIS sample frames. The 1989 and 1993 data were weighted to provide national population estimates. Confidence intervals were calculated by using standard errors generated by SUDAAN (Shah et al. 1997). Because part of the 1993 survey was a follow-up survey of respondents from 1989, the 1993 survey cannot be used for tobacco prevalence estimates (smokers were more likely to be lost to follow-up).

Youth Risk Behavior Surveillance System

CDC developed the Youth Risk Behavior Surveillance System (YRBSS) in 1990 to measure six categories of priority health risk behaviors, including

tobacco use among adolescents. Data were collected through national, state, and local school-based surveys of high school students that were conducted during the spring of 1991, 1993, 1995, 1997, and 1999 and through a national household-based survey of youth aged 12 through 21 years conducted during 1992 (Kolbe 1990; CDC 1992; Kann et al. 1993, 1995, 1996, 1998, 2000; Kolbe et al. 1993). Data from the 1999 national school-based survey are used in this report.

The 1999 Youth Risk Behavior Survey (YRBS) used a three-stage, cluster-sample design to draw a nationally representative sample of 9th- through 12th-grade students in public and private schools in all 50 states and the District of Columbia. Schools having a substantial proportion of black students and Hispanic students were oversampled. The questionnaire was

administered in the classroom by trained data collectors. The data were weighted to provide national estimates, and confidence intervals were calculated by using standard errors generated by SUDAAN (Shah et al. 1997).

Analyses done for this report restricted the YRBS sample to students less than 18 years of age (see Tables 2.8, 2.10, and 2.39). Of the students in this group, 99.8 percent were between 14 and 17 years of age. However, published YRBS data, including publications cited in this report, include information on students 18 years of age or older. Because of the age restrictions used in data analyses for this report, the estimates in this report may be different from the published estimates.

Appendix 2: Definitions

Measures of cigarette smoking differ among surveys and between surveys of children and adults. Five surveys (MTF Survey, NHSDA, NYTS, TAPS, and YRBS) provide information about smoking among children and adolescents, and four surveys (BRFSS, NHIS, NHSDA, and the Current Population Survey) provide information about smoking among adults. For each smoking measure, the definitions used in the various surveys are summarized here.

Attempts to Quit Smoking

An attempt to quit smoking is defined as having quit smoking for one or more days. Depending on the year of the survey, NHIS asked about attempts to quit in the past year or in a lifetime. Examples of questions are, “During the past 12 months, have you quit smoking for one day or longer?” and “Have you EVER stopped smoking for one day or longer?” In the 1998 NHIS, the question was revised to, “During the past 12 months, have you stopped smoking for more than one day because you were trying to quit smoking?”

Bidis

Bidis are small, brown, hand-rolled cigarettes from India and other southeast Asian countries. They consist of tobacco wrapped in a tendu or temburni leaf and are tied at one end with a string. In NYTS, ever use of bidis was defined as having ever tried bidis, even one or two puffs. In NYTS, current use of bidis was defined as use on 1 or more of the 30 days preceding the survey.

Body Weight

Body mass index (BMI) (weight in kilograms divided by height in meters squared) is used as the measure of body weight. In NHANES III, weight (in kilograms to two decimal places) and height (to the nearest millimeter) were measured at examination. For persons aged 20 years or older, overweight was defined as BMI equal to or greater than 27.3 for women and 27.8 for men. These values are based on the gender-specific 85th percentile of BMI from NHANES II for persons aged 20 through 29 years. For persons aged 18 or 19 years, overweight was defined as BMI of at least 25.7 for women and 25.8 for men, on

the basis of the gender-specific 85th percentile of BMI from NHANES II for persons aged 18 or 19 years.

The classification of weight perception varies by survey. In NHIS, adults responded to the question, “Do you consider yourself overweight, underweight, or just about right?” NHIS analyses on weight perception in this report excluded persons who were overweight according to BMI on the basis of self-reported weight and height.

Cigar Use

Adults

Among adult respondents in NHIS, ever smoking a cigar was determined by persons self-reporting that they had ever smoked cigars. For the 1970 NHIS, prevalence was based on persons who reported smoking cigars at the time of the survey. Current cigar smokers in NHIS for 1987, 1991, and 1992 included respondents who smoked at least 50 cigars in their entire lifetime and who smoked at the time of the survey. For the 1998 NHIS, current cigar smokers were respondents who reported that they ever smoked cigars and smoked cigars at the time of survey.

Children and Adolescents

In the 1999 NYTS, ever use of cigars was defined as ever trying cigars, cigarillos, or little cigars, even one or two puffs. In the 1999 NYTS, the 1998 NHSDA, and the 1999 YRBS, current cigar smoking among adolescents was defined as having smoked cigars on at least 1 of the 30 days preceding the survey.

Current Smoker

Adults

NHIS for 1965–1991 defined current smokers as respondents who have smoked at least 100 cigarettes and who answered yes to the question, “Do you smoke cigarettes now?” Beginning in 1992, NHIS assessed whether respondents smoked every day, some days, or not at all. Persons who smoked every day or some days were classified as current smokers. The 1995–1996 Current Population Survey also included information on lifetime cigarette smoking (> 100 cigarettes) and distinguished between current smokers who consumed cigarettes every day or only

some days. Estimates of prevalence of current smoking included persons who smoked either every day or only some days. For the 1974–1994-A NHSDA data used in this report, a current smoker was defined as a person who has smoked 100 or more cigarettes (about 5 packs) in his or her entire lifetime and who smoked in the 30 days before the survey. For the NHSDA data since the 1994-B survey, a current smoker was defined as a person who has smoked for 100 or more days and who smoked in the 30 days before the survey.

Children and Adolescents

In the surveys of children and adolescents, current cigarette smoking among adolescents was defined as having smoked on at least 1 of the 30 days preceding the survey.

Ever Smoked

Adults

In NHIS, BRFSS, and the Current Population Survey, adults who had ever smoked were respondents who had smoked at least 100 cigarettes in their entire lifetime. In NHSDA for 1974–1994-A, adults who had ever smoked were respondents who had smoked at least 100 cigarettes (about 5 packs) in their entire lifetime; since the 1994-B survey, persons who had ever smoked were respondents who had smoked at least 100 days in their entire lifetime.

Children and Adolescents

In the 1974–1977 NHSDA, children and adolescents who had ever smoked were those who reported that they had ever smoked a cigarette. In the 1979–1994-A NHSDA, ever smoked was defined as the inverse of never having smoked a cigarette. In the 1994-B survey and in subsequent years, persons who had ever smoked were respondents who reported ever having smoked a cigarette, even one or two puffs. In the MTF Survey, those who reported that they had ever smoked cigarettes, even once or twice, were classified as having ever smoked.

Ever Tried Smoking

Children and Adolescents

In NYTS, TAPS, and YRBS, persons who had ever tried smoking are those respondents who had tried a cigarette, even one or two puffs. In the 1979–1994-A NHSDA, smoking status was determined by response

to the question, “About how old were you when you first tried a cigarette?” If any age was given, the person was considered to have ever tried smoking.

Former Smoker

Adults

In NHIS, BRFSS, and the Current Population Survey, former smokers were respondents who had smoked at least 100 cigarettes in their lifetime but did not smoke at the time of the survey. No time frame for not smoking was specified, but some analyses specify former smokers who have not smoked in one year or in the past 12 months. In NHSDA for 1974–1994-A, former smokers had smoked at least 100 cigarettes but had not smoked in the past 30 days; since the 1994-B survey, former smokers had smoked at least 100 days but had not smoked in the past 30 days.

Children and Adolescents

In TAPS II, respondents who reported having smoked cigarettes regularly in the past, but not in the past 30 days, and who stated that they had quit smoking were classified as former smokers. In the MTF Survey, persons who had ever used cigarettes regularly but had not smoked in the past 30 days were classified as former smokers.

Initiation

For this report, smoking initiation was defined as the age at which a person first tried a cigarette (NHSDA), first smoked a whole cigarette (TAPS and YRBS), or first became a daily smoker (NHSDA and YRBS). The MTF Survey measured the school grade in which respondents first smoked a cigarette and first smoked daily. NHIS measured the recalled age at which adult respondents first started smoking fairly regularly (self-defined); this response was used to estimate the percentage of adults who became regular smokers during their adolescent years. Results from the different measures were not combined and are clearly identified in the tables and text.

Kreteks

Kreteks are clove cigarettes made in Indonesia that contain clove extract and tobacco. In NYTS, current use of kreteks was defined as use on 1 or more of the 30 days preceding the survey.

Never Smoked

Adults

In NHIS, BRFSS, and the Current Population Survey, persons who had never smoked were those who had not smoked 100 cigarettes in their entire lifetime. In NHSDA for 1974–1994-A, persons who had never smoked were those who had not smoked 100 cigarettes (about 5 packs) in their entire lifetime. In NHSDA since the 1994-B survey, persons who had never smoked had not smoked for 100 days in their entire lifetime.

Children and Adolescents

In TAPS and YRBS, persons who had never smoked were those who had never tried a cigarette, not even a puff. In the MTF Survey, persons who had never smoked were defined as persons who had never smoked, not even once or twice. In NHSDA, persons who had never smoked were those who had never tried cigarettes.

Noncurrent Smoker

In YRBS, MTF Survey, and NHSDA data, non-current smoker was used to describe adolescents who had ever tried a cigarette, even one or two puffs or only once or twice (ever smoked), but who had not smoked in the 30 days before the survey.

Percentage of Smokers Who Quit Smoking

The percentage of smokers who quit smoking was calculated for adults as the percentage of former smokers who had ever smoked at least 100 cigarettes. For children and adolescents, the percentage of smokers who quit smoking was defined as the proportion of children or adolescents who had ever smoked regularly (self-defined) who quit smoking.

Pipe Use

Adults

Current pipe smokers in NHIS were categorized as having smoked a pipe at least 50 times during their lifetime and by use at the time of the interview. Current pipe smoking in AUTS was determined by self-reporting of ever smoking a pipe and smoking a pipe at the time of the survey.

Children and Adolescents

In NYTS, current pipe smokers had smoked a pipe on 1 or more of the 30 days preceding the survey.

Quantity of Cigarettes Smoked

Adults

For this report, heavy smoking among adults was defined as smoking 25 or more cigarettes per day. NHIS was used to assess the number of cigarettes smoked per day among adults. Until 1992, NHIS asked all current smokers, “On the average, how many cigarettes do you now smoke a day?” Since 1992, this same question was asked of daily smokers, but persons who smoked only on some days were asked the number of cigarettes smoked on the days they smoked. To combine these responses into a comparable measure per day, responses from persons who smoked only on some days were multiplied by the fraction of days of smoking per month. Data from NHIS are also recoded as 25 or more cigarettes per day. The data used here for pregnant women were published data from NHIS, which defined heavy smoking as smoking 21 or more cigarettes per day.

NHSDA asked, “How many cigarettes have you smoked per day, on the average, during the past 30 days?” Responses were coded as 25 or fewer cigarettes and 26 or more cigarettes. This coding resulted in a definition of heavy smoking that is slightly inconsistent between NHSDA and NHIS.

Children and Adolescents

To measure the quantity of cigarettes smoked, NHSDA, YRBS, and TAPS assessed the number of cigarettes smoked per day. NHSDA asked, “When you smoked cigarettes during the past 30 days, how many did you usually smoke each day?” Categories were coded as 5 or fewer, 6 to 15, and 16 or more cigarettes per day. NYTS and YRBS asked, “During the past 30 days, on the days you smoked, how many cigarettes did you smoke per day?” Categories were coded as less than 1 per day, 1 per day, 2 to 5 per day, 6 to 10 per day, 11 to 20 per day, and more than 20 per day. TAPS asked, “I’m going to ask you to think about your cigarette smoking on each of the last seven days. Let’s start with yesterday, which was [day]. Please think back carefully and tell me how many cigarettes you smoked [day]? Now, how many cigarettes did you smoke the day before that, which was [day]?” The actual number was recorded. For the present report, heavy smoking among young persons was defined as smoking about one-half pack of cigarettes per day, but due to NHSDA coding categories, this resulted in the category being 6 to 15 or more cigarettes per day.

Rolling Averages

When sample sizes were small, yearly trend data were based on two-year rolling averages to increase subgroup sample sizes and generate more stable and reliable estimates. (Percentages were calculated by averaging the data for the specified year and the previous year.) The two-year periods reported have overlap (e.g., 1976–1977, 1977–1978, 1978–1979).

Skip Pattern

A skip pattern directs the respondent to the next relevant question on the basis of his or her specific response to a previous question.

Smokeless Tobacco Use

Adults

Smokeless tobacco use includes use of chewing tobacco and snuff. For NHIS, current smokeless tobacco use identifies persons who have used snuff or chewing tobacco at least 20 times during their lifetime and who used it at the time of the interview.

Children and Adolescents

In NYTS, ever use of smokeless tobacco was determined by asking, "Have you ever used chewing tobacco, snuff, or dip, such as Redman, Levi Garrett, Beechnut, Skoal, Skoal Bandits, or Copenhagen?"

In MTF Surveys, current smokeless tobacco use among adolescents was defined as having used smokeless tobacco on at least 1 of the 30 days preceding the survey. In NYTS and YRBS, smokeless tobacco use was defined as having used chewing tobacco or snuff on at least 1 of the 30 days preceding the survey.

Socioeconomic Status

In this report, socioeconomic status is defined by income level: below the poverty level, at or above the poverty level, or unknown. In 1965–1995, poverty status was based on income earned in the year before the survey and on definitions developed by the Social Security Administration in 1964, modified by federal interagency committees in 1969 and 1980, and prescribed by the Office of Management and Budget as the standard to be used by federal agencies for statistical purposes. In 1997 and 1998, the 1996 poverty thresholds from the Bureau of the Census were used.

Educational attainment is the most commonly used single indicator of social class; it is considered a reliable but limited indicator of socioeconomic status (Liberatos et al. 1988; Montgomery and Carter-Pokras 1993). Educational attainment has been associated with certain health risk factors, including cigarette smoking, even after income and occupation are controlled for (Winkleby et al. 1990). For most analyses, educational attainment was categorized as 8 or fewer years, 9 to 11 years, 12 years, 13 to 15 years, or 16 or more years. Persons with fewer than 12 years of education were not grouped together (unless small sample sizes necessitated broader categories) because both historical data (Green and Nemzer 1973; USDHEW 1976; Schuman 1977) and recent data (CDC 1994c; Zhu et al. 1996) suggest that the prevalence of smoking is much lower among persons with 8 or fewer years of education than among those with 9 to 11 years of education (Andersen et al. 1979).

Appendix 3: Validity of Self-Reported Data

Some researchers express concern that self-reported current smoking status may be increasingly underreported because of the increased social disapproval of smoking, and a study by Warner (1978) supports this view. However, Warner compared data from early years (derived from in-person interviews) with data from recent years (derived from telephone interviews). Estimates from telephone interviews are generally lower than those from in-person interviews because of nonresponse from population subgroups at higher risk from smoking and because of sampling bias from population subgroups without telephone service (Andersen et al. 1979), so the apparent decline in reporting over time may result from use of different interview methods (USDHHS 1989).

Other research suggests that underreporting of cigarette use has not increased over time. Hatzian-dreu and colleagues (1989) compared total self-reported cigarette consumption (based on 1974–1985 data from NHIS and NHSDA) with adjusted consumption data (based on cigarette excise taxes) from the U.S. Department of Agriculture for the same period. The researchers found no increase in the underreporting of cigarette smoking and concluded that cross-sectional surveys of self-reported smoking status are reliable. They also found no change when they compared their data with results from comparable surveys conducted in the 1960s.

Biochemical validation studies also suggested that data on self-reported cigarette consumption are valid, except in certain situations, such as in conjunction with intense smoking cessation programs, and with certain populations, such as pregnant women or adolescents (USDHHS 1990d, 1994; Kendrick et al. 1995; Velicer et al. 1992). A meta-analysis of 26 validation studies found that self-reported smoking status is generally accurate (Patrick et al. 1994), particularly when interviewer-administered questionnaires are used.

Underreporting may vary by race and ethnicity (Brownson et al. 1999), but not all studies found racial or ethnic differences in underreporting (Wills and Cleary 1997). A study by Bauman and Ennett (1994) found that blacks were more likely than whites to underreport tobacco use. Wagenknecht and coworkers (1992) found that misclassification was low among adults aged 18 through 30 years overall but relatively high among blacks and among respondents with a high school education or less. For some subgroups, the

misclassification rate could be as high as 4 percent. In HHANES, 6.3 percent of Mexican Americans who self-reported that they were nonsmokers were classified as smokers on the basis of serum cotinine levels (Pérez-Stable et al. 1992). In another study, self-reported prevalence was 4 percentage points lower than the cotinine-validated prevalence among Hispanic women in New Mexico (Coults et al. 1988). Wewers and colleagues (1995) found that smoking was significantly underreported among Southeast Asian immigrant women, particularly Cambodian and Laotian women. Misclassification may also be more common among occasional smokers; Wells and colleagues (1998) reported that misclassification rates (female smokers misclassified as females who had never smoked) was 0.8 percent among majority (white) regular smokers, 6.0 percent among majority occasional smokers, 2.8 percent among minority (black, Latino) regular smokers, and 15.3 percent among minority occasional smokers.

Even if estimates of smoking prevalence are reliable, smokers may misreport the number of cigarettes smoked per day because of digit preference (preference for multiples of 10). In the 1976–1980 NHANES II, persons who had smoked more heavily, whites, and those with less education were more likely to show digit preference (Klesges et al. 1995). Smokers may also underreport the number of cigarettes smoked per day (Warner and Murt 1982). In HHANES data, 3 percent of Mexican American women who reported smoking 20 or more cigarettes per day and 25 percent of Mexican American women who reported smoking 1 to 9 cigarettes per day had cotinine levels indicating higher consumption (Pérez-Stable et al. 1990a). Explanations for these findings may include racial and ethnic differences in underreporting, cotinine metabolism, depth of inhalation, and the quantity of cigarettes smoked.

Underreporting of cigarette smoking status may be more of a problem among children and adolescents than among adults. Williams and associates (1979) found, however, that adolescents reported their smoking status accurately when confidentiality was stressed. Dolcini and colleagues (1996), in their review of 28 studies, concluded that assuring adolescents of confidentiality, and if possible, anonymity, should increase reporting accuracy. Traditionally, self-administered school surveys provide more confidentiality and anonymity than household surveys, and

self-reports of current smoking from school surveys appear to be valid (Bauman et al. 1982). Traditional household surveys that use face-to-face interviews tend to underreport prevalence of tobacco use, particularly among young adolescents (Rootman and Smart 1985; USDHHS 1994; Hedges and Jarvis 1998). Telephone surveys of adolescents and young adults may also underestimate smoking prevalence (Luepker et al. 1989). However, in a comparison of responses from self-administered, school-based and household-based questionnaires among white, middle-class high school students, Zanes and Matsoukas (1979) did not find any statistically significant differences in the reported use of legal or illegal drugs. A study of telephone versus in-person interviews among Latino girls also found no difference in the reporting of smoking-related behaviors (Kaplan and Tanjasiri 1996). Dolcini and colleagues (1996) noted that adolescent self-report is generally accurate, but that accuracy may be improved if adolescents expect external confirmation of their smoking status.

The 1974–1993 NHSDA surveys were standard household surveys in which respondents were interviewed aloud by trained interviewers, which would tend to lessen the confidentiality of responses if others in the household were present. Beginning with the

1994 NHSDA, survey methods were changed from an interview format to a self-completed written questionnaire to increase confidentiality of responses. This change in method also resulted in the elimination of skip patterns (see definition for “skip pattern” in Appendix 2), and the initial response was edited to be consistent with later answers (Brittingham 1998). A split sample was used in 1994 to assess the effect of the change. The new method resulted in prevalence estimates of smoking that were two times higher overall and three times higher among adolescents aged 12 through 13 years (SAMHSA 1995b). These prevalence estimates from the new methodology are more comparable to those from self-administered school surveys.

Measures using recall about smoking initiation or past attempts to quit smoking may be less accurate than data about current smoking behavior; however, Gilpin and colleagues (1994) found that the distribution of reported age at smoking initiation among birth cohorts was consistent across survey years. Gilpin and Pierce (1994) also found that smokers did not recall unsuccessful cessation attempts that occurred far in the past or were of short duration, a finding also reported by Stanton and colleagues (1996b).

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