Chapter 2
Patterns of Smoking Cessation Among U.S. Adults, Young Adults, and Youth

Introduction

This chapter documents key patterns and trends in cigarette smoking cessation in the United States among adults overall (persons 18 years of age and older), young adults (18–24 years of age), and youth (12–17 years of age). The chapter also reviews the changing demographic and smoking-related characteristics of cigarette smokers, with a focus on how these changes may influence future trends in cessation.

This chapter also describes persistent disparities in cessation by age, race/ethnicity, level of education, status of health insurance, and other demographic characteristics. In addition, this chapter highlights trends and recent findings for several different measures, including the quit ratio (the proportion of ever smokers who are former smokers); recent successful cessation; past-year quit attempts; interest in quitting; receipt of cessation advice from healthcare professionals; and use of effective cessation strategies, such as counseling and medication. As with previous Surgeon General's reports, this chapter focuses primarily on cigarette smoking (U.S. Department of Health and Human Services [USDHHS] 1990, 2014); however, given the shifting patterns of tobacco product use in the United States, it also touches on cessation as it relates to all tobacco products. Monitoring key trends and current patterns in tobacco use and cessation is critical for informing the development and implementation of policies and programs to increase cessation and, as a result, reduce the morbidity, mortality, and associated financial costs caused by tobacco product use in the United States.

Data Sources

A variety of national surveillance systems in the United States collect data on smoking cessation among adults and youth. These systems typically collect an array of information on cigarette smoking history; use of other tobacco products; and various aspects of cessation, such as quit intentions, quit attempts, and successful cessation. These surveys use different data collection methods and may define specific cessation behaviors using comparable, but not identical, approaches. Accordingly, it is important to monitor the results from national surveys that include cessation-related data involving adults, young adults, and youth to create a comprehensive picture of cessation prevalence and patterns.

Appendix 2.1 describes the surveys referenced in this chapter, all of which are cross-sectional except for the Population Assessment of Tobacco and Health (PATH) Study. The primary source for data on adults was the National Health Interview Survey (NHIS), and the primary sources for data on youth were the national Youth Risk Behavior Survey (YRBS), conducted as part of the Youth Risk Behavior Surveillance System (YRBSS), and the National Youth Tobacco Survey (NYTS) (Table 2.1). These surveys were chosen because of their scientific and methodologic reliability and validity and because they are conducted as part of long-standing surveillance systems (Thacker et al. 1988; Centers for Disease Control and Prevention [CDC] 2001). Additionally, most of these surveys have historically been used to track progress toward national cessation goals, including the U.S. Department of Health and Human Services' *Healthy People* initiative (Office of Disease Prevention and Health Promotion n.d.b).

These data systems have additional strengths, including the timeliness of data releases and proven data collection methodologies, which use anonymous or confidential self-reported surveys that yield relatively high response rates. Self-reported data have been found to adequately reflect patterns of cigarette smoking among adults, including whether a respondent who has smoked in the past is currently not smoking, using scientifically validated biomarkers and other approaches (Connor Gorber et al. 2009; Wong et al. 2012); however, few studies have examined the validity of other cessation-related measures (Brigham et al. 2010; Persoskie and Nelson 2013).

NHIS, which has been a major source of health data among the U.S. adult population since the 1950s, is an annual household interview survey of the civilian, noninstitutionalized population. At the time this report was compiled, NHIS data on cigarette smoking among adults 18 years of age and older were available from 1965 to 2017, and data on cigarette smoking cessation for daily smokers and nondaily smokers were available from 1997 to 2017. In addition, since 2000, NHIS has fielded a CCS every 5 years, which includes detailed questions on cigarette smoking cessation; NHIS also fielded the CCS in 1987 and 1992, but the cessation questions were not consistent between these surveys. Therefore, for analyses of adult cessation trends, the present report uses the longest series of years available for each cessation measure. Data on the characteristics of

Table 2.1 Sources of national survey data on smoking cessation used for this report, 1965–2017; United States

	BRFSS	HINTS	MTF	NAMCS	NATS	NHIS	NYTS	PATH	TUS-CPS	YRBS
Sponsoring agency or organization	Centers for Disease Control and Prevention; Health Resources and Services Administration; Administration on Aging; U.S. Department of Veterans Affairs; and Substance Abuse and Mental Health Services Administration	Health Communication and Informatics Research Branch, Division of Cancer Control and Population Sciences, National Cancer Institute	National Institute on Drug Abuse, administered by the University of Michigan's Institute for Social Research	Centers for Disease Control and Prevention	Centers for Disease Control and Prevention and U.S. Food and Drug Administration	National Center for Health Statistics	Centers for Disease Control and Prevention (with support from U.S. Food and Drug Administration since 2011)	U.S. Food and Drug Administration; National Institute on Drug Abuse	National Cancer Institute (2014–2015 wave cosponsored by the U.S. Food and Drug Administration)	Centers for Disease Control and Prevention
Type	Cross-sectional	Cross-sectional	Cross-sectional and longitudinal	Cross-sectional	Cross-sectional	Cross-sectional	Cross-sectional	Longitudinal	Cross-sectional and longitudinal	Cross-sectional
Years	2017	2017	2011–2017	2004–2011	2013–2014	1965–2017; Cancer Control Supplements 2000, 2005, 2010, and 2015	1999, 2000, 2002, 2004, 2006, 2009, 2015, and 2017	2013–2014, 2014–2015	2001–2002, 2003, 2006–2007, 2010–2011, and 2014–2015	1991, 1993, 1995, 1997, 1999, 2001, 2003, 2005, 2007, 2009, 2011, 2013, 2015, and 2017
Mode	Telephone-based questionnaire that state health departments conduct monthly over landline and cellular telephones using a standardized questionnaire and technical and methodologic assistance provided by CDC	Household-based, mailed questionnaire	School-based, self-administered questionnaire	• Review medical records for information about patient visits • Interview physicians and community health center providers	Telephone-based questionnaire	Computer-assisted personal interview	School-based, self-administered questionnaire (paper-based)	Computer-assisted personal interview	Questionnaire via telephone and in-person interviews	School-based, self-administered questionnaire (paper-based)

Table 2.1 Continued

	BRFSS	HINTS	MTF	NAMCS	NATS	NHIS	NYTS	PATH	TUS-CPS	YRBS
Response rate	2017: 45.9%	• 2017: 25.0% • HINTS-FDA: 34.1% (NCI 2017a) • HINTS 5 Cycle 1 (2017): 32.4% (NCI 2017b)	• 2015: – 12th-grade RR: 83% – Schools: 382 • 2016: – 12th-grade RR: 80% – Schools: 372 • 2017: – 12th-grade RR: 79%	• 2009: 62.4% • 2010: 57.3% • 2011: 54.1% • 2012: 39.4% • 2013: 40.4% • 2014: 39.0% • 2015: 29.6% • 2016: 32.7%	2013–2014: 36.1% overall (47.6% landline and 17.1%, cellular)	• 2015[a]: – Household: 70.1% – Family: 69.3% – Sample adult: 63.4% • 2016[a]: – Household: 67.9% – Family: 67.1% – Sample adult: 61.9% • 2017[a]: – Household: 66.5% – Family: 65.7% – Sample adult: 53.0% • For years 1997–2017, the question about a past-year quit attempt was asked of all current cigarette smokers	• 2015: – School: 72.6% – Student: 87.4% – Overall: 63.4% • 2016: – School: 81.5% – Student: 87.9% – Overall: 71.6% • 2017: – School: 76.8% – Student: 88.7% – Overall: 68.1%	• 2013–2014: – 74.0% (adult) – 78.4% (youth) • 2014–2015: – 83.1% (adult) – 88.4% (youth)	2014–2015: Average self-response rate (for all waves combined) 54.2%	• 2015: – School: 69% – Student: 86% – Overall: 60% • 2017: – School: 75% – Student: 81% – Overall: 60%

Table 2.1 Continued

	BRFSS	HINTS	MTF	NAMCS	NATS	NHIS	NYTS	PATH	TUS-CPS	YRBS
Sample size	2017: 450,016	• 2017: 3,335 HINTS-FDA: 1,736 HINTS 5 Cycle 1 (2017): 3,285	• 2015: – 12th-grade students: 13,730 – Schools: 382 • 2016: – 12th-grade students: 12,600 – Schools: 372 • 2017: – 12th-grade students 13,522 – Schools: 360	• Patient records extracted: – 2009: 32,281 from a sample of 3,319 physicians – 2010: 31,229 from a sample of 3,525 physicians – 2011: 30,872 from a sample of 3,819 physicians – 2012: 76,330 from a sample of 15,740 physicians – 2013: 54,873 from a sample of 11,212 physicians – 2014: 45,710 from a sample of 9,989 physicians – 2015: 28,332 from a sample of 8,091 physicians – 2016: 13,165 from a sample of 3,699 physicians	2013–2014: 75,233 respondents (70% landline and 30% cellular)	• Adults >18 years of age: – 2015: 33,672 2016: 33,028 2017: 26,742 • Overall households: – 2015: 41,493 2016: 30,220 2017: 32,617	• Students in grades 6–12: – 2015: 17,711 – 2016: 20,675 – 2017: 17,872	• 2013–2014: 45,971 (32,320 adults/16,651 youth) • 2014–2015: 40,534 (28,362 adults/12,172 youth)	2014–2015: 163,920	• Students in grades 9–12: – 2015: 15,624 2017: 14,765

Table 2.1 Continued

	BRFSS	HINTS	MTF	NAMCS	NATS	NHIS	NYTS	PATH	TUS-CPS	YRBS
Cessation measure(s)	Quit ratio	Use of Internet-based programs or tools in quit attempts	Interest in quitting	• Screening for tobacco use • Counseling for use of or exposure to tobacco	Advice to quit	Quit ratio, recent successful cessation, past-year quit attempt, Cancer Control Supplements, interest in cessation, provider advice to quit, and use of effective treatments	Advice to quit and use of counseling and medications to quit[b]	Quit attempts, quit ratio, recent successful cessation; use of NRT, medications, or counseling to quit	Past-year quit attempts, interest in quitting, recent smoking cessation, or receipt of medical doctor's advice to quit	Past-year quit attempt

Notes: **BRFSS =** Behavioral Risk Factor Surveillance System; **CDC =** Centers for Disease Control and Prevention; **HINTS =** Health Information National Trends Survey; **MTF =** Monitoring the Future; **NATS =** National Adult Tobacco Survey; **NAMCS =** National Ambulatory Medical Care Survey; **NHIS =** National Health Interview Survey; **NYTS =** National Youth Tobacco Survey; **PATH =** Population Assessment of Tobacco and Health; **RR =** relative risk; **TUS-CPS =** Tobacco Use Supplement to the Current Population Survey; **YRBS =** National Youth Risk Behavior Survey.

[a]RR for household component, and unconditional RR for family and sample adult components.

[b]The measure of advice to quit has changed over time: 2009 ("During the past 12 months, did a medical doctor, dentist, or nurse tell you to stop smoking?") and 2015 ("During the past 12 months, did any doctor, dentist, or nurse give you advice not to use tobacco that is smoked or put in your mouth?"). In 2017, NYTS did not contain either of these measures (advice to quit; use of counseling/cessation medications). There are other cessation measures that are not listed here (e.g., thinking about quitting during the past 12 months, and stopped using because trying to quit).

cigarette smokers are reviewed beginning with the year 2000 to correspond with the available cessation data.

YRBSS monitors six categories of health-related behaviors that contribute to the leading causes of death and disability among youth and adults. In operation since 1991, the national YRBS is a biennial survey that utilizes probability samples of students in public and private high schools; students anonymously complete questionnaires administered in schools. The survey is nationally representative of the U.S. high school population. This Surgeon General's report uses biennial data from the national YRBS to examine trends in youth cigarette smoking and past-year quit attempts among current cigarette smokers. For trends in cigarette smoking cessation among youth, this report uses biennial data from 1991 to 2015 from the national YRBS. However, this report does not include state and local data from YRBS surveys because (a) only one state and two districts produced weighted data for all years of the YRBS and (b) some of these surveys had small sample sizes for the measures examined in this report (CDC 2013).

NYTS is a cross-sectional, voluntary, school-based, self-administered, pencil-and-paper survey of U.S. middle and high school students. A three-stage cluster sampling procedure is used to generate a nationally representative sample of U.S. students who attend public and private schools in grades 6–12. Because the NYTS is a tobacco-focused survey as opposed to a general health survey, it collects more comprehensive data than YRBS on a variety of tobacco-related measures from middle school and high school students, including tobacco product use, smoking cessation, exposure to secondhand smoke, tobacco-related knowledge and attitudes, access to tobacco products, and other tobacco-related indicators. The NYTS has been conducted most years since 1999. This chapter examined data from 2000, 2004, 2009, and 2015, corresponding roughly with the years of adult data from the NHIS Cancer Control Supplement (CCS). In 2017, the most recent wave of data available at the time this report was compiled, cessation of all tobacco products was assessed, and separate questions were not asked about cigarette smoking cessation specifically.

As reviewed in more detail in Appendix 2.1, this chapter also considers other sources of data, including the Tobacco Use Supplement to the Current Population Survey (TUS-CPS), the Behavioral Risk Factor Surveillance System (BRFSS), the National Adult Tobacco Survey (NATS), the National Ambulatory Medical Care Survey (NAMCS), the Health Information National Trends Survey (HINTS), and the Monitoring the Future (MTF) Study. Data from Nielsen Retail Management Services were also used to assess sales of over-the-counter nicotine replacement therapy (NRT). The data contain projected NRT sales from two major retail channels: expanded all outlets combined and convenience stores. The former category includes aggregated sales from food stores, drug stores, mass merchandizers, club stores, dollar stores, and military commissaries. In addition, published baseline and longitudinal analyses from the PATH Study are summarized.

Key Epidemiologic Measures

Appendix 2.2 defines the survey measures used in this chapter. In brief, this chapter examines a variety of epidemiologic areas related to cigarette smoking and cessation, including trends in current and former cigarette smoking and the smoking characteristics of adult and youth current cigarette smokers; disparities in current smoking, trends in the quit ratio, recent successful cessation, past-year quit attempts, current interest in quitting, and ever trying to quit smoking cigarettes among adult and youth smokers; tobacco screening and advice to quit delivered by health professionals; counseling and use of Food and Drug Administration (FDA)-approved medications for smoking cessation; use of other strategies for smoking cessation; and disparities in smoking cessation. This chapter also briefly addresses cessation of other tobacco products to the extent possible, given that national surveys include few measures of cessation for noncigarette tobacco products. Patterns of use of noncigarette tobacco products were included in the 2014 Surgeon General's report (USDHHS 2014). However, because limited cessation information is available for noncigarette tobacco products, this report does not review trends in the use of these products and changes in the characteristics of the populations that use these products.

Data are presented in an order that first highlights the primary public health goal of tobacco use cessation (i.e., successful cessation), including the following three measures: prevalence of former smoking (persons who ever smoked >100 cigarettes who do not currently smoke), quit ratio (the proportion of ever smokers who are former smokers), and prevalence of recent smoking cessation (persons who quit smoking for >6 months in the past year). These measures are then followed by intermediary measures that reflect a smoker's journey to cessation (i.e., the cessation continuum), starting with the most proximate measure (prevalence of past-year quit attempts) and moving backward on the continuum from assessing a smoker's current interest in quitting completely to whether he or she

has ever made a quit attempt (Institute of Medicine 2007). The chapter concludes by examining tobacco screening and cessation interventions provided by health professionals and the utilization of other selected cessation strategies.

For adults overall, the most recent year of data from NHIS is presented for each indicator by key demographic characteristics (e.g., sex, age [18–24, 25–44, and 45–64 years of age and 65 years of age and older], race/ethnicity, level of education, geographic region, and status of health insurance), followed by trends over time among adults for men and women overall and for non-Hispanic Whites (hereafter referred to as Whites), non-Hispanic Blacks (hereafter referred to as Blacks), and Hispanics. These data on adults are then followed by corresponding sections for analyses on young adults (18–24 years of age) and youth from various data sources. Some measures for young adults are missing, and statistically stable estimates could not be produced because of small sample sizes.

Trends in Current and Former Cigarette Smoking

Tests for linear and quadratic (nonlinear) trends were performed and controlled for variations in sex and race/ethnicity over time. Models for adults overall controlled for age over time, and models for youth controlled for grade level. A test for linear trend is statistically significant if a straight line (indicating a consistent increase or decrease) fits the adjusted data significantly better than no linear trend (i.e., the null hypothesis of no linear trend over time is rejected). Similarly, a test for quadratic trend is statistically significant if a curved line with one bend (indicating an accelerated or decelerated rate of change during the assessed period) fits the adjusted data better than no quadratic trend. Quadratic trends were initially assessed. If the quadratic trend was not statistically significant, then tests for linear trends were performed. Tests for other time functions (i.e., trend shapes) were not assessed; it is possible that other time functions could also fit the data.

Adults

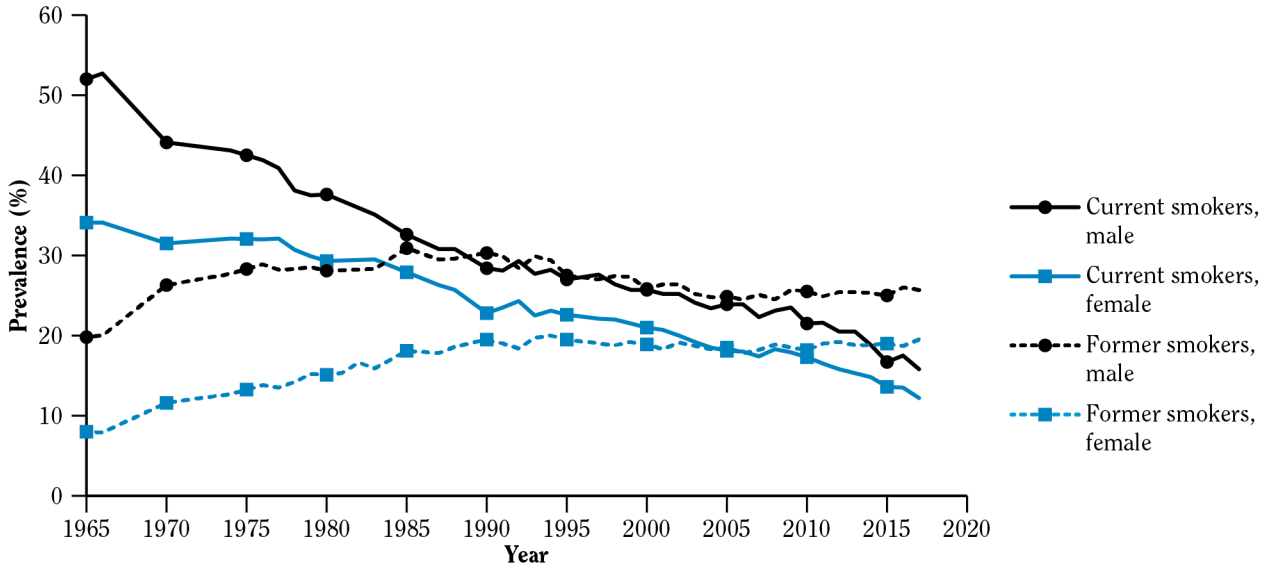
The NHIS definition of current cigarette smoking has changed over time. For the purposes of this report, the definition of current smoking has been standardized. Specifically, current cigarette smokers are defined as those who smoked at least 100 cigarettes in their lifetime and who smoked every day or on some days at the time of the survey. Former cigarette smokers are defined as those who smoked at least 100 cigarettes during their lifetime but were not smoking at the time of the survey.

Among adults in 2018, the prevalence of current cigarette smoking was 13.8%, the lowest measured prevalence among U.S. adults since NHIS data collection for this measure began in 1965; the prevalence of former cigarette smoking was 20.9% (NHIS, public use data, 2018) (Blackwell and Villarroel 2018; Wang et al. 2018a). From 1965 to 2017, the prevalence of current smoking declined by 36.2 percentage points (relative percentage change: 69.6%) among men (from 52.0% to 15.8%) and 21.9 percentage points (relative percentage change: 64.2%) among women (from 34.1% to 12.2%) ($p < 0.001$ for quadratic trend for both groups) (Figure 2.1). The prevalence of former smoking among all men peaked in 1985 (at 30.9%), and the prevalence of former smoking among women peaked in 1994 (at 20.0%) ($p < 0.001$ for quadratic trend for both groups). Among men, 1991 was the first year in which the prevalence of former smoking was higher than the prevalence of current smoking; however, not until 2010–2017 was the prevalence of former smoking consistently greater each year than the prevalence of current smoking. Among women, the prevalence of former smoking first surpassed the prevalence of current smoking in 2011 and remained higher through 2017.

Declines in the prevalence of current smoking were also observed across racial and ethnic subgroups (Figure 2.2) ($p < 0.001$ for linear trend for Whites from 42.2% in 1965 to 15.2% in 2017, Blacks [$p < 0.001$ for linear trend] from 46.0% in 1965 to 14.9% in 2017, and Hispanics [$p < 0.0001$ for linear trend] from 31.6% in 1978 to 9.9% in 2017). Although the prevalence of former smoking exceeded the prevalence of current smoking among Whites during 2002–2017 and among Hispanics during 2014–2017, the prevalence of former smoking among Blacks never exceeded the prevalence of current cigarette smoking during 1965–2017 ($p < 0.001$ for quadratic trends for former smoking among Whites and Blacks and a linear trend [$p < 0.001$] for Hispanics). The pattern of lower prevalence of former smoking than current smoking among Blacks may be the result of both their lower prevalence of initiation and their lower quit ratios compared with other racial/ethnic groups (USDHHS 2014).

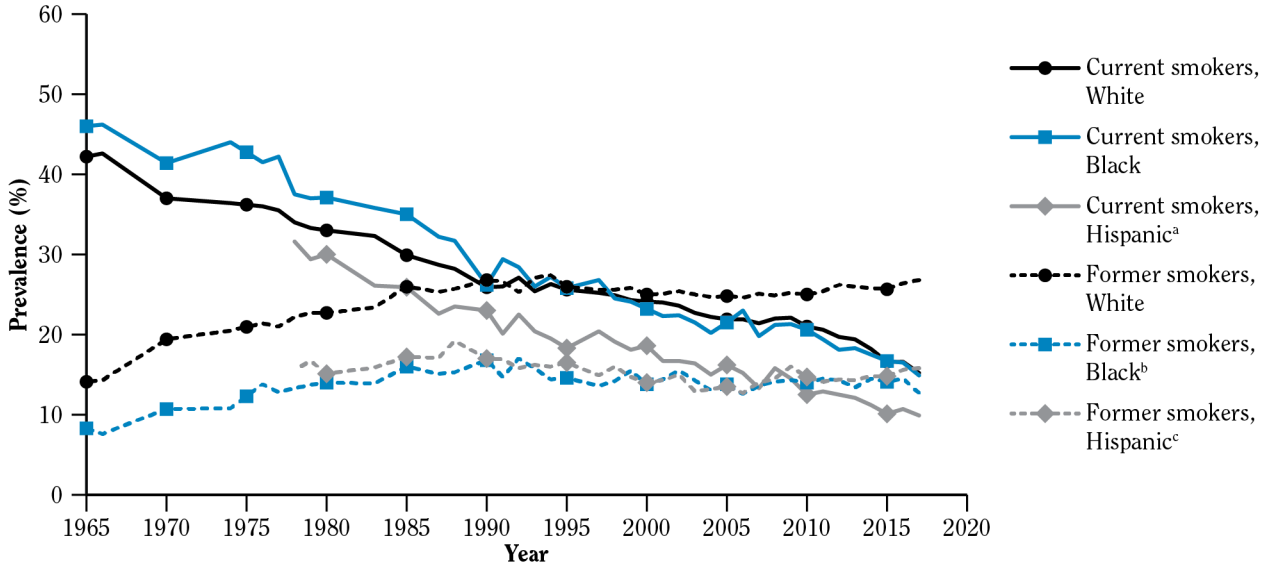
It is important to note that the definition of a former smoker is broad and contains both persons who quit many years ago and persons who are actively trying to quit (i.e., they were not smoking at the time of the survey but could have quit for only 1 day). Decreases in the prevalence of former cigarette smoking among adults during the past 20–30 years primarily reflect decreases in

Figure 2.1 Trends in prevalence (%) of current and former cigarette smoking among adults 18 years of age and older, by sex; National Health Interview Survey (NHIS) 1965–2017; United States



Source: NHIS, National Center for Health Statistics, public use data, 1965–2017.
Note: From 1965 to 2017, data were reported for the following years: 1965, 1966, 1970, 1974, 1976–1980, 1983, 1985, 1987, 1988, 1990–1995, and 1997–2017.

Figure 2.2 Trends in prevalence (%) of current and former cigarette smoking among adults 18 years of age and older, by race/ethnicity; National Health Interview Survey (NHIS) 1965–2017; United States



Source: NHIS, National Center for Health Statistics, public use data, 1965–2017.
Note: From 1965 to 2015, data were reported for the following years: 1965, 1966, 1970, 1974, 1976–1980, 1983, 1985, 1987, 1988, 1990–1995, and 1997–2017.
[a]Data were not collected for 1965, 1966, 1970, 1974, 1976, and 1977.
[b]Data were statistically unreliable (relative standard error >30% or denominator <50 sample cases) for the following years: 1980, 1987, 1992–1995, 2002, 2003, 2005, 2007–2013, and 2015–2017.
[c]Data were statistically unreliable (relative standard error >30% or denominator <50 sample cases) for 1992 and 2016.

cigarette smoking initiation, as illustrated by data from birth cohorts (USDHHS 2014). Specifically, this means that the prevalence of former smoking has primarily decreased because youth and young adults, in particular, are less likely to initiate cigarette smoking than they might have been in the past. Therefore, the pool of persons who are eligible to quit has decreased over time. Nevertheless, during the past decade, adult former cigarette smokers have become more common than current smokers, with the exception of Black adults.

Young Adults

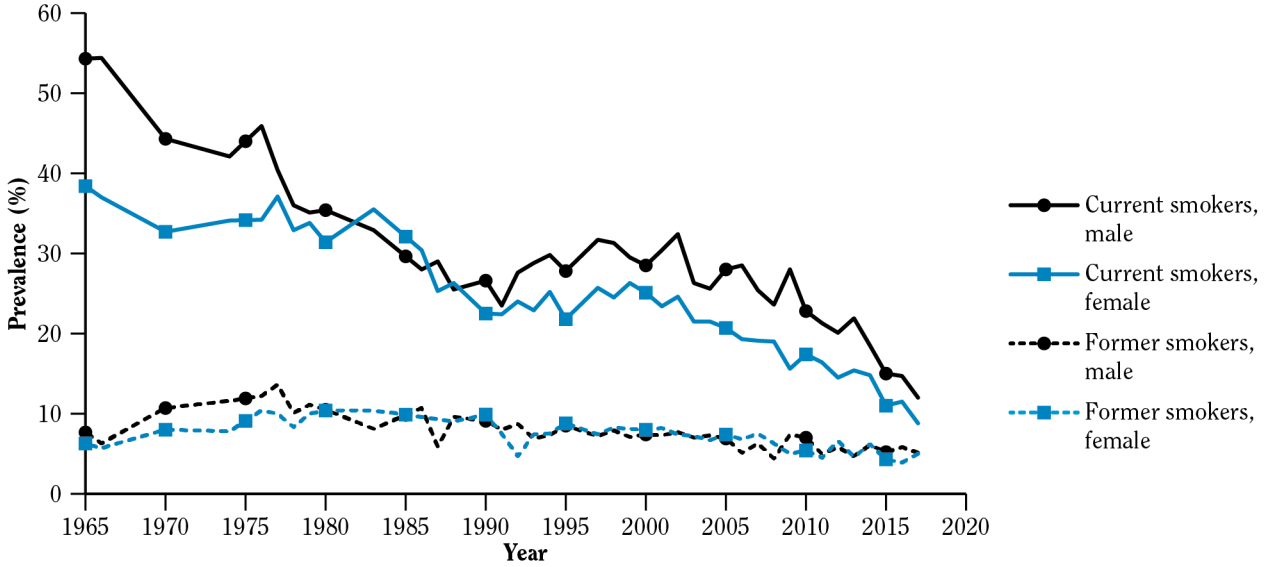
Current cigarette smokers are defined as those who smoked at least 100 cigarettes in their lifetime and who smoked every day or on some days at the time of the survey. Among U.S. young adults (18–24 years of age) in 2017, the prevalence of current cigarette smoking was 10.4%, and the prevalence of former cigarette smoking was 5.1% (NHIS, public use data, 2017) (Wang et al. 2018a). Similar to data for adults overall, the prevalence of current smoking during 1965–2017 declined by 42.3 percentage points (relative percentage change: 77.9%) among young adult men (from 54.3% in 1965 to 12.0% in 2015; $p < 0.001$ for linear trend) and 29.6 percentage points (relative percentage change: 77.1%) among young adult women (from 38.4% in 1965 to 8.8% in 2017; $p < 0.001$ for quadratic trend) (Figure 2.3). In contrast to the findings for adults overall, the prevalence of former smoking among young adult men peaked in 1977 (at 13.6%), and the prevalence of former smoking among young adult women peaked in 1978 (at 10.4%). Among young adult men and young adult women, the prevalence of former smoking has never exceeded the prevalence of current smoking (Figure 2.3).

Declines in the prevalence of current smoking among young adults across racial and ethnic subgroups were also similar to those for adults overall (Figure 2.4), declining for young adult Whites from 45.4% in 1965 to 13.5% in 2017 ($p < 0.001$ for quadratic trend), for young adult Blacks from 49.2% in 1965 to 8.6% in 2017 ($p < 0.001$ for quadratic trend), and for young adult Hispanics from 36.1% in 1978 to 5.6% in 2017 ($p < 0.001$ for linear trend) (Figure 2.4). In contrast to the findings for adults overall, the prevalence of former smoking among young adults in any of the three racial/ethnic groups never exceeded the prevalence of current smoking (Figure 2.4).

Youth

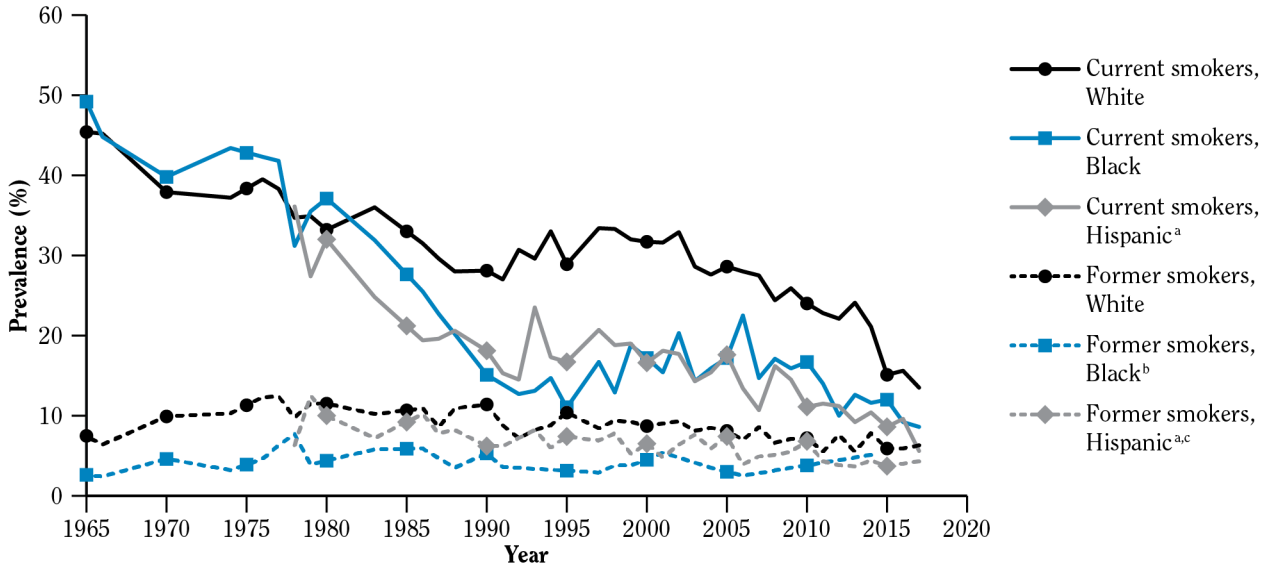
Current cigarette smoking in YRBS is defined as having smoked cigarettes on at least 1 day during the 30 days before the survey. In 2017, the prevalence of current

Figure 2.3 Trends in prevalence (%) of current and former cigarette smoking among young adults 18–24 years of age, by sex; National Health Interview Survey (NHIS) 1965–2017; United States



Source: NHIS, National Center for Health Statistics, public use data, 1965–2017.
Note: From 1965 to 2017, data were reported for the following years: 1965, 1966, 1970, 1974, 1976–1980, 1983, 1985, 1987, 1988, 1990–1995, and 1997–2017.

Figure 2.4 Trends in prevalence (%) of current and former cigarette smoking among young adults 18–24 years of age, by race/ethnicity; National Health Interview Survey (NHIS) 1965–2017; United States



Source: NHIS, National Center for Health Statistics, public use data, 1965–2017.
Note: From 1965 to 2017, data were reported for the following years: 1965, 1966, 1970, 1974, 1976–1980, 1983, 1985, 1987, 1988, 1990–1995, and 1997–2017.
[a]Data were not collected for 1965, 1966, 1970, 1974, 1976, and 1977.
[b]Data were statistically unreliable (relative standard error >30% or denominator <50 sample cases) for the following years: 1980, 1987, 1992–1995, 2002, 2003, 2005, 2007–2013, and 2015–2017.
[c]Data were statistically unreliable (relative standard error >30% or denominator <50 sample cases) for 1992 and 2016.

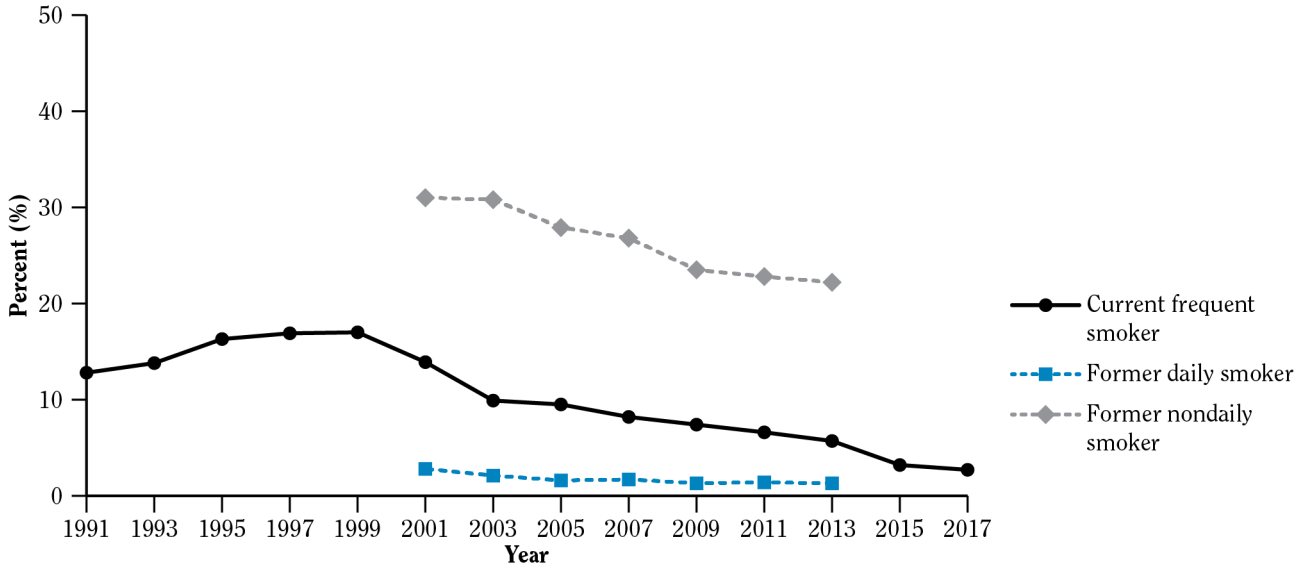
smoking among U.S. students in grades 9–12 was 8.8% (Kann et al. 2018). Many youth experiment with cigarette smoking, and some progress to a more established pattern of smoking. Those with a more established pattern may be particularly important to study for future cessation trends, as they are most likely to become adult smokers (USDHHS 2012). Among students in grades 9–12, the prevalence of current frequent cigarette smoking (ever smokers who had smoked 20 or more days during the past 30 days) was 2.7% (Kann et al. 2018). The prevalence of current smoking increased during 1991–1997 (27.5–36.4%) and then decreased during 1997–2017 (36.4–8.8%), and a significant quadratic trend was observed (Kann et al. 2018). Similarly, the prevalence of current frequent smoking increased during 1991–1999 (12.8–17.0%) and then decreased during 2001–2017 (13.9–2.7%), and a significant quadratic trend was also observed (Figure 2.5).

Similar nonlinear trends in these measures over time were observed by sex (YRBS, public use data, 1991–2017) and race/ethnicity (Figures 2.6a and 2.6b). The prevalence of current frequent smoking was consistently and statistically higher in Whites than in Blacks and Hispanics.

The YRBS does not contain a measure of former smoking that is similar to the NHIS measure of former smoking for adults (i.e., ever smoked at least 100 cigarettes but was not a current smoker at the time of the survey). However, during 2001–2013, the YRBS asked students whether they had ever smoked daily. Students who were former daily smokers (i.e., ever smokers who were not smoking currently but reported smoking daily in the past) presumably include the majority of youth who had smoked at least 100 cigarettes and had since stopped smoking. In 2013, the prevalence of former daily smoking (i.e., ever daily smokers who reported no current smoking) among students in grades 9–12 was 1.3%, and the prevalence of former nondaily smoking was 22.2% (Figure 2.5). From 2001 to 2013, a nonlinear decrease was observed in the prevalence of former daily smoking, and the prevalence of former nondaily smoking decreased linearly. Similar patterns were observed among females (YRBS, public use data, 2001–2013) and Whites (Figure 2.6b). In contrast, males (YRBS, public use data, 2001–2013) and Blacks (Figure 2.6b) had linear decreases for former daily smoking, but changes in this measure were not observed among Hispanics. In addition, nonlinear decreases in former nondaily smoking occurred among Blacks.

For all years, the prevalence of former nondaily smoking was higher than the prevalence of current

Figure 2.5 Trends in prevalence (%) of current frequent[a], former daily[b], and former nondaily[c] cigarette smoking among high school students; National Youth Risk Behavior Survey (YRBS) 1991–2017; United States



Source: YRBS, Centers for Disease Control and Prevention, public use data, 1991–2017.
Note: The question about daily smoking was not asked in 2015 and 2017.
[a]Students who answered "yes" to "have you ever smoked" and "yes" to "do you currently smoke?"; and reported smoking on >19 days during the past 30 days.
[b]Students who answered "yes" to "have you ever smoked" and "no" to "do you currently smoke?" and answered "yes" to "ever daily."
[c]Students who answered "yes" to "have you ever smoked" and "no" to "do you currently smoke?" and answered "no" to "ever daily."

frequent and former daily smoking (Figure 2.5), indicating high percentages of youth tried (i.e., experimented with), but did not maintain, cigarette smoking. In contrast, the low prevalence of former daily smokers most likely reflects the low prevalence of daily smoking among students in grades 9–12 and the low prevalence of cessation among those who only recently became daily smokers (Fiore et al. 2008; USDHHS 2014).

Changing Characteristics of Current Cigarette Smokers

Adults

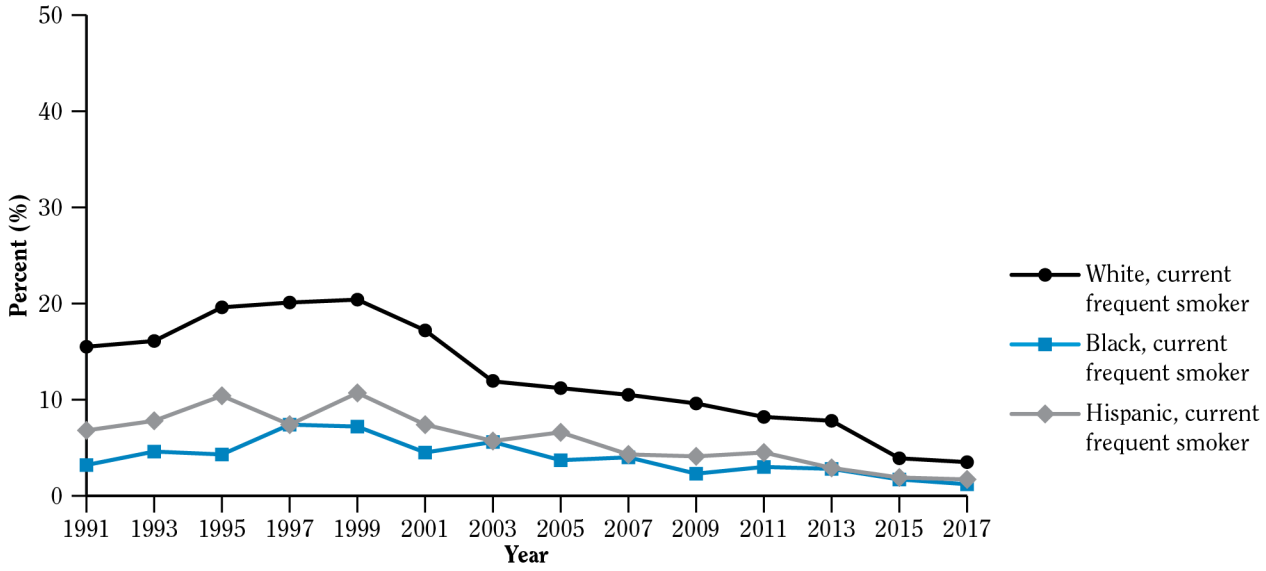
Demographic characteristics of current adult cigarette smokers have changed in recent years, reflecting changes in demographics of the U.S. population and advancements in national and state tobacco prevention and control policies (Howden and Meyer 2011; Humes et al. 2011; Ryan and Bauman 2016; National Center for Health Statistics 2018). These changes may have affected levels of interest in quitting cigarettes, the prevalence of quit attempts, and the prevalence of successful cessation. For example, during 2000–2017, notable changes occurred across several demographic variables (Table 2.2):

- During 2000–2017, the proportion of current smokers who were 45–64 years of age increased from 30.9% to 39.9%, and the proportion of current smokers who were 65 years of age and older rose from 6.8% to 11.8%. Conversely, during this period, the proportions of current smokers who were 18–24 or 25–44 years of age decreased, reflecting the decreased initiation of smoking among youth since 1997 (USDHHS 2014).

- The proportion of current smokers who were Hispanic increased from 8.4% in 2000 to 11.3% in 2017, and the proportion of current smokers who were White decreased from 76.4% in 2000 to 69.5% in 2017.

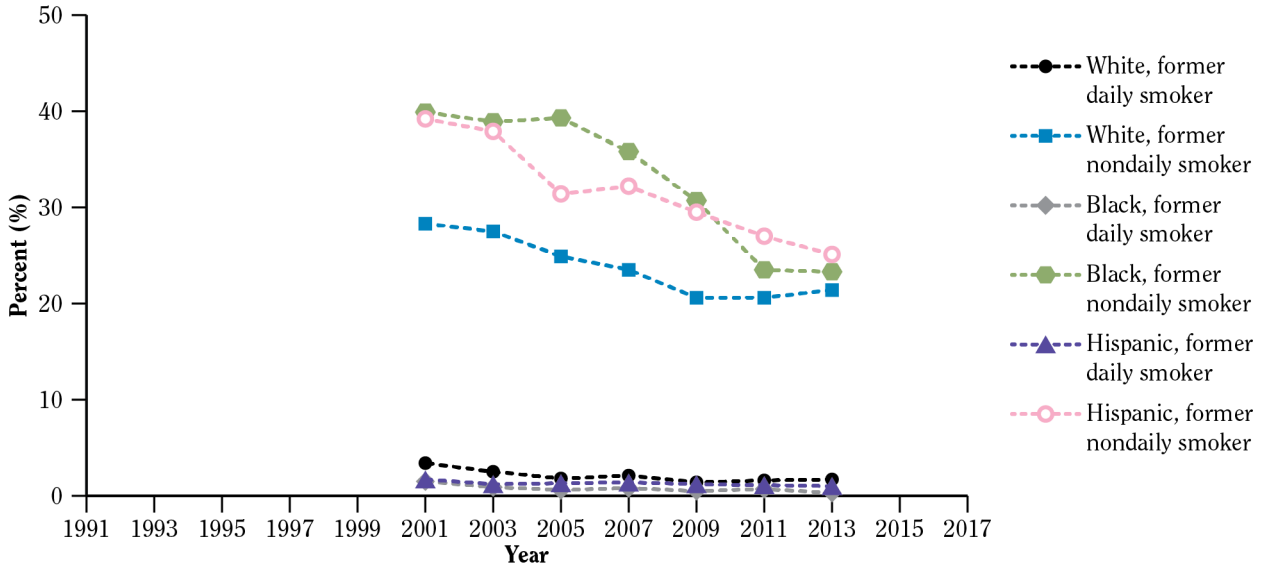
- The proportion of current smokers 25 years of age and older whose highest level of education was a high school diploma decreased from 33.4% in

Figure 2.6a Trends in prevalence (%) of current frequent[a] cigarette smoking among high school students, by race/ethnicity; National Youth Risk Behavior Survey (YRBS) 1991–2017; United States



Source: YRBS, Centers for Disease Control and Prevention, public use data, 1991–2017.
Note: The question about daily smoking was not asked in 2015 and 2017.
[a]Students who answered "yes" to "have you ever smoked" and "yes" to "do you currently smoke?"; and reported smoking on >19 days during the past 30 days.

Figure 2.6b Trends in prevalence (%) of former daily[a] and former nondaily[b] cigarette smoking among high school students, by race/ethnicity; National Youth Risk Behavior Survey (YRBS) 1991–2017; United States



Source: YRBS, Centers for Disease Control and Prevention, public use data, 1991–2017.
Note: The question about daily smoking was not asked in 2015 and 2017.
[a]Students who answered "yes" to "have you ever smoked" and "no" to "do you currently smoke?"; and answered "yes" to "daily."
[b]Students who answered "yes" to "have you ever smoked" and "no" to "do you currently smoke?"; and answered "no" to "daily."

Table 2.2 Distribution of selected demographic characteristics of adult current cigarette smokers[a] 18 years of age and older; National Health Interview Survey (NHIS) 2000, 2005, 2010, 2015, and 2017; United States

Characteristic	2000: % (95% CI)	2005: % (95% CI)	2010: % (95% CI)	2015: % (95% CI)	2017: % (95% CI)
Sex (% male)	52.9 (51.6–54.3)	54.9 (53.5–56.4)	53.8 (52.2–55.4)	53.4 (51.5–55.3)	54.7 (52.6–56.8)
Age group (in years)					
18–24	15.2 (14.0–16.3)	15.2 (14.0–16.4)	13.4 (12.1–14.7)	10.6 (9.3–12.0)	8.9 (7.6–10.2)
25–44	47.2 (45.9–48.5)	43.4 (41.9–44.9)	40.3 (38.8–41.9)	40.1 (38.2–42.1)	39.4 (37.5–41.3)
45–64	30.9 (29.7–32.0)	34.8 (33.4–36.2)	38.1 (36.4–39.7)	38.6 (36.7–40.5)	39.9 (38.0–41.8)
≥65	6.8 (6.2–7.3)	6.6 (6.0–7.2)	8.2 (7.4–9.1)	10.6 (9.6–11.7)	11.8 (10.7–12.9)
Race/ethnicity					
White, non-Hispanic	76.4 (75.2–77.7)	74.4 (72.9–76.0)	74.1 (72.6–75.6)	71.3 (69.5–73.1)	69.5 (67.1–71.8)
Black, non-Hispanic	11.1 (10.3–11.9)	11.4 (10.4–12.4)	12.4 (11.2–13.5)	12.9 (11.7–14.2)	12.6 (11.0–14.2)
Hispanic	8.4 (7.7–9.2)	10.0 (9.0–10.9)	9.0 (8.2–9.8)	10.4 (9.3–11.5)	11.3 (9.5–13.1)
American Indian/Alaska Native, non-Hispanic	0.8 (0.5–1.1)	0.8 (0.4–1.1)	0.8 (0.5–1.1)	0.9 (0.6–1.2)	1.2 (0.7–1.8)
Asian, non-Hispanic	2.0 (1.5–2.5)	2.3 (1.8–2.9)	2.2 (1.8–2.6)	2.6 (2.1–3.2)	3.0 (2.3–3.8)
Multiple races, non-Hispanic	1.2 (0.9–1.5)	1.1 (0.8–1.5)	1.5 (1.2–1.9)	1.9 (1.4–2.3)	2.3 (1.8–2.9)
Level of education[b]					
≤12 years (no diploma)	21.5 (20.4–22.6)	19.8 (18.5–21.1)	18.4 (17.1–19.8)	19.8 (18.3–21.3)	18.0 (16.4–19.7)
GED certificate	5.5 (4.8–6.1)	5.6 (4.9–6.4)	6.7 (5.8–7.6)	6.1 (5.2–7.0)	7.0 (6.0–8.0)
High school diploma	33.4 (32.0–34.9)	32.0 (30.5–33.5)	29.4 (27.8–31.0)	27.4 (25.7–29.2)	27.2 (25.5–28.9)
Some college (no degree)	18.0 (17.0–19.1)	19.0 (17.8–20.2)	21.2 (19.8–22.5)	20.5 (18.9–22.1)	20.0 (18.4–21.6)
Associate degree	8.7 (7.9–9.5)	10.5 (9.5–11.4)	10.7 (9.6–11.8)	13.0 (11.7–14.2)	12.6 (11.3–13.9)
Undergraduate degree	9.5 (8.6–10.3)	9.6 (8.7–10.5)	10.0 (8.9–11.0)	10.0 (8.8–11.2)	11.1 (9.7–12.4)
Graduate degree	3.4 (2.8–3.9)	3.5 (3.0–4.1)	3.7 (3.0–4.4)	3.2 (2.5–3.8)	4.0 (3.2–4.8)
Poverty status (% below poverty level)	14.8 (13.7–15.8)	16.3 (15.2–17.4)	19.5 (18.2–20.9)	21.0 (19.6–22.5)	19.2 (17.5–20.9)
Geographic region					
Northeast	18.0 (16.7–19.3)	16.8 (15.5–18.2)	15.9 (14.6–17.2)	15.6 (13.9–17.2)	14.7 (12.8–16.6)
Midwest	27.8 (26.4–29.1)	28.7 (27.1–30.2)	26.2 (24.6–27.8)	27.8 (25.6–29.9)	26.4 (24.3–28.6)
South	37.9 (36.2–39.5)	37.7 (35.8–39.5)	38.7 (36.8–40.6)	37.7 (35.7–39.7)	40.3 (37.9–42.6)
West	16.4 (15.2–17.5)	16.8 (15.6–18.1)	19.2 (17.7–20.8)	19.0 (17.3–20.7)	18.6 (16.7–20.5)

Table 2.2 Continued

Characteristic	2000: % (95% CI)	2005: % (95% CI)	2010: % (95% CI)	2015: % (95% CI)	2017: % (95% CI)
Health insurance coverage					
Private	61.9 (60.5–63.3)	56.4 (54.7–58.1)	48.3 (46.6–50.0)	48.1 (46.1–50.1)	48.7 (46.6–50.8)
Medicaid (includes persons with Medicaid and Medicare)	7.7 (7.0–8.5)	11.0 (10.1–11.9)	13.4 (12.4–14.4)	21.6 (19.9–23.3)	20.9 (19.1–22.7)
Medicare only	1.9 (1.6–2.3)	1.8 (1.5–2.1)	2.8 (2.3–3.2)	4.0 (3.3–4.7)	4.6 (3.9–5.4)
Other coverage	3.7 (3.3–4.2)	4.3 (3.7–4.8)	5.7 (5.0–6.4)	6.7 (5.8–7.6)	7.6 (6.6–8.6)
Uninsured	24.0 (22.9–25.2)	26.3 (24.9–27.7)	29.5 (28.1–30.9)	18.8 (17.2–20.3)	17.7 (16.1–19.2)

Source: NHIS, National Center for Health Statistics, public use data, 2000, 2005, 2010, 2015, and 2017.
Notes: **CI =** confidence interval; **GED =** General Educational Development.
[a]Persons who reported smoking ≥100 cigarettes during their lifetime and who, at the time of the interview, reported smoking every day or some days.
[b]Among only adults 25 years of age and older.

2000 to 27.2% in 2017; the proportion of current smokers with 12 or fewer years of education (with no diploma) decreased from 21.5% in 2000 to 18.0% in 2017; and the proportion of current smokers with an associate degree increased from 8.7% to 12.6% during the time period.

- The proportion of current smokers living below the poverty level increased from 2000 (14.8%) to 2017 (19.2%).

- The proportion of current smokers covered by Medicaid rose from 7.7% in 2000 to 20.9% in 2017, and the proportion of current smokers with private health insurance decreased from 61.9% in 2000 to 48.7% in 2017.

- The proportion of current smokers covered only by Medicare increased from 1.9% in 2000 to 4.6% in 2017, and the proportion of current smokers who were uninsured increased from 24.0% in 2000 to 29.5% in 2010 but then decreased to 17.7% in 2017.

Tobacco-use characteristics among current adult cigarette smokers also changed during 2000–2017. The proportion of current smokers who did not smoke every day increased from 17.9% in 2000 to 25.1% in 2017 (Table 2.3), and the proportion of current smokers who smoked fewer than 14 cigarettes per day also increased: the proportion of smokers who smoked 1–4 cigarettes per day rose from 4.0% in 2000 to 7.0% in 2017; and the proportion of smokers who smoked 5–14 cigarettes per day rose from 25.4% to 34.9%. The proportion of smokers who usually smoked menthol cigarettes increased from 26.4% in 2005 to 31.6% in 2010 but did not change significantly (31.5%) in 2015 (data on menthol cigarettes were not available in 2017). Use of other tobacco products (cigars, smokeless tobacco, and/or pipes) by current cigarette smokers increased from 10.2% in 2000 to 14.5% in 2017. Current adult cigarette smokers who were also current users of electronic cigarettes (e-cigarettes) decreased from 13.6% in 2015 to 10.0% in 2017 (NHIS, public use data, 2015, 2017). Current e-cigarette users who were also current cigarette smokers decreased from 58.8% in 2015 to 49.6% in 2017 (NHIS, public use data, 2015, 2017).

Young Adults

Trends in demographic characteristics among young adult current smokers (18–24 years of age) were similar to trends among all adults, except that the proportion of young adult smokers living below the poverty level was the highest in 2010 (29.9%) (Table 2.4), and the proportion of adult current smokers living below the poverty level was highest in 2015 (21.0%) (Table 2.2). The proportion of young adult current smokers who had private insurance was lowest (38.2%) in 2010. Among adult current smokers, the lowest proportion with private insurance (48.1%) was in 2015 (Table 2.2).

Changes in the distribution of tobacco product use over time among young adults are similar to those for all adults (Table 2.5). In 2017, the proportion of cigarette smokers who were some-day smokers was higher among young adults (34.7%) than among adults overall (25.1%) (Table 2.3), and the proportion who smoked 15–24 cigarettes per day was lower among young adults (15.8%) than among adults overall (27.8%). In addition, in 2017, the prevalence of cigar smoking, smokeless tobacco use, and pipe use among current smokers was higher among young adults (19.2%, 9.3%, and 7.7%, respectively) (Table 2.5) than it was among adults overall (10.6%, 3.5%, and 2.7%, respectively) (Table 2.3); the same was also true for the combined category of any cigar, smokeless tobacco, and/or pipe use (28.4% vs. 14.5%).

Youth

Findings from the national YRBS indicate that, among high school students (grades 9–12) who were current frequent cigarette smokers (ever smokers who had smoked >19 days during the past 30 days), the proportion who were White decreased from 84.5% in 2001 to 75.6% in 2005 and remained lower through 2017 (73.7%, $p < 0.001$ for quadratic trend)), and the proportion who were Hispanic increased from 6.2% in 2001 to 13.6% in 2015 to 14.5% in 2017 (Table 2.6; $p < 0.001$ for quadratic trend). The proportion who were Black remained statistically unchanged during this period (3.9% in 2001 and 5.3% in 2017).

Use of smokeless tobacco increased during 2001–2015 among frequent youth smokers (from 19.9% to 35.2%) (Table 2.7); comparable data were not available from the 2017 YRBS because the smokeless tobacco question changed. In 2017, the majority of frequent youth smokers (68.0%) also used e-cigarettes. According to NYTS, use of menthol cigarettes among high school students increased among frequent smokers, from 33.7% in 2000 to 52.9% in 2017 (Table 2.8) to 53.0% in 2018 (NYTS, public use data, 2018). Similar findings were observed among current youth cigarette smokers, in a comparison of NYTS data between 1999–2009 and 2010–2013 using a slightly different definition of use of menthol cigarettes (Courtemanche et al. 2017). Of note, caution should be taken when assessing trends among youth or comparing

Table 2.3 Distribution of tobacco use characteristics among adult current cigarette smokers[a] 18 years of age and older; National Health Interview Survey (NHIS) 2000, 2005, 2010, 2015, and 2017; United States

Characteristic	2000: % (95% CI)	2005: % (95% CI)	2010: % (95% CI)	2015: % (95% CI)	2017: % (95% CI)
Cigarette smoking frequency, amount					
Some-day smokers	17.9 (16.8–19.0)	19.4 (18.2–20.6)	21.9 (20.5–23.2)	24.4 (22.8–26.0)	25.1 (23.4–26.9)
Daily smokers, 1–4 cpd	4.0 (3.4–4.4)	4.4 (3.7–5.0)	5.9 (5.2–6.6)	6.6 (5.8–7.5)	7.0 (5.9–8.1)
Daily smokers, 5–14 cpd	25.4 (24.2–26.6)	29.4 (27.9–30.8)	32.5 (31.0–33.9)	34.4 (32.6–36.2)	34.9 (33.1–36.8)
Daily smokers, 15–24 cpd	37.7 (36.4–39.0)	35.4 (33.9–36.9)	32.5 (30.9–34.0)	28.5 (26.7–30.2)	27.8 (26.0–29.6)
Daily smokers, ≥25 cpd	15.1 (14.1–16.1)	11.4 (10.4–12.5)	7.3 (6.4–8.2)	6.1 (5.1–7.0)	5.1 (4.3–5.9)
Usually smokes menthol					
Yes	NA	26.4 (24.9–27.9)	31.6 (30.0–33.3)	31.5 (29.7–33.4)	NA
No	NA	71.3 (69.9–72.7)	66.3 (64.7–67.9)	66.0 (64.1–67.9)	NA
No usual type	NA	2.3 (1.8–2.8)	2.0 (1.6–2.5)	2.4 (1.9–3.0)	NA
Current use of other tobacco products					
Cigars	7.4 (6.7–8.1)	8.0 (7.1–8.9)	10.3 (9.2–11.3)	8.7 (7.6–9.8)	10.6 (9.1–12.0)
Smokeless tobacco	2.7 (2.2–3.2)	3.5 (2.7–4.3)	3.6 (3.0–4.3)	4.0 (3.1–4.9)	3.5 (2.8–4.2)
Pipes	1.4 (1.1–1.7)	1.4 (1.0–1.8)	NA	2.6 (2.0–3.3)	2.7 (2.0–3.3)
Any use of cigars, smokeless tobacco, pipes	10.2 (9.4–11.1)	11.3 (10.3–12.4)	NA	13.3 (11.9–14.6)	14.5 (12.9–16.1)
E-cigarettes	NA	NA	NA	13.6 (12.2–14.9)	10.0 (8.8–11.1)

Source: NHIS, National Center for Health Statistics, public use data, 2000, 2005, 2010, 2015, and 2017.
Notes: **CI =** confidence interval;
[a]Persons who reported smoking ≥100 cigarettes during their lifetime and who, at the time of the interview, reported smoking every day or some days.

Table 2.4 Distribution of selected demographic characteristics of young adult current cigarette smokers[a] 18–24 years of age; National Health Interview Survey (NHIS) 2000, 2005, 2010, 2015, and 2017; United States

Characteristic	2000: % (95% CI)	2005: % (95% CI)	2010: % (95% CI)	2015: % (95% CI)	2017: % (95% CI)
Sex (% male)	53.0 (49.5–56.6)	57.5 (53.0–61.9)	57.2 (51.9–62.5)	58.2 (51.5–64.8)	57.6 (49.9–65.4)
Race/ethnicity					
White, non-Hispanic	77.7 (74.6–80.6)	73.0 (68.9–77.0)	72.7 (68.3–77.1)	64.3 (58.1–70.6)	71.2 (64.2–78.2)
Black, non-Hispanic	8.8 (6.7–10.8)	9.5 (6.9–12.1)	12.0 (8.7–15.4)	12.9 (8.5–17.4)	11.4 (6.6–16.3)
Hispanic	9.5 (7.5–11.5)	12.8 (10.3–15.2)	10.3 (7.5–13.1)	14.5 (10.2–18.9)	12.1 (7.0–17.2)
American Indian/Alaska Native, non-Hispanic	—[b]	—[b]	—[b]	—[b]	—[b]
Asian, non-Hispanic	1.9 (0.9–3.0)	—[b]	2.3 (1.3–3.4)	3.1 (1.3–4.9)	—[b]
Multiple races, non-Hispanic	1.7 (0.8–2.6)	—[b]	—[b]	—[b]	—[b]
Poverty status (% below poverty level)	21.0 (17.7–24.2)	24.2 (19.5–28.9)	29.9 (25.1–34.7)	24.5 (19.3–29.6)	24.5 (17.7–31.3)
Geographic region					
Northeast	17.5 (14.1–20.9)	13.0 (9.8–16.3)	16.7 (12.2–21.2)	16.2 (10.2–22.3)	13.4 (6.5–20.3)
Midwest	32.4 (28.3–36.5)	31.6 (27.5–35.8)	28.1 (23.8–32.5)	30.0 (23.5–36.4)	27.3 (21.2–33.4)
South	35.8 (31.6–39.9)	40.8 (35.8–45.8)	36.8 (31.8–41.7)	33.3 (27.1–39.6)	42.0 (34.3–49.7)
West	14.4 (11.9–16.9)	14.5 (11.9–17.2)	18.4 (14.6–22.2)	20.5 (15.2–25.7)	17.3 (11.7–22.8)
Health insurance coverage					
Private	52.9 (49.0–56.9)	43.5 (39.0–48.0)	38.2 (33.1–43.3)	47.4 (40.3–54.5)	46.5 (39.4–53.6)
Medicaid and persons with Medicaid and Medicare	9.0 (7.0–10.8)	13.7 (10.8–16.5)	16.9 (13.2–20.6)	26.2 (20.3–32.0)	21.5 (15.2–27.8)
Other coverage	—[b]	1.8 (0.8–2.8)	3.0 (1.4–4.7)	—[b]	—[b]
Uninsured	35.6 (31.7–39.5)	40.4 (36.0–44.8)	41.0 (35.9–46.2)	22.0 (17.0–27.0)	28.1 (21.4–34.7)

Source: NHIS, National Center for Health Statistics, public use data, 2000, 2005, 2010, 2015, and 2017.

Notes: **CI =** confidence interval.

[a]Persons who reported smoking ≥100 cigarettes during their lifetime and who, at the time of the interview, reported smoking every day or some days.

[b]Prevalence estimates with a relative standard error ≥30% are not presented due to low precision.

Table 2.5 Distribution of tobacco use characteristics of young adult current cigarette smokers[a] 18–24 years of age; National Health Interview Survey (NHIS) 2000, 2005, 2010, 2015, and 2017; United States

Characteristic	2000: % (95% CI)	2005: % (95% CI)	2010: % (95% CI)	2015: % (95% CI)	2017: % (95% CI)
Cigarette smoking frequency, amount					
Some-day smoker	21.8 (18.5–25.1)	24.4 (20.6–28.3)	30.0 (25.4–34.5)	40.8 (34.1–47.6)	34.7 (28.1–41.2)
Daily smoker, 1–4 cpd	5.4 (3.7–7.0)	7.6 (5.0–10.2)	8.8 (6.0–11.6)	9.5 (5.5–13.6)	8.6 (4.5–12.7)
Daily smoker, 5–14 cpd	36.2 (32.4–40.0)	38.7 (34.6–42.7)	36.6 (31.7–41.6)	36.2 (29.3–43.1)	40.6 (33.0–48.1)
Daily smoker, 15–24 cpd	30.9 (27.5–34.3)	24.0 (20.1–27.9)	21.9 (17.7–26.0)	12.1 (7.8–16.4)	15.8 (10.1–21.5)
Daily smoker, ≥25 cpd	5.8 (3.9–7.6)	—[b]	—[b]	—[b]	—[b]
Usually smokes menthol					
Yes	NA	30.7 (26.1–35.2)	43.8 (38.5–49.0)	35.4 (28.5–42.4)	NA
No	NA	66.3 (61.6–71.1)	52.7 (47.4–58.0)	58.7 (51.4–66.0)	NA
No usual type	NA	3.0 (1.7–4.3)	3.5 (1.6–5.4)	5.9 (2.5–9.2)	NA
Current use of other tobacco products					
Cigars	10.0 (7.6–12.4)	10.8 (7.7–13.9)	15.6 (11.8–19.4)	10.0 (6.0–14.0)	19.2 (13.3–25.1)
Smokeless tobacco	4.6 (2.6–6.5)	8.1 (4.0–12.2)	6.7 (4.1–9.3)	10.6 (5.4–15.7)	9.3 (5.2–13.3)
Pipes	2.5 (1.3–3.6)	2.4 (1.1–3.7)	NA	6.1 (2.8–9.3)	7.7 (4.0–11.5)
Any use of cigars, smokeless tobacco, and pipes	15.0 (12.0–18.1)	17.3 (12.8–21.9)	NA	21.5 (15.3–27.8)	28.4 (21.7–35.0)
E-cigarettes	NA	NA	NA	18.6 (13.1–21.7)	16.1 (11.0–21.1)

Source: NHIS, National Center for Health Statistics, public use data, 2000, 2005, 2010, 2015, and 2017.

Notes: **CI =** confidence interval; **cpd =** cigarettes smoked per day; **NA =** not available.

[a]Persons who reported smoking ≥100 cigarettes during their lifetime and who, at the time of the interview, reported smoking every day or some days.

[b]Prevalence estimates with a relative standard error ≥30% are not presented due to low precision.

Table 2.6 Distribution of demographic characteristics of high school students who are frequent cigarette smokers[a]; National Youth Risk Behavior Survey (YRBS) 2001, 2005, 2009, 2015, and 2017; United States

Characteristic	2001: % (95% CI)	2005: % (95% CI)	2009: % (95% CI)	2015: % (95% CI)	2017: % (95% CI)
Sex (% male)	52.0 (48.1–55.9)	50.3 (46.4–54.3)	57.2 (53.2–61.0)	52.0 (47.0–56.9)	49.1 (42.0–56.3)
Grade					
9	19.2 (15.4–23.7)	21.8 (18.5–25.5)	18.1 (15.1–21.6)	17.4 (11.0–26.6)	14.4 (9.9–20.5)
10	23.3 (20.0–26.8)	21.0 (17.3–25.2)	20.6 (17.9–23.6)	22.9 (17.4–29.5)	17.1 (12.1–23.6)
11	25.3 (21.0–30.3)	26.3 (23.0–30.0)	26.9 (23.1–31.0)	23.4 (17.3–30.8)	26.5 (20.0–34.2)
12	32.2 (28.5–36.1)	30.9 (26.8–35.4)	34.4 (31.0–38.1)	36.3 (30.6–42.4)	42.0 (35.2–49.2)
Race/ethnicity[b]					
White, non-Hispanic	84.5 (81.1–87.4)	75.6 (69.5–80.8)	78.9 (73.8–83.3)	66.0 (57.6–73.5)	73.7 (67.6–78.9)
Black, non-Hispanic	3.9 (2.7–5.7)	5.4 (3.3–8.6)	4.2 (2.6–7.0)	7.1 (4.1–12.1)	5.3 (2.3–11.9)
Hispanic	6.2 (4.4–8.6)	10.5 (7.6–14.2)	10.2 (7.8–13.1)	13.6 (9.7–18.7)	14.5 (10.8–19.3)

Source: YRBS, Centers for Disease Control and Prevention, public use data, 2001, 2005, 2009, 2015, and 2017.

Notes: **CI =** confidence interval.

[a]Students who answered "yes" to "have you ever smoked?"; and "yes" to "do you currently smoke?"; and reported smoking on >19 days during the past 30 days.

[b]Estimates will not add up to 100% because data were not reported for students of other/multiple races/ethnicities.

Table 2.7 Prevalence of use of other tobacco products among high school students who are frequent cigarette smokers[a]; National Youth Risk Behavior Survey (YRBS) 2001, 2005, 2009, 2015, and 2017; United States

Other tobacco products	2001: % (95% CI)	2005: % (95% CI)	2009: % (95% CI)	2015: % (95% CI)	2017: % (95% CI)
Cigars[b]	44.3 (40.0–48.8)	47.6 (42.7–52.7)	52.7 (45.6–59.7)	54.1 (47.1–61.0)	54.8 (46.7–62.7)
Smokeless tobacco[c]	19.9 (15.9–24.5)	23.5 (19.9–27.6)	35.5 (31.1–40.2)	35.2 (29.2–41.7)	NA
Electronic vapor products[d]	NA	NA	NA	76.4 (70.8–81.2)	68.0 (58.2–76.4)

Source: YRBS, Centers for Disease Control and Prevention, public use data, 2001, 2005, 2009, 2015, and 2017.
Notes: **CI =** confidence interval; **NA =** not available.
[a]Students who answered "yes" to "have you ever smoked?"; "yes" to "do you currently smoke?"; and reported smoking ≥20 days during the past 30 days.
[b]Smoked cigars, cigarillos, or little cigars on at least 1 day during the 30 days before the survey.
[c]Used chewing tobacco, snuff, or dip on at least 1 day during the 30 days before the survey.
[d]Used e-cigarettes, e-cigars, e-pipes, vape pipes, vaping pens, e-hookahs, or hookah pens during the 30 days before the survey.

Table 2.8 Prevalence of use of menthol cigarettes among high school students who currently smoke cigarettes, by frequency of smoking[a]; National Youth Tobacco Survey (NYTS) 2000, 2004, 2009, 2015, and 2017; United States

Usually smokes menthol cigarettes	2000: % (95% CI)	2004: % (95% CI)	2009: % (95% CI)	2015: % (95% CI)	2017: % (95% CI)
Yes	33.7 (28.7–38.7)	47.2 (40.3–54.1)	50.5 (44.1–56.9)	48.8 (39.8–57.8)	52.9 (41.0–64.7)
No	63.7 (58.7–68.6)	52.8 (45.9–59.7)	49.5 (43.1–55.9)	45.2 (36.6–53.8)	42.2 (30.0–54.3)
No usual brand	2.7 (1.9–3.4)	NA	NA	NA	NA
Not sure	NA	NA	NA	6.0 (1.9–10.0)	__[b]

Source: NYTS, Centers for Disease Control and Prevention, public use data, 2000, 2004, 2009, 2015, and 2017.
Notes: **CI =** confidence interval; **NA =** not available;
[a]Students who answered "yes" to "have you ever tried cigarette smoking?" were categorized as (a) current infrequent smokers for smoking 1–19 days during the past 30 days or (b) current frequent smokers for smoking ≥20 days during the past 30 days.
[b]Prevalence estimates with a relative standard error ≥30% are not presented due to low precision.

the timing of the increases among youth with the increases among adults (Table 2.3) because wording of the question in NYTS changed over time, which may have influenced the likelihood of an affirmative response. For example, in 2000, the question was, "Is the brand of cigarettes you usually smoked during the past 30 days mentholated?" but in questionnaires in 2015 and 2017, the question changed to, "Menthol cigarettes are cigarettes that taste like mint. During the past 30 days, were the cigarettes that you usually smoked menthol?" (CDC 2018).

Key Disparities in Current Cigarette Smoking Among Adults and Youth

Numerous Surgeon General's reports have reviewed disparities in the prevalence of current smoking (USDHHS 1998, 2001, 2012, 2014). In 2017, the prevalence of current cigarette smoking was 20.0% or higher in a variety of vulnerable or high-risk groups:

- 36.8% among those who had obtained a General Educational Development (GED) certificate but went no further in their education;
- 35.2% among persons with serious psychological distress, a proxy variable for mental illness;
- 24.7% among persons with no health insurance;
- 24.5% among Medicaid enrollees;
- 24.0% among American Indians/Alaska Natives; and
- 20.3% among lesbian, gay, and bisexual adults (Wang et al. 2018a).

Disparities by Behavioral Health Condition

Data from the U.S. National Survey on Drug Use and Health (NSDUH) from 2005 to 2013 indicate that current smoking among adults reporting anxiety, depression, or substance abuse disorders ranged from 39.6% to 56.3% (Stanton et al. 2016). In the 2014 NSDUH, the prevalence of current smoking among persons who abused or were dependent on illicit drugs other than marijuana was 63.3%, and among those who abused or were dependent on marijuana, it was 51.3% (Weinberger et al. 2018). Data from the 2012 NHIS indicate that the age-adjusted prevalence of current smoking was 53.0% among those with a lifetime history of bipolar disorder, 31.5% among those with a lifetime history of depression, 30.6% among those with a lifetime history of attention deficit disorder or attention deficit hyperactivity disorder, and 28.3% among those with a lifetime history of phobias or fears (NHIS, public use data, 2012).

Disparities by Chronic Disease Status

Using 2017 NHIS data, the prevalence of current smoking was high among persons with emphysema (35.2%) and those with chronic bronchitis (29.7%). Among those with other smoking-related diseases (lung cancer, other cancers, coronary heart disease, and stroke) (see Chapter 4), the prevalence of current smoking ranged from 13.5% to 35.2% and was 14.8% among those with other chronic diseases[1] and 12.2% among those with no chronic diseases (NHIS, public use data, 2017).

Disparities by Geographic Location

The prevalence of current smoking varies widely by geographic location. Data from the 2017 NHIS indicate that by region, cigarette smoking was higher in the Midwest (16.9%) and South (15.5%) than in the Northeast (11.2%) and West (11.0%) (Wang et al. 2018a). Data from the 2017 BRFSS indicate that by state, West Virginia, Kentucky, and Louisiana had the highest prevalence of current cigarette smoking (26.0%, 24.6%, and 23.1%, respectively), and the states of Utah, California, and Connecticut had the lowest prevalence (8.9%, 11.3%, and 12.7%, respectively) (CDC 2017). Data from the 2013

[1]Other chronic diseases are defined as those that are not related to smoking, including hypertension; other heart condition or heart disease; ulcer; and cancers, including blood, bone, brain, breast, gallbladder, lymphoma, melanoma, ovarian, prostate, skin (non-melanoma and other), soft tissue, testicular, thyroid, and other types of cancer.

BRFSS indicate that persons who live in rural counties have a higher prevalence of smoking than persons who live in metropolitan areas, with estimates ranging from a high of 25.1% in rural counties to a low of 16.1% in large metropolitan centers (Matthews et al. 2017). In a multivariate logistic regression model controlling for age, sex, poverty, and geographic region, the 2013–2014 PATH Study observed that, compared with urban residents, rural residents had 25% greater odds of being current cigarette smokers (smoked in the past 30 days) (Roberts et al. 2017).

Disparities by Sexual Orientation and Gender Identity

The prevalence of cigarette smoking among lesbian, gay, bisexual, and transgender (LGBT) individuals is higher than the prevalence of smoking among heterosexual or straight persons. According to NHIS data, in 2017, current cigarette smoking was 20.3% among lesbian, gay, and bisexual adults compared with 13.7% among heterosexual or straight adults (Wang et al. 2018a). Variations in the prevalence of cigarette smoking also exist across sexual orientation and gender minority subgroups. Data from the 2012–2013 NATS indicated that cigarette smoking was particularly high among bisexual women, and that sexual minority women started smoking and transitioned to daily smoking earlier than their heterosexual or straight counterparts (Johnson et al. 2016). Data from the 2009–2010 NATS indicated that menthol cigarette smoking was significantly higher among LGBT adult smokers, particularly among LGBT women, than among their heterosexual counterparts (Fallin et al. 2015). Limited information exists on the prevalence of cigarette smoking by gender identity. A 2013 cross-sectional online survey of U.S. adults found that the prevalence of cigarette smoking was higher among transgender adults than among cisgender adults (Buchting et al. 2017).

Similar disparities in the prevalence of smoking by sexual orientation and gender identity exist among youth. Data from the 2017 YRBS indicated that current cigarette smoking by high school students in grades 9–12 was higher among gay, lesbian, and bisexual students (16.2%) than among heterosexual students (8.1%) and those unsure of their sexual orientation (10.1%) (Kann et al. 2018). Moreover, 2017 YRBS data from 19 states and large urban school districts found that ever use of cigarettes was significantly higher among transgender high school students (32.9%) than among cisgender male (23.2%) and cisgender female (22.0%) students (Johns et al. 2019).

Sexual orientation and gender identity are two separate and distinct measures, and existing surveillance data suggest disparities in smoking prevalence by both sexual orientation and gender identity. Taken together, these findings reinforce the heterogeneity of tobacco product use by sexual orientation and the critical importance of (a) tobacco control efforts designed to reach sexual and gender minorities and (b) tobacco survey measures designed specifically to ask adults and youth about gender identity separately from sexual orientation.

Disparities in Smoking in Pregnant Women

Smoking during pregnancy can have devastating health consequences for the mother, such as the outcome of the pregnancy, and for the future health of the child, making quitting smoking an important part of prenatal care (USDHHS 2014) (also see in this report related sections on smoking cessation and reproductive health in Chapter 4). According to data from birth certificates of children of women who gave birth in 2016, 7.2% of women in the United States reported smoking during pregnancy (Drake et al. 2018).

In a study using the first wave of data from the 2013–2014 PATH Study, the prevalence of current cigarette smoking among women of reproductive age was 20.1%, and current cigarette smoking was highly correlated with the use of other tobacco products (Lopez et al. 2018). Data from the 2013 Pregnancy Risk Assessment Monitoring System (PRAMS) indicated that 21.1% of women had smoked during the 3 months before pregnancy, and 14.0% had smoked postpartum. Estimates of the prevalence of smoking in working women of reproductive age and in working pregnant women from the 2009–2013 NHIS are generally lower than estimates in PRAMS, with 17.3% and 6.8% of these women, respectively, being current smokers (Mazurek and England 2016).

In 2016, disparities in cigarette smoking during pregnancy occurred by age, race/ethnicity, educational level, and geographic location (Drake et al. 2018). For smoking during pregnancy, women 20–24 years of age had the highest prevalence (10.7%) by age group; American Indian/Alaska Native women had the highest prevalence (16.7%) by race/ethnicity; and women with a high school diploma or GED had the highest prevalence by level of education (12.2%). Prevalence of current smoking among pregnant women was highest in West Virginia (25.1%), Kentucky (18.4%), and Montana (16.5%) and lowest in Arizona, California, Connecticut, Hawaii, New Jersey, New York, Nevada, Texas, Utah, and Washington, D.C. (each <5.0%) (Drake et al. 2018).

Disparities in Smoking Among Active Duty Service Members

Tobacco use can negatively impact the readiness and resilience of active duty service members and is a major concern to the Military Health System of the U.S. Department of Defense (Bondurant and Wedge 2009). In June 2019, the Surgeons General of the Air Force, Army, Navy, and United States released an open letter stating tobacco use is a threat to the health and fitness of U.S. military forces and compromises readiness, which is the foundation of a strong national defense (Adams et al. 2019). An estimated 38% of current cigarette smokers in the military initiated smoking after enlisting (Carter 2016), and tobacco use has been associated with higher dropout rates during basic training, poorer visual acuity, higher rates of leaving military service during the first year, and higher rates of absenteeism (Bondurant and Wedge 2009). Factors that may promote tobacco use in the military include stress, peer influence, and easy access to less expensive tobacco products (Haddock et al. 2014). Additionally, the tobacco industry has previously been shown to target marketing toward active duty service members (Smith and Malone 2009).

In addition to the health-related burden, tobacco use also exacts significant financial costs to the military. In 2009, it was estimated that tobacco use costs the U.S. Department of Defense $1.6 billion a year for medical care, increased hospitalizations, and absenteeism (Bondurant and Wedge 2009). Additionally, in 2010, Veterans Health Administration (VHA) spent $2.7 billion on smoking-related ambulatory care, prescription drugs, hospitalizations, and home healthcare (Barnett et al. 2015).

According to data from the 2015 Health Related Behaviors Survey (HRBS) from the U.S. Department of Defense, 13.9% of service members currently smoked cigarettes, a prevalence that is two-fold higher among military personnel who have been deployed (28.0%) (Meadows et al. 2018). Additionally, among active duty service members, disparities exist by branch of service, sex, age group, race/ethnicity, education, and pay grade. For example, cigarette smoking is highest among those in the Marine Corps (20.7%); men (14.4%); persons 17–24 years of age (19.5%); those who reported being Other race/ethnicity (16.1%), White (14.6%), or Hispanic (14.6%); those with a high school education or less (25.1%); and those with low salaries (E1–E4 pay grade) (17.9%).

Correlation of Smoking-Related Risk Factors

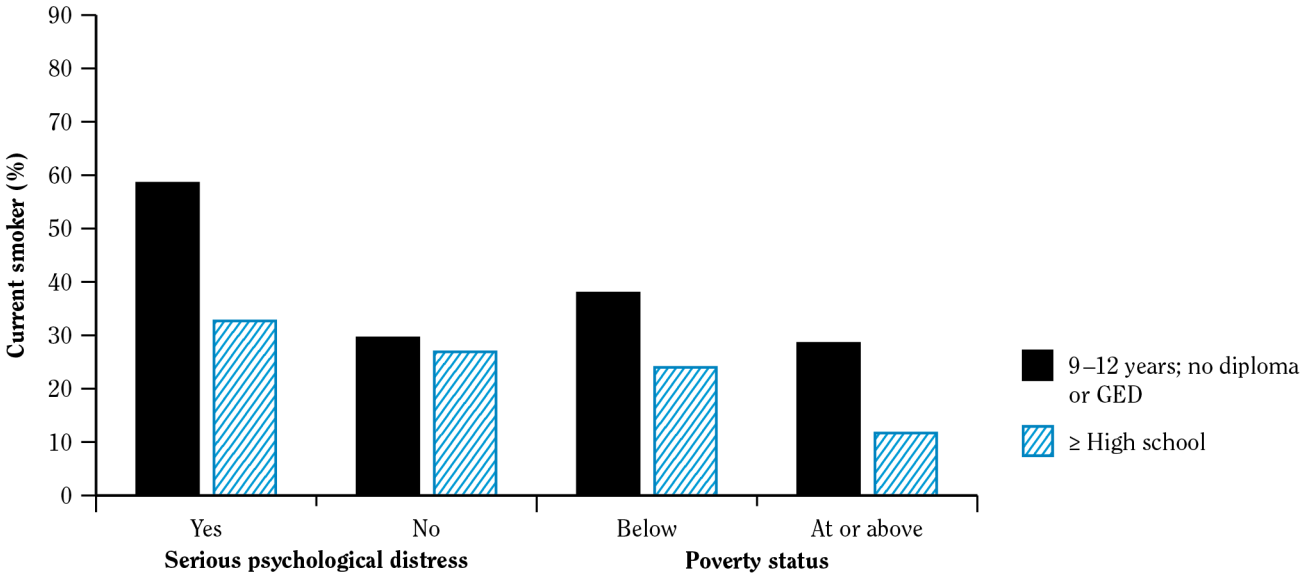
As with many health behaviors and chronic diseases, several risk factors for cigarette smoking are highly correlated (Remington et al. 2016). For example, in 2017, the prevalence of serious psychological distress was 9.6% among those who completed grades 9–12 (with neither a high school diploma nor a GED certificate) compared with 2.8% among those with at least a high school education (NHIS, public use data, 2017). Similarly, those who completed grades 9–12 (with neither a diploma or a GED certificate) were more likely than those with more than a high school education to live below the poverty level (27.9% vs. 7.2%, respectively) or to be uninsured (20.3% vs. 7.3%, respectively) (NHIS, public use data, 2017). Persons with multiple risk factors for current smoking had a higher prevalence of smoking than those with a single risk factor. For example, the prevalence of smoking was 58.5% among those with serious psychological distress who completed 9–12 years of education with neither a diploma or a GED certificate, but it was 32.7% among those with serious psychological distress with at least a high school education (Figures 2.7a and 2.7b [NHIS, public use data, 2017]).

Cigarette Smoking Cessation Among Adults and Youth

Recent Successful Cessation

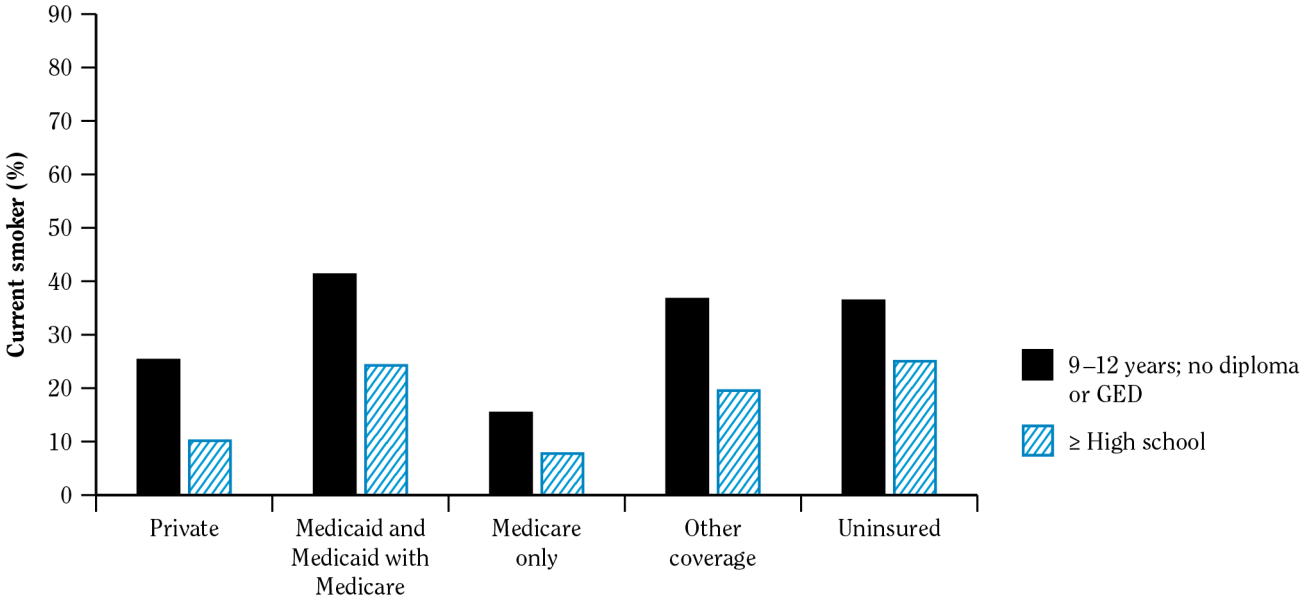
Recent successful cessation is defined as having smoked during the past year but having quit for at least 6 months at the time of the survey interview. The denominator in the prevalence calculation includes all persons who smoked during the past year (i.e., both current cigarette smokers and former smokers who reported quitting during the past year). Furthermore, to be included in the denominator, current smokers had to have smoked for at least 2 years—corresponding to the *Healthy People 2020* definition for recent smoking cessation success (measure TU-5.1) (Office of Disease Prevention and Health Promotion n.d.a). Recent smoking cessation gives a more proximate measure of current patterns in smoking cessation than prevalence of former smoking; however, recent smoking cessation may overestimate sustained quitting because some former smokers will relapse to smoking after 6 months (Hughes et al. 2008). Estimates of long-term sustained quit rates using smoking prevalence and initiation

Figure 2.7a Prevalence of current cigarette smoking by level of education and presence or absence of serious psychological distress and poverty status among adults 25 years of age and older: National Health Interview Survey (NHIS) 2017; United States



Source: NHIS, National Center for Health Statistics, public use data, 2017.
Note: **GED =** General Educational Development.

Figure 2.7b Prevalence of current cigarette smoking by level of education and status of health insurance among adults 25 years of age and older: National Health Interview Survey (NHIS) 2017; United States



Source: NHIS, National Center for Health Statistics, public use data, 2017.
Note: **GED =** General Educational Development.

data from NHIS and NSDUH, as well as death rates of smokers from the Cancer Intervention and Surveillance Modeling Network, indicate that permanent annual quit rates during 2008–2014 were 4.5% using NHIS data and 4.2% using NSDUH data (Mendez et al. 2017).

Adults

Data from the 2017 NHIS indicate that 7.6% of adults who were ever cigarette smokers reported recent successful cessation (Table 2.9). Recent successful cessation generally decreased with age (14.0% among young adults [18–24 years of age] and 6.3% among adults [65 years of age and older]) (Table 2.9). Among the 50 states, the District of Columbia, Guam, and Puerto Rico, the highest prevalence of recent successful cessation was observed in South Dakota, Connecticut, Minnesota, and the District of Columbia. (7.5–7.9%), and the lowest prevalence was observed in Mississippi, Indiana, Nevada, Pennsylvania, and Tennessee (3.3–3.9%) (Table 2.10). It is important to note that, because the BRFSS does not ask current smokers about the number of years smoked, the BRFSS measure is not restricted to current smokers who smoked for at least 2 years; therefore, this measure is not directly comparable to that used in NHIS (see Appendix 2.2 for more information). The PATH Study observed that (a) 15.5% of current cigarette smokers at Wave 1 (September 2013–December 2014) who reported at Wave 2 (October 2014–October 2015) that they had attempted to quit in the past 12 months were abstinent for 30 or more days at Wave 2 and (b) cigarette smokers with a college degree had a higher prevalence of cessation (i.e., abstinence of >30 days) (20.0%) than those with lower levels of education (14.9%) (Benmarhnia et al. 2018). In a second analysis of the PATH Study, Berry and colleagues (2019) did not limit the analysis to current cigarette smokers who were trying to quit, but instead examined quitting among all current cigarette smokers at Wave 1. Through multivariate logistic regression models, the study observed that (a) daily smokers were less likely (odds ratio [OR] = 0.27; 95% confidence interval [CI], 0.19–0.38) to quit than some-day smokers and (b) daily smokers who had tried to quit during the year before Wave 1 were more likely to quit (OR = 1.25; 95% CI, 1.00–1.57) for 30 or more days at Wave 2 than those who did not attempt to quit during the previous year. In a third analysis of the PATH Study, Rodu and Plurphanswat (2017) examined correlates at Wave 1 of having quit smoking during the past year. The study found that, among cigarette smokers who tried to quit during the past year, the odds of having quit in the past year decreased with increased age, with increased number of quit attempts, and with increased level of education; and odds of having quit in the past year were lower among Blacks than they were among Whites (OR = 0.70; 95% CI, 0.50–0.97).

During 2000–2015, a linear increase in recent successful cessation was observed (from 5.7% to 7.4%), as noted previously (Babb et al. 2017). Using data from NHIS, Mendez and colleagues (2017) also observed an increase in permanent annual quit rates from 2.4% (1990–1995) to 4.5% (2008–2014). No significant trends for this measure were observed among young adults (NHIS, public use data, 2000, 2005, 2010, and 2015).

Quit Ratio

The quit ratio represents the percentage of ever smokers who have quit smoking and is defined as the number of former smokers divided by the number of ever smokers. Similar to the prevalence of former smoking, quit ratio is a broad cessation measure encompassing cigarette smokers who quit many decades ago through those who have quit for 1 day at the time of their survey interview. However, although the denominator for the prevalence of former smoking includes all adults in the United States, the denominator for quit ratio includes only persons who have ever smoked 100 or more cigarettes in their lifetime. Data from the 2017 NHIS show that the quit ratio for U.S. adults was 61.7% (Table 2.9), indicating that there are more former cigarette smokers in the United States than current cigarette smokers (by a ratio of almost 3:2). The quit ratio in 2017 represents a 6-percentage-point increase over the quit ratio in 2012 (55.1%) and reflects a continued increasing trend in the population-based quit ratio since 1965 (USDHHS 2014).

Adults

Data from the 2017 NHIS indicate that the quit ratio increased linearly with age, ranging from 32.7% among 18- to 24-year-olds to 82.9% among those 65 years of age and older (Table 2.9). The quit ratio has been consistently highest among adults 65 years of age and older and consistently lowest among young adults (Figure 2.8a). The quit ratio has increased in all adult age groups since 1965, with some variability from year to year.

Data from the 2017 NHIS indicate that quit ratios were lower among Blacks (46.1%) than Asians (64.3%), Whites (63.9%), and Hispanics (61.5%) (Table 2.9). Persons of multiple races (50.0%) had lower quit ratios than Whites (63.9%). The quit ratio increased among White and Black adults from 1965 to 2017, and it increased between 1980 and 2017 among Hispanics (data on Hispanics were not available before 1980), with variability from year to year (Figure 2.8b).

Data from the 2017 NHIS also indicate that the quit ratio generally increased with level of education.

Table 2.9 Percentage of ever cigarette smokers 18 years of age and older who have recently successfully quit and quit smoking (quit ratio), by selected characteristics; National Health Interview Survey (NHIS) 2017; United States

Characteristic	Recent successful cessation:[a] % (95% CI)	Quit ratio: % (95% CI)
Total	7.6 (6.6–8.6)	61.7 (60.4–63.0)
Sex		
Men	7.2 (5.9–8.5)	61.9 (60.2–63.6)
Women	8.1 (6.5–9.6)	61.5 (59.6–63.3)
Age group (years)		
18–24	14.0 (9.4–18.7)	32.7 (26.6–38.8)
25–44	7.9 (6.5–9.4)	50.7 (48.4–53.0)
45–64	6.1 (4.5–7.6)	59.7 (57.7–61.7)
≥65	6.3 (3.9–8.6)	82.9 (81.3–84.5)
Race/ethnicity		
White, non-Hispanic	7.4 (6.3–8.5)	63.9 (62.5–65.3)
Black, non-Hispanic	7.0 (4.0–10.1)	46.1 (42.3–50.0)
Hispanic	9.1 (5.7–12.5)	61.5 (57.3–65.7)
American Indian/Alaska Native, non-Hispanic	—[b]	—[b]
Asian, non-Hispanic	—[b]	64.3 (57.3–71.2)
Multiple races, non-Hispanic	—[b]	50.0 (41.2–58.8)
Level of education[c]		
≤12 years (no diploma)	5.8 (3.7–7.9)	50.6 (47.2–53.9)
GED certificate	6.1 (3.1–9.0)	42.4 (37.1–47.7)
High school diploma	6.1 (4.1–8.0)	58.4 (56.0–60.9)
Some college (no degree)	8.2 (5.6–10.8)	62.4 (59.9–65.0)
Associate degree	5.7 (3.5–8.0)	63.3 (60.2–66.5)
Undergraduate degree	8.7 (5.7–11.7)	76.1 (73.3–78.9)
Graduate degree	11.0 (6.0–16.0)	82.8 (79.8–85.8)
Poverty status		
At or above poverty level	8.0 (6.9–9.2)	64.5 (63.2–65.8)
Below poverty level	5.8 (3.9–7.6)	42.2 (38.7–45.7)
U.S. Census region		
Northeast	8.6 (5.8–11.4)	68.0 (65.0–70.9)
Midwest	6.8 (4.8–8.7)	59.3 (56.7–61.9)
South	7.7 (6.0–9.3)	56.6 (54.5–58.7)
West	7.8 (5.8–9.7)	67.6 (65.1–70.1)
Health insurance coverage		
Private	8.5 (6.9–10.1)	67.9 (66.4–69.4)
Medicaid (includes persons with Medicaid and Medicare)	6.6 (4.6–8.7)	41.1 (37.5–44.6)
Medicare only	—[b]	81.5 (78.6–84.4)
Other coverage	6.6 (3.7–9.5)	60.4 (56.4–64.4)
Uninsured	7.5 (5.0–10.0)	38.7 (35.0–42.5)

Table 2.9 Continued

Source: NHIS, National Center for Health Statistics, public use data, 2017; Babb and colleagues (2017).
Notes: **CI =** confidence interval; **GED =** General Educational Development.
[a]The numerator includes former smokers who quit smoking for ≥6 months during the past year. The denominator for this measure includes both current smokers who smoked for ≥2 years and former smokers who quit during the past year.
[b]Prevalence estimates with a relative standard error ≥30% are not presented due to low precision.
[c]Among only adults 25 years of age and older.

Table 2.10 Percentage of current and ever smokers 18 years of age and older who quit smoking (quit ratio)[a] and prevalence of recent successful cessation[b] and a past-year quit attempt,[c] by state; Behavioral Risk Factor Surveillance System (BRFSS) 2017; United States

State/territory	Quit ratio: % (95% CI)	Recent successful cessation: % (95% CI)	Past-year quit attempt: % (95% CI)
Overall	59.2 (57.0–61.4)	—	—
Alabama	52.8 (50.3–55.3)	4.7 (3.2–6.2)	67.5 (64.1–70.9)
Alaska	54.9 (50.6–59.3)	5.1 (2.8–7.4)	63.6 (57.2–70.0)
Arizona	61.3 (59.7–63.0)	6.3 (5.0–7.6)	66.6 (64.2–69.0)
Arkansas	53.4 (49.7–57.1)	5.2 (2.9–7.5)	66.7 (61.7–71.8)
California	66.3 (63.9–68.7)	7.0 (5.2–8.8)	68.0 (64.2–71.7)
Colorado	63.6 (61.6–65.6)	6.2 (4.5–7.8)	68.2 (65.2–71.1)
Connecticut	67.1 (65.0–69.2)	7.7 (5.6–9.9)	71.6 (68.3–74.9)
Delaware	59.5 (56.2–62.9)	6.3 (3.4–9.2)	71.0 (66.5–75.4)
District of Columbia	56.3 (53.0–59.6)	7.0 (4.7–9.3)	69.3 (64.9–73.8)
Florida	60.8 (58.5–63.1)	5.2 (3.8–6.7)	67.6 (64.4–70.8)
Georgia	53.8 (51.1–56.5)	4.4 (2.9–6.0)	64.3 (60.5–68.1)
Hawaii	67.6 (65.2–70.0)	6.6 (4.2–8.9)	67.0 (63.2–70.8)
Idaho	62.4 (59.3–65.6)	6.0 (3.1–8.9)	62.2 (57.2–67.1)
Illinois	59.8 (57.1–62.6)	5.4 (3.5–7.2)	64.8 (60.7–68.9)
Indiana	52.9 (51.2–54.6)	3.9 (3.0–4.9)	62.0 (59.6–64.3)
Iowa	59.0 (57.0–61.1)	4.7 (3.5–6.0)	59.9 (56.9–63.0)
Kansas	58.3 (57.0–59.7)	5.0 (4.1–6.0)	64.3 (62.4–66.2)
Kentucky	51.0 (48.4–53.5)	4.3 (2.8–5.7)	62.1 (58.7–65.5)
Louisiana	49.9 (47.1–52.7)	5.3 (3.7–7.0)	69.7 (66.3–73.2)
Maine	64.7 (62.5–66.9)	6.1 (4.3–7.9)	62.2 (58.5–66.0)
Maryland	61.4 (59.2–63.6)	5.3 (3.5–7.1)	65.9 (62.4–69.3)
Massachusetts	64.7 (61.7–67.7)	5.0 (3.2–6.9)	64.6 (59.8–69.3)
Michigan	58.1 (56.2–59.9)	4.5 (3.4–5.6)	66.2 (63.6–68.8)
Minnesota	64.5 (63.0–66.0)	7.5 (6.2–8.7)	63.8 (61.5–66.1)
Mississippi	49.3 (46.2–52.4)	3.3 (1.9–4.6)	61.1 (56.8–65.5)
Missouri	55.4 (53.0–57.8)	5.5 (3.9–7.0)	59.7 (56.2–63.1)
Montana	61.4 (58.7–64.0)	4.8 (3.1–6.4)	60.6 (56.6–64.7)
Nebraska	61.5 (59.6–63.5)	5.7 (4.2–7.1)	63.9 (61.0–66.8)
Nevada	57.7 (53.9–61.5)	3.9 (2.2–5.7)	62.7 (57.2–68.2)
New Hampshire	65.9 (63.0–68.8)	5.6 (3.5–7.7)	63.7 (58.8–68.6)

Table 2.10 Continued

State/territory	Quit ratio: % (95% CI)	Recent successful cessation: % (95% CI)	Past-year quit attempt: % (95% CI)
New Jersey	64.8 (62.4–67.2)	5.5 (3.8–7.2)	71.3 (67.7–74.9)
New Mexico	57.7 (55.0–60.5)	5.3 (3.5–7.1)	65.5 (61.7–69.3)
New York	62.1 (60.1–64.1)	6.2 (4.6–7.9)	66.4 (63.4–69.5)
North Carolina	60.1 (57.3–62.9)	4.8 (3.1–6.4)	65.4 (61.3–69.6)
North Dakota	57.7 (55.3–60.2)	4.2 (2.8–5.6)	62.2 (58.7–65.7)
Ohio	53.6 (51.6–55.6)	4.4 (3.1–5.7)	61.7 (58.9–64.6)
Oklahoma	54.9 (52.5–57.3)	5.9 (4.4–7.4)	65.9 (62.5–69.2)
Oregon	61.5 (59.1–64.0)	4.6 (3.1–6.0)	62.5 (58.8–66.2)
Pennsylvania	59.0 (56.6–61.3)	3.9 (2.7–5.1)	64.3 (60.9–67.6)
Rhode Island	65.6 (62.7–68.5)	6.3 (4.0–8.7)	69.6 (64.9–74.3)
South Carolina	58.5 (56.5–60.5)	4.7 (3.2–6.2)	65.8 (62.9–68.7)
South Dakota	57.1 (53.6–60.6)	7.9 (5.0–10.8)	64.5 (59.4–69.6)
Tennessee	51.2 (48.5–54.0)	3.9 (2.4–5.4)	60.3 (56.6–64.0)
Texas	55.8 (52.6–59.1)	5.4 (3.4–7.3)	70.7 (66.6–74.7)
Utah	62.8 (60.3–65.3)	6.1 (4.3–7.9)	66.4 (62.8–70.1)
Vermont	65.1 (62.6–67.6)	6.3 (4.1–8.5)	66.0 (62.0–70.0)
Virginia	59.2 (57.0–61.4)	5.6 (3.9–7.4)	66.4 (63.2–69.6)
Washington	66.8 (65.1–68.6)	6.3 (4.9–7.7)	68.1 (65.4–70.7)
West Virginia	50.2 (47.9–52.5)	5.8 (4.3–7.3)	61.6 (58.5–64.8)
Wisconsin	61.5 (58.8–64.2)	5.1 (3.2–6.9)	58.6 (54.3–62.8)
Wyoming	58.1 (55.2–61.0)	6.7 (4.4–9.1)	65.0 (61.0–69.0)
Guam	43.6 (38.5–48.7)	6.7 (3.8–9.7)	72.3 (66.7–77.9)
Puerto Rico	62.3 (58.5–66.1)	6.3 (2.9–9.6)	67.1 (61.5–72.7)

Source: BRFSS, Centers for Disease Control and Prevention, public use data, 2017.

Notes: **CI =** confidence interval.

[a]Quit ratio is calculated as the proportion of current smokers who reported having stopped smoking for >1 day during the past year because they were trying to quit smoking, and former smokers who quit smoking during the past year (numerator), among all current and former smokers who only quit in the past year (denominator).

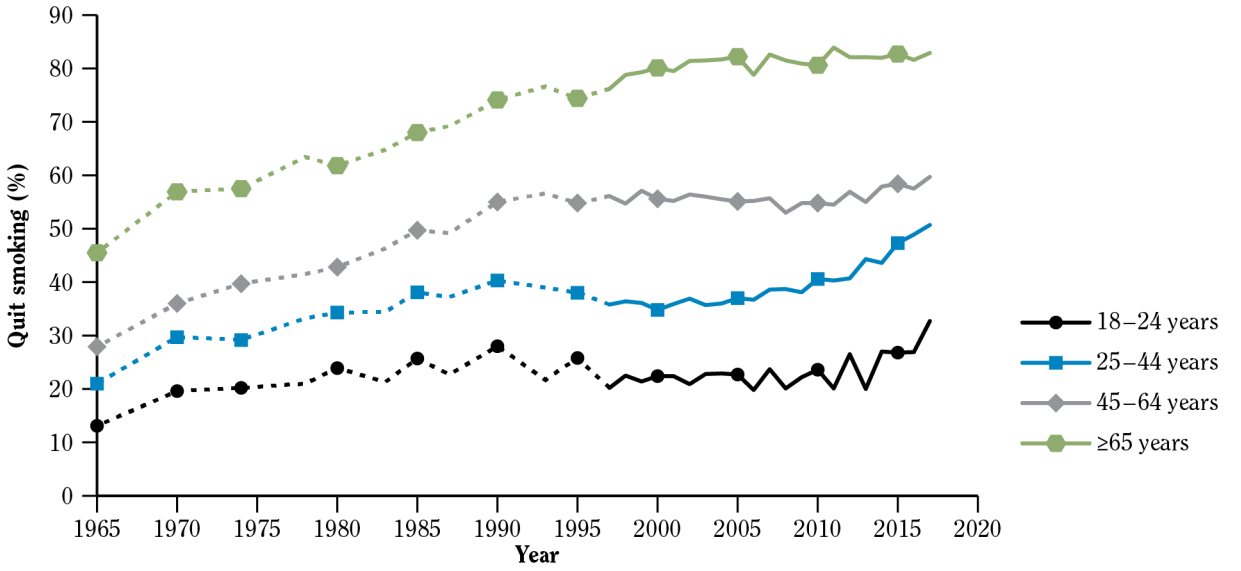
[b]The percentage of former smokers who quit smoking for >6 months during the past year among current smokers and former smokers who quit during the past year.

[c]Current smokers who reported that they stopped smoking for >1 day during the past 12 months because they were trying to quit smoking and former smokers who quit during the past year.

For example, in 2017, the quit ratio among those with a graduate degree (82.8%) was far higher than the quit ratio among those who had 12 or fewer years of education (with no diploma) (50.6%) or a GED certificate (42.4%) (Table 2.9). Those living below the federal poverty level had a much lower quit ratio (42.2%) than persons at or above the poverty level (64.5%). By geographic region, the Northeast (68.0%) and West (67.6%) had higher quit ratios than the Midwest (59.3%) and the South (56.6%). By status of health insurance, those who were uninsured (38.7%) or enrolled in Medicaid (41.1%) had the lowest quit ratios.

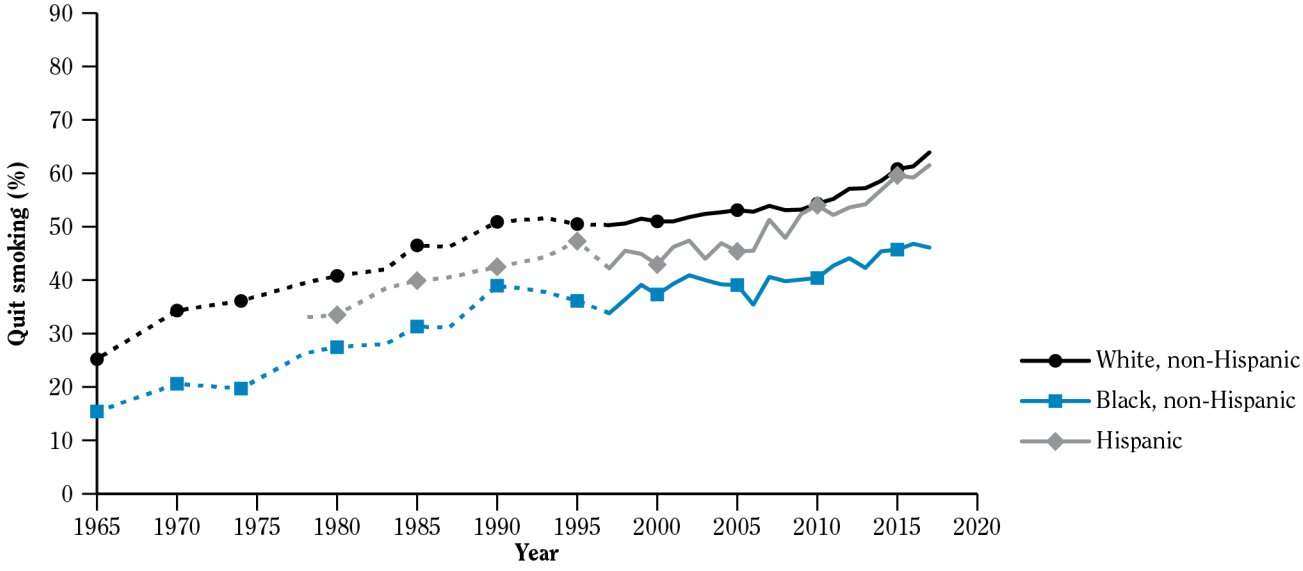
Data from the 2017 BRFSS indicate that quit ratios were greater than 50% in every state except Mississippi (49.3%) and Louisiana (49.9%) (Guam also had a prevalence <50%) (Table 2.10). Thus, in the vast majority of states, more than half of the persons who had ever smoked cigarettes had quit smoking. In three states (Hawaii [67.7%], Connecticut [67.1%], and Washington [66.8%]), more than two-thirds of ever smokers had quit smoking, and the quit ratio in 20 other states and Puerto Rico was between 60.1% and 66.3%. These are marked improvements from 2004, when only 34 states had quit ratios

Figure 2.8a Percentage of ever smokers 18 years of age and older who quit smoking (quit ratio), by age group; National Health Interview Survey (NHIS), 1965–2017; United States



Source: NHIS, National Center for Health Statistics, public use data, 1965–2017.
Note: From 1965 to 1996, data were reported for the following years (as indicated by the dotted line): 1965, 1970, 1974, 1978, 1980, 1983, 1985, 1987, 1990, 1993, and 1995. Data were reported annually for years 1997–2017 (as indicated by the solid line).

Figure 2.8b Percentage of ever smokers 18 years of age and older who quit smoking (quit ratio), by race/ethnicity; National Health Interview Survey (NHIS), 1965–2017; United States



Source: NHIS, National Center for Health Statistics, public use data, 1965–2017.
Note: From 1965 to 1996, data were reported for the following years (as indicated by the dotted line): 1965, 1970, 1974, 1978, 1980, 1983, 1985, 1987, 1990, 1993, and 1995. Data were reported annually for years 1997–2017 (as indicated by the solid line).

greater than 50% and just 4 states had quit ratios greater than 60% (CDC 2005). In 2004, the median quit ratio across 49 states and the District of Columbia was 52.4%, and in 2017, the median quit ratio for all 50 states and the District of Columbia was 59.2%.

Young Adults

The quit ratio among young adults has consistently been the lowest of all adult age groups since 1965 (Figure 2.8a). The quit ratio among young adult ever smokers has increased since 1965 (from 13.1% in 1965 to 32.7% in 2017); however, little change has occurred since the 1980s. The positive relationship between quit ratio and age is due in part to the accumulation of quitters with age; specifically, the numerator among older ever smokers includes persons who quit many decades ago, but among young adult ever smokers, a decade ago would be when they were 8–14 years of age—a time when many were smoking their first cigarette, not quitting (USDHHS 2012). This positive relationship is also due, in part, to the increased mortality among older current smokers compared with long-term former smokers, which would decrease the denominator among older versus younger ever smokers (USDHHS 2014).

Youth

Compared with adults, smoking behaviors among youth are less established and the prevalence of quitting is much lower (USDHHS 2012). Therefore, quit ratios among youth are not included in this report because they would most likely reflect cessation attributable to both quitting and experimentation, or discontinuation of non-established smoking patterns (USDHHS 2012).

Trends in the Cessation Continuum for Current Smokers

Data from TUS-CPS from 2006–2007, 2010–2011, and 2014–2015 were used to develop a cigarette smoking cessation continuum for adults 18 years of age and older who were current smokers. A cessation continuum was constructed to describe more completely the dynamic process of smoking cessation, including interest in quitting, quitting history, and past-year quit attempts. The continuum included six subgroups of current cigarette smokers:

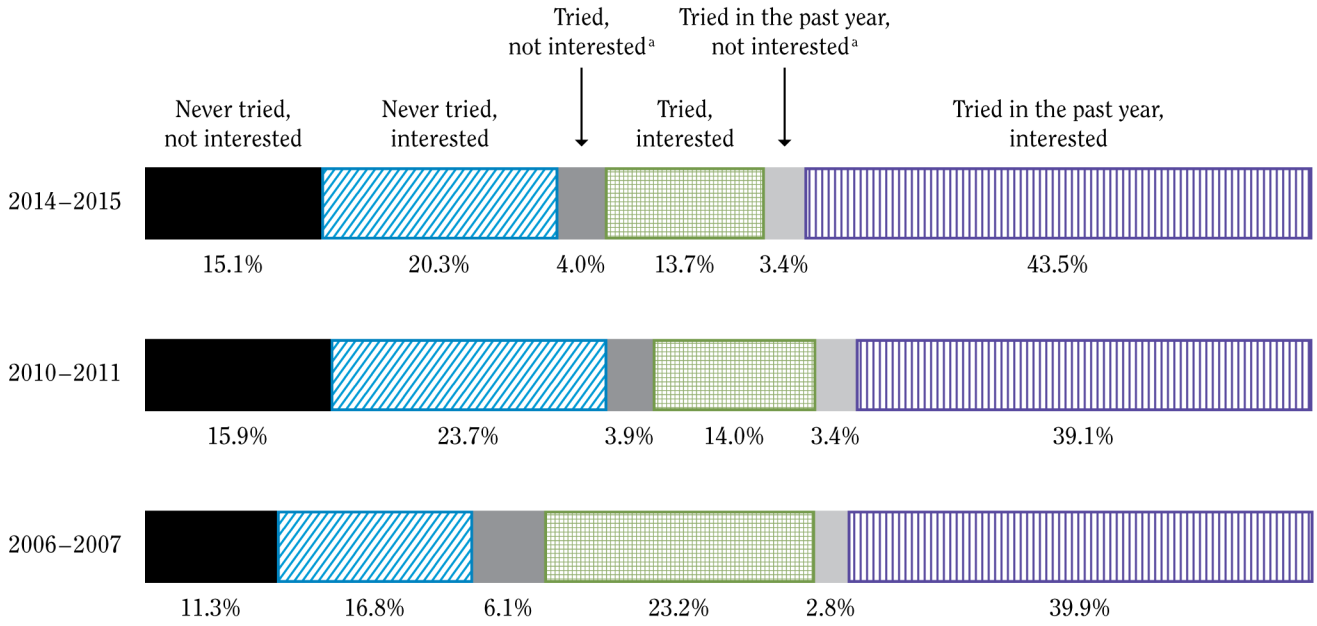
- Persons who had never tried to quit and who were currently *not interested* in quitting,
- Persons who had never tried to quit but were currently *interested* in quitting,
- Persons who had ever tried to quit but did not try in the past year and who were currently *not interested* in quitting,
- Persons who had ever tried to quit but did not try to quit in the past year and who were currently *interested* in quitting,
- Persons who tried to quit in the past year but were currently *not interested* in quitting, and
- Persons who tried to quit in the past year and were currently *interested* in quitting.

It is important to note that, although the definition of those who ever tried to quit includes cigarette smokers whose quit attempt lasted less than 1 day, the definition of trying to quit in the past year includes only quit attempts that lasted for 1 day or longer (i.e., not attempts that lasted for less than 1 day) among current daily smokers and some-day smokers who smoked 12 or more days in the past 30 days—thereby underestimating the prevalence of past-year quit attempts (Hughes et al. 2013). The more conservative definition of past-year quit attempt was selected to match more closely the past-year quit attempt question on NHIS, which has the greatest number of years of data on the prevalence of past-year quit attempts. Appendix 2.2 presents more information about the potential effect of excluding past-year quit attempts of less than 1 day on prevalence estimates.

The proportion of current adult smokers who had never tried to quit but were interested in quitting increased from 16.8% (95% CI, 16.2–17.3) in 2006–2007 to 23.7% (95% CI, 22.9–24.4) in 2010–2011, and then decreased to 20.3% (95% CI, 19.6–21.0) in 2014–2015 (Figure 2.9). From 2006–2007 to 2010–2011, the proportions of three groups changed: (a) the proportion of current adult smokers who had never tried to quit and were not interested in quitting increased from 11.3% (95% CI, 10.8–11.8) to 15.9% (95% CI, 15.3–16.6), (b) the proportion of current adult smokers who had ever tried to quit but did not try during the past year and at the time of the survey were not interested in quitting decreased from 6.1% (95% CI, 5.7–6.4) to 3.9% (95% CI, 3.6–4.2), and (c) the proportion of current adult smokers who had ever tried to quit but did not try during the past year and were interested in quitting decreased from 23.2% (95% CI, 22.6–23.7) to 14.0% (95% CI, 13.5–14.6). The proportion of those who had tried to quit during the past year and were interested in quitting increased from 39.1% (95% CI, 38.3–40.0) in 2010–2011 to 43.5% (95% CI, 42.7–44.3) in 2014–2015.

For all years, the proportion of those who were interested in quitting was greater than the proportion of

Figure 2.9 Cessation continuum for current cigarette smokers 18 years of age and older; Tobacco Use Supplement to the Current Population Survey (TUS-CPS) 2006–2007, 2010–2011, 2014–2015; United States



Source: TUS-CPS, public use data, 2006–2007, 2010–2011, and 2014–2015.
[a]Ever tried to quit but did not try to quit during the past year.

those who were not interested in quitting, regardless of quit attempt status. In addition, the ratio between those interested and those not interested in quitting increased across the quit attempt continuum from those who had never tried to quit to those who had tried to quit during the past year. The following sections examine trends and demographic differences in the cessation components of this continuum.

Attempts to Quit Smoking During the Past Year

Adults

According to NHIS, in 2015, 55.4% of adult cigarette smokers had made a past-year quit attempt (Table 2.11). This included current smokers (those who had smoked 100 cigarettes in their lifetime and now smoked some days or every day) who had made a quit attempt lasting at least 1 day during the past year and former smokers who had quit during the past year. Persons younger than 45 years of age had a higher prevalence of quit attempts than those 45 years of age and older. Asians (69.4%) and Blacks (63.4%) had a higher prevalence of quit attempts during the past year compared with Whites (53.3%). Those with Medicare had a lower prevalence of making a quit attempt during the past year compared with those who had private insurance. The prevalence of quit attempts did not change during 2015–2017 (both 55.4%) (NHIS, public use data, 2017). Also, the prevalence of quit attempts did not change within each of the demographic groups, and the quit attempt patterns by demographic subgroups were similar except for level of education and insurance status. In 2017, the prevalence of past-year quit attempts was higher among persons with graduate degrees (64.9%) than among those with 12 or fewer years of education and no diploma (50.4%) and those with a high school diploma (47.6%); prevalence of past-year quit attempts was higher among those with an associate degree (59.8%) than among those with a high school diploma (47.6%) (NHIS, public use data, 2017). In 2017, the prevalence of past-year quit attempts was lower among both those with Medicare (40.5%) and the uninsured (50.9%) than among those with private insurance (58.6%) (NHIS 2017, public use data, 2017).

In 2015, quit attempts varied by smoking frequency but not by status of smoking menthol cigarettes (Table 2.12). Among adults 18 years of age or older in 2015, nondaily smokers had a higher prevalence of past-year quit attempts (63.6%) compared with daily smokers (44.6%). These findings are similar to those obtained in previous analyses of nationally representative data (Tindle and Shiffman 2011; Schauer et al. 2014b; Keeler et al. 2017) and to data in the 2017 NHIS (NHIS, public use data, 2017). Although quit attempts during the past year did not differ significantly across age groups of nondaily

Table 2.11 Prevalence of a past-year quit attempt[a] and interest in quitting smoking[b] among adult cigarette smokers 18 years of age and older, by selected characteristics; National Health Interview Survey (NHIS) 2015; United States

Characteristic	Past-year quit attempt: % (95% CI)	Interest in quitting: % (95% CI)
Total	55.4 (53.5–57.3)	68.0 (65.9–70.0)
Sex		
Men	55.3 (52.7–57.9)	66.7 (63.8–69.6)
Women	55.6 (53.0–58.1)	69.4 (66.7–72.1)
Age group (years)		
18–24	66.7 (61.0–72.4)	62.3 (55.7–69.0)
25–44	59.8 (57.3–62.3)	72.7 (69.7–75.7)
45–64	49.6 (46.8–52.5)	68.7 (65.8–71.6)
≥65	47.2 (42.2–52.3)	53.7 (48.4–58.9)
Race/ethnicity		
White, non-Hispanic	53.3 (50.8–55.7)	67.5 (65.0–70.0)
Black, non-Hispanic	63.4 (59.0–67.9)	72.8 (68.2–77.4)
Hispanic	56.2 (51.6–60.9)	67.4 (61.9–72.8)
American Indian/Alaska Native, non-Hispanic	52.1 (32.1–72.2)	55.6 (35.8–75.4)
Asian, non-Hispanic[c]	69.4 (62.1–76.7)	69.6 (59.5–79.8)
Multiple races, non-Hispanic	57.8 (47.2–68.4)	59.8 (45.7–73.9)
Level of education[d]		
≤12 years (no diploma)	50.4 (46.2–54.5)	68.0 (63.7–72.2)
GED certificate	48.1 (40.1–56.0)	65.7 (58.0–73.4)
High school diploma	52.2 (48.3–56.2)	65.5 (61.9–69.1)
Some college (no degree)	57.8 (53.6–61.9)	70.2 (66.1–74.4)
Associate degree	57.4 (52.2–62.7)	70.6 (65.3–76.0)
Undergraduate degree	57.6 (51.5–63.8)	73.3 (67.7–78.8)
Graduate degree	55.8 (46.0–65.6)	74.0 (65.1–82.9)
Poverty status		
At or above poverty level	55.5 (53.3–57.7)	68.2 (65.9–70.4)
Below poverty level	55.2 (51.6–58.8)	67.3 (63.4–71.1)
U.S. Census region		
Northeast	58.8 (54.6–63.0)	74.5 (69.0–80.1)
Midwest	54.0 (49.7–58.4)	67.1 (63.1–71.1)
South	54.3 (51.6–57.0)	67.2 (64.0–70.4)
West	56.9 (52.5–61.3)	65.5 (60.7–70.2)
Health insurance coverage		
Private	57.2 (54.6–59.9)	69.0 (66.1–71.8)
Medicaid (includes persons with Medicaid and Medicare)	56.3 (52.5–60.1)	69.2 (65.3–73.2)
Medicare only	42.3 (35.5–49.4)	47.7 (40.3–55.2)
Other coverage	50.7 (43.9–57.4)	63.6 (57.2–69.9)
Uninsured	53.5 (49.7–57.2)	69.5 (65.2–73.9)

Table 2.11 Continued

Source: Babb and colleagues (2017).

Notes: **CI =** confidence interval; **GED =** General Educational Development.

[a]Current smokers who reported that they stopped smoking for >1 day during the past 12 months because they were trying to quit smoking and former smokers who quit during the past year.

[b]Current smokers who reported that they wanted to stop smoking completely.

[c]Does not include Native Hawaiians or Other Pacific Islanders.

[d]Among only adults 25 years of age and older.

Table 2.12 Prevalence of a past-year quit attempt[a] among adult current cigarette smokers 18 years of age and older, by selected smoking-related and demographic characteristics; National Health Interview Survey (NHIS) 2015; United States

Characteristic	Nondaily: % (95% CI)	Daily: % (95% CI)	Menthol: % (95% CI)	Nonmenthol: % (95% CI)
Total	63.6 (60.2–67.1)	44.6 (42.3–46.9)	51.5 (47.9–55.1)	48.3 (45.6–51.1)
Sex				
Male	60.9 (56.3–65.4)	45.0 (41.7–48.3)	52.7 (47.5–57.9)	49.0 (45.4–52.7)
Female	67.8 (62.6–72.9)	44.2 (41.2–47.1)	50.5 (45.8–55.2)	47.4 (43.8–51.1)
Age group (years)				
18–24	63.5 (53.8–73.3)	58.8 (50.3–67.3)	60.5 (50.2–70.7)	64.8 (54.4–75.1)
25–44	64.1 (59.0–69.2)	49.4 (45.9–52.9)	54.8 (49.7–60.0)	51.9 (48.0–55.8)
45–64	64.5 (59.1–69.9)	39.1 (36.0–42.2)	46.2 (40.7–51.7)	43.1 (39.4–46.8)
≥65	57.4 (46.4–68.4)	37.4 (31.8–43.0)	42.7 (31.8–53.6)	42.1 (35.9–48.3)
Race/ethnicity				
White, non-Hispanic	66.4 (61.6–71.1)	41.9 (39.2–44.7)	47.1 (42.2–52.0)	46.8 (43.7–50.0)
Black, non-Hispanic	70.1 (62.0–78.1)	56.6 (51.0–62.3)	60.0 (54.2–65.8)	62.4 (52.9–72.0)
Hispanic	50.3 (42.3–58.3)	48.0 (41.7–54.3)	48.2 (39.6–56.8)	53.5 (46.6–60.3)
American Indian/Alaska Native, non-Hispanic	—[b]	—[b]	—[b]	—[b]
Asian, non-Hispanic	67.2 (53.0–81.4)	55.9 (43.3–68.5)	—[b]	56.5 (42.7–70.2)
Multiple races, non-Hispanic	—[b]	40.0 (26.6–53.4)	—[b]	42.6 (25.1–60.2)
Level of education[c]				
≤12 years (no diploma)	67.4 (57.4–77.3)	40.7 (35.7–45.7)	50.7 (43.1–58.2)	43.4 (38.3–48.5)
GED certificate	—[b]	40.2 (31.8–48.7)	55.3 (42.4–68.2)	39.1 (28.4–49.8)
High school diploma	67.0 (59.0–75.0)	41.5 (37.0–45.9)	49.1 (41.9–56.2)	45.9 (40.8–51.0)
Some college (no degree)	66.4 (59.2–73.7)	47.2 (42.2–52.2)	50.2 (42.5–58.0)	52.3 (46.9–57.7)
Associate degree	56.7 (47.1–66.3)	48.0 (41.6–54.5)	52.5 (41.5–63.5)	48.5 (40.8–56.1)
Undergraduate degree	61.1 (50.9–71.3)	43.2 (35.4–51.0)	53.9 (42.7–65.1)	46.3 (38.2–54.4)
Graduate degree	46.3 (30.4–62.2)	45.6 (31.5–59.7)	—[b]	49.8 (37.2–62.3)
Poverty status				
At or above poverty level	63.7 (59.8–67.6)	43.8 (41.1–46.5)	51.0 (46.7–55.2)	48.1 (44.9–51.3)
Below poverty level	63.5 (55.5–71.4)	47.5 (43.1–51.9)	53.2 (46.9–59.6)	49.5 (44.6–54.4)
U.S. Census region				
Northeast	72.4 (64.1–80.7)	47.2 (41.6–52.8)	58.2 (49.7–66.7)	51.8 (43.7–60.0)

Table 2.12 Continued

Characteristic	Nondaily: % (95% CI)	Daily: % (95% CI)	Menthol: % (95% CI)	Nonmenthol: % (95% CI)
U.S. Census region (continued)				
Midwest	71.2 (63.2–79.3)	41.5 (36.5–46.5)	48.8 (41.0–56.7)	46.5 (40.7–52.4)
South	59.3 (54.2–64.3)	45.0 (41.7–48.2)	50.5 (45.2–55.7)	47.5 (43.9–51.1)
West	56.8 (49.8–63.8)	46.7 (41.1–52.2)	51.8 (43.5–60.0)	49.8 (43.7–55.8)
Health insurance coverage				
Private	63.8 (59.1–68.4)	43.6 (40.4–46.9)	53.3 (48.5–58.1)	47.0 (43.0–51.0)
Medicaid (includes persons with Medicaid and Medicare)	65.2 (57.2–73.2)	48.0 (43.2–52.8)	55.0 (48.2–61.8)	49.9 (44.6–55.2)
Medicare only	—[b]	36.2 (28.0–44.3)	41.2 (24.2–58.1)	38.0 (28.8–47.3)
Other coverage	69.6 (56.1–83.1)	39.9 (32.7–47.0)	37.7 (25.7–49.7)	48.5 (40.5–56.5)
Uninsured	60.9 (52.9–69.0)	45.7 (40.9–50.4)	49.5 (42.2–56.8)	49.9 (44.6–55.2)

Source: NHIS, National Center for Health Statistics, public use data, 2015.
Notes: **CI =** confidence interval; **GED =** General Educational Development.
[a]Current smokers who reported that they stopped smoking for >1 day during the past 12 months because they were trying to quit smoking and former smokers who quit during the past year.
[b]Prevalence estimates with a relative standard error ≥30% are not presented due to low precision.
[c]Among only adults 25 years of age and older.

smokers, the prevalence of quit attempts among daily smokers (Table 2.12) was higher among persons younger than 45 years of age than among those 45 years of age and older; in 2017, the prevalence of quit attempts was higher among those younger than 45 years of age than among only those 65 years of age and older. Among daily smokers, Blacks had a higher prevalence of quit attempts compared with Whites (NHIS, public use data, 2017). Among nondaily smokers in 2015, Whites and Blacks were more likely than Hispanics to make a quit attempt (Table 2.12); these racial/ethnic differences were not observed in 2017: Whites (55.9%), Blacks (67.8%), and Hispanics (57.8%) (NHIS, public use data, 2017). Also, among nondaily smokers, for all education levels below a graduate degree, the prevalence of making a past-year quit attempt was greater than 50%, although prevalence across educational groups was not statistically significant. In contrast, among daily smokers, the prevalence of making a past-year quit attempt was greater than 50% in only three groups: those 18–24 years of age, Blacks, and Asians (NHIS, public use data, 2017).

According to findings from the 2017 BRFSS, the prevalence of having a past-year quit attempt among cigarette smokers was greater than 60% in every state except Wisconsin (58.6%), Missouri (59.7%), and Iowa (59.9%) (Table 2.10). The prevalence of having a past-year quit attempt exceeded 70% in four states and one U.S. territory: Connecticut (71.6%), New Jersey (71.3%), Delaware (71.0%), Texas (70.7%), and Guam (72.3%).

Young Adults

Quit attempts among young adults varied significantly across demographic subgroups (NHIS, public use data, 2017). During 1997–2017, significant nonlinear increases in quit attempts among young adults were found among males, females, and Whites ($p < .05$ for quadratic trends), and significant linear increases were found among Hispanics ($p < .05$ for linear trends), but there were no significant changes in quit attempts among Blacks (NHIS, public use data, 1997–2017). Since 2009, across males and females and across Whites, Blacks, and Hispanics, the majority of cigarette smokers had tried to quit smoking during the past year. The prevalence of quit attempts among young adults differed across states; the prevalence of a quit attempt was highest in Vermont (86.5%), Mississippi (85.7%), and Florida (85.5%) and lowest in Oregon (58.9%), District of Columbia (59.6%), and Illinois (60.5%) (BRFSS, public use data, 2017).

Youth

Using data from the 2015 national YRBS, among the 10.8% of students in grades 9–12 who currently smoked cigarettes, 45.4% had tried to quit smoking cigarettes during the 12 months preceding the survey (Kann et al. 2016). The prevalence of having tried to quit smoking cigarettes was higher among female (52.8%) than male (39.7%) students. The prevalence of having tried to quit

smoking cigarettes was higher among 9th-grade (47.8%), 10th-grade (51.6%), and 12th-grade (47.7%) students than among 11th-grade students (37.9%). In contrast to the report from the national YRBS, the analysis of data from NYTS found that, in 2015, the prevalence of having a past-year quit attempt among students in grades 9–12 was 57.8% (NYTS, public use data, 2015), or 12.4 percentage points higher than the YRBS finding (Table 2.13a). Appendix 2.2 discusses factors contributing to this difference and other differences between the two surveys. The analysis of data from the 2017 NYTS also found that the prevalence of a past-year quit attempt was 61.1% among students in grades 9–12 and 67.2% among students in grades 6–8 (Tables 2.13a and 2.13b) (the YRBS did not ask this question in 2017).

Trends in Attempts to Quit Smoking During the Past Year

Adults

According to data from NHIS, from 1997 to 2017, the prevalence of a past-year quit attempt increased significantly among men and women ($p < 0.05$ for quadratic trends) (Figure 2.10). The percentage of female cigarette smokers who made a past-year quit attempt increased from 1997 (49.5%) to 2008 (54.1%); this percentage was 50% or greater from 2005 to 2017 and peaked at 57.7% in 2014; however, percentages from 2008 to 2017 were not statistically significantly different. The prevalence of past-year quit attempts among men also increased from 1997 (48.9%) to 2009 (52.2%) (Figure 2.10); it was 50% or higher every year from 2009 to 2017 and peaked at 55.3% in 2015; however, percentages from 2009 to 2017 were not significantly different.

During 1997–2017, there were significant increasing trends in quit attempts among Whites, Blacks, and Hispanics ($p < 0.05$ for quadratic trends among Whites and Blacks and $p < 0.05$ for linear trend among Hispanics). Among Whites, the prevalence of past-year quit attempts rose from 48.5% in 1997 to 54.4% in 2014; larger increases were observed among Blacks from 1997 (49.0%) to 2016 (63.8%) and among Hispanics from 1997 (53.3%) to 2012 (61.1%) (Figure 2.11); prevalence was not statistically different from 2014 to 2017 for Whites, 2016 to 2017 for Blacks, and 2012 to 2017 for Hispanics. The prevalence of past-year quit attempts peaked in 2016 among Blacks (63.8%), in 2014 among Whites (54.4%), and in 2012 among Hispanics (61.6%). From 2013 (Lavinghouze et al. 2015) to 2017 (Table 2.10), the prevalence of a quit attempt increased in Delaware, decreased in Missouri and Wisconsin, and remained stable in all other states and the District of Columbia.

Young Adults

Among young adults, significant nonlinear increases in quit attempts were found among males, females, and Whites ($p < 0.05$ for quadratic trends), and significant linear increases were observed for Hispanics ($p < 0.05$ for linear trends) (NHIS, public use data, 1997–2017). Peak prevalence of past-year quit attempts occurred in 2013 among young adult males (60.6%), in 2014 among young adult females (65.6%), and in 2015 among young adult Whites (66.6%).

Youth

Data from the national YRBS showed, among high school students who were current cigarette smokers, a significant linear decrease in the prevalence of past-year quit attempts from 2001 to 2015 among males (from 53.4% to 39.7%) and females (from 61.4% to 52.8%) (Figure 2.12). A similar linear decrease occurred in the prevalence of past-year quit attempts among Whites (from 57.2% in 2001 to 44.1% in 2015), but no change occurred among Hispanics (50.3% in 2001 and 49.6% in 2015) (YRBS, public use data, 2001–2015). The sample size for Blacks was insufficient to yield statistically stable estimates.

In contrast, data from the NYTS (Tables 2.13a and 2.13b) suggest a more stable trend in the prevalence of past-year quit attempts among high school students between 2000 (59.3%) and 2017 (61.1%). These differences could be the result of multiple factors, including variations in the length of the questionnaire and its content, time of administration (i.e., spring vs. fall semester), periodicity of the survey (i.e., biennial vs. annual), and sample demographics. Analysis of data from NYTS indicates that the prevalence of a past-year quit attempt among middle school students in grades 6–8 increased from 59.9% in 2000 to 77.0% in 2015 and then remained unchanged in 2017 (67.2%).

Number and Duration of Quit Attempts During the Past Year

Adults

Successfully quitting cigarette smoking usually involves multiple quit attempts. For example, estimates from a longitudinal study of adult smokers in Ontario, Canada, indicated that among those currently trying to quit, the highest probability of successful cessation on a given quit attempt, accounting for self-reported lifetime quit attempts, occurred on quit attempts 4–6 (Chaiton et al. 2016). However, further life table analyses of these smokers estimated that the average number of quit attempts before successfully quitting for at least 1 year was 29.6 (95% CI, 27.6–31.7) (Chaiton et al. 2016). Analysis of

Table 2.13a Quitting behaviors among current cigarette smokers[a] in high school (grades 9–12); National Youth Tobacco Survey (NYTS) 2000, 2004, 2009, 2015, and 2017; United States

Quitting behaviors	2000: % (95% CI)	2004: % (95% CI)	2009: % (95% CI)	2015: % (95% CI)	2017: % (95% CI)
Tried to quit cigarettes ≥1 days during the past year	59.3 (57.4–61.2)	57.6 (54.9–60.3)	53.7 (49.8–57.7)	57.8 (53.0–62.6)	61.1 (54.8–67.4)
Number of times tried to quit cigarettes during the past year[b]					
1	35.0 (33.3–36.8)	23.7 (20.7–26.8)	22.2 (18.7–25.6)	24.6 (17.8–31.3)	24.8 (19.1–30.5)
2	29.8 (27.8–31.7)	22.0 (19.3–24.6)	22.0 (18.6–25.4)	20.0 (15.0–25.0)	19.5 (14.4–24.7)
3–5	23.7 (22.1–25.4)	26.5 (23.5–29.5)	25.1 (21.5–28.8)	25.2 (20.6–29.8)	18.2 (13.8–22.6)
6–9	4.4 (3.6–5.2)	8.8 (7.2–10.5)	8.8 (6.9–10.8)	7.7 (5.2–10.3)	10.5 (7.1–13.8)
≥10	7.1 (5.9–8.3)	19.0 (15.9–22.1)	21.9 (18.1–25.7)	22.5 (17.7–27.3)	27.0 (22.6–31.5)
Considered quitting cigarettes within					
30 days	NA	41.6 (36.5–46.6)	44.3 (39.8–48.9)	30.1 (25.0–35.1)	33.6 (29.4–37.8)
6 months	NA	30.1 (26.1–34.1)	32.5 (28.6–36.5)	21.5 (15.4–27.5)	18.3 (13.6–23.1)
Not within 6 months	NA	28.3 (24.5–32.2)	23.1 (19.0–27.3)	48.5 (42.3–54.6)	48.1 (42.7–53.5)

Source: NYTS, Centers for Disease Control and Prevention, public use data, 2000, 2004, 2009, 2015, and 2017.
Notes: **CI =** confidence interval; **NA =** not applicable, question not asked in this year.
[a]Smoked cigarettes during the past 30 days.
[b]Among those who tried to quit smoking cigarettes during the past year.

Table 2.13b Quitting behaviors among current cigarette smokers[a] in middle school (grades 6–8); National Youth Tobacco Survey (NYTS) 2000, 2004, 2009, 2015, and 2017; United States

Quitting behaviors	2000: % (95% CI)	2004: % (95% CI)	2009: % (95% CI)	2015: % (95% CI)	2017: % (95% CI)
Tried to quit cigarettes ≥1 day during the past year	59.9 (56.8–63.0)	64.7 (60.2–69.2)	63.2 (53.6–72.7)	77.0 (71.0–83.0)	67.2 (58.3–76.1)
Number of times tried to quit cigarettes during the past year[b]					
1	35.2 (31.6–38.8)	20.4 (16.4–24.4)	22.8 (17.7–27.8)	21.7 (12.2–31.2)	15.3 (8.6–22.0)
2	27.6 (24.1–31.1)	16.9 (14.1–19.7)	20.0 (14.8–25.2)	__[c]	19.1 (9.3–28.9)
3–5	18.6 (15.8–21.3)	23.3 (19.5–27.1)	21.9 (16.1–27.7)	21.8 (13.3–30.4)	24.0 (12.7–35.3)
6–9	6.3 (3.9–8.8)	10.1 (7.4–12.7)	7.0 (3.8–10.1)	__[c]	__[c]
≥10	12.3 (9.9–14.7)	29.3 (26.0–32.5)	28.4 (22.9–33.8)	23.9 (12.1–35.7)	33.3 (22.7–43.9)
Considered quitting cigarettes within					
30 days	NA	57.8 (51.0–64.6)	56.7 (44.1–69.2)	51.7 (39.0–64.4)	45.5 (31.8–59.1)
6 months	NA	17.6 (13.2–22.1)	25.6 (14.6–36.6)	__[c]	18.4 (9.0–27.8)
Not within 6 months	NA	24.5 (19.5–29.5)	17.8 (10.2–25.3)	38.8 (24.6–53.1)	36.2 (24.6–47.7)

Source: NYTS, Centers for Disease Control and Prevention, public use data, 2000, 2004, 2009, 2015, and 2017.

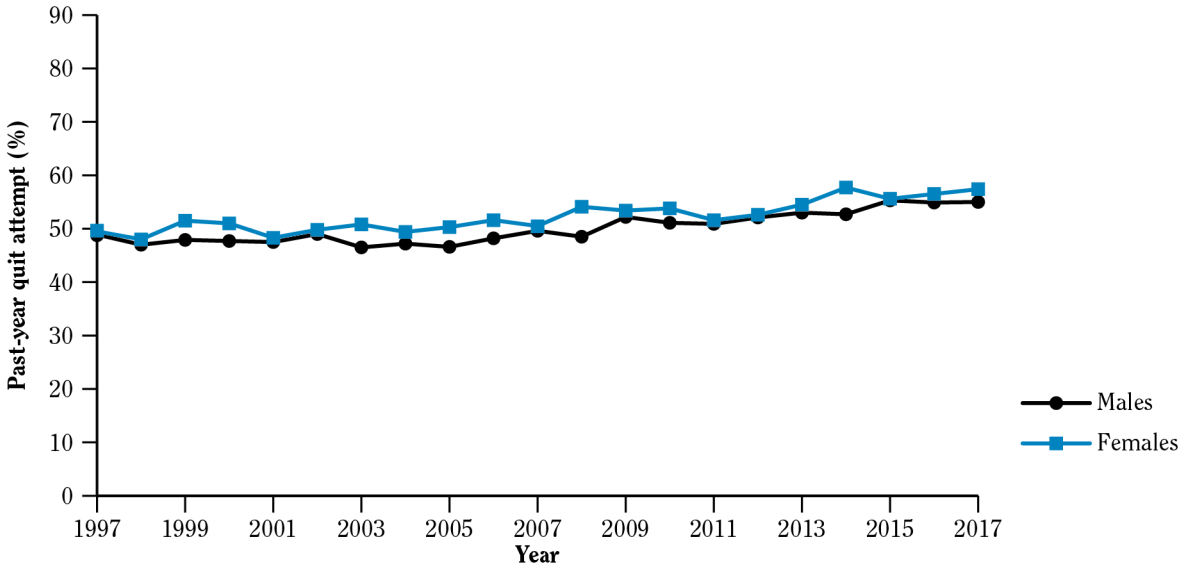
Notes: **CI =** confidence interval; **NA =** not applicable, question not asked in this year.

[a]Smoked cigarettes during the past 30 days.

[b]Among those who tried to quit smoking cigarettes during the past year.

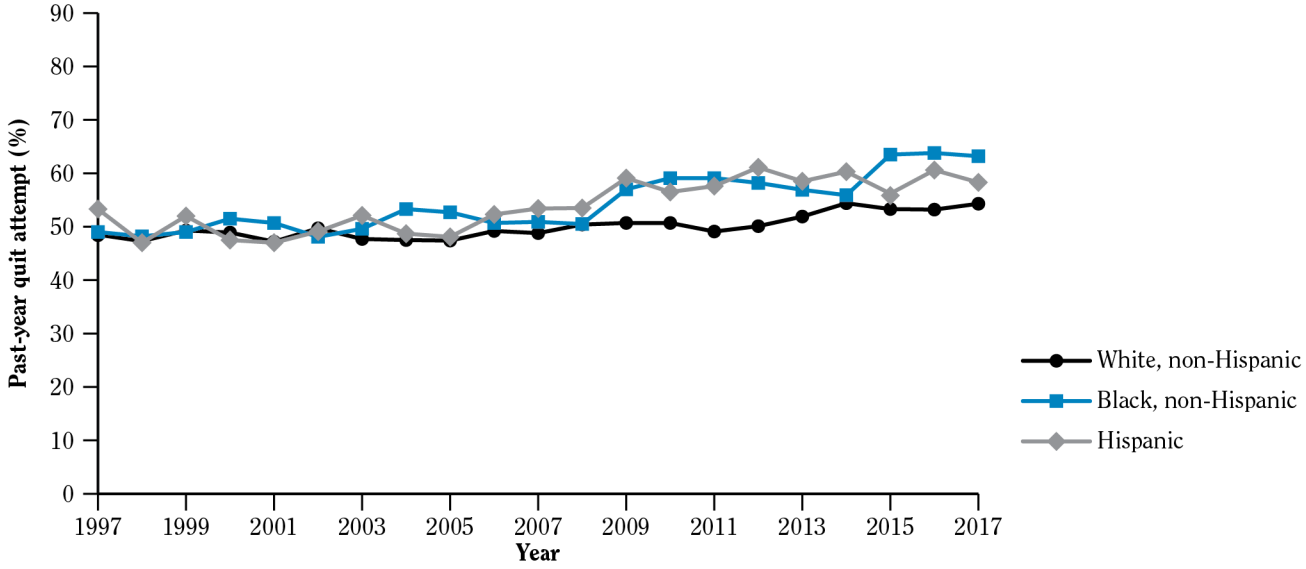
[c]Prevalence estimates with a relative standard error ≥30% are not presented due to low precision.

Figure 2.10 Prevalence of past-year quit attempts[a] among adult cigarette smokers 18 years of age and older, by sex; National Health Interview Survey (NHIS) 1997–2017; United States



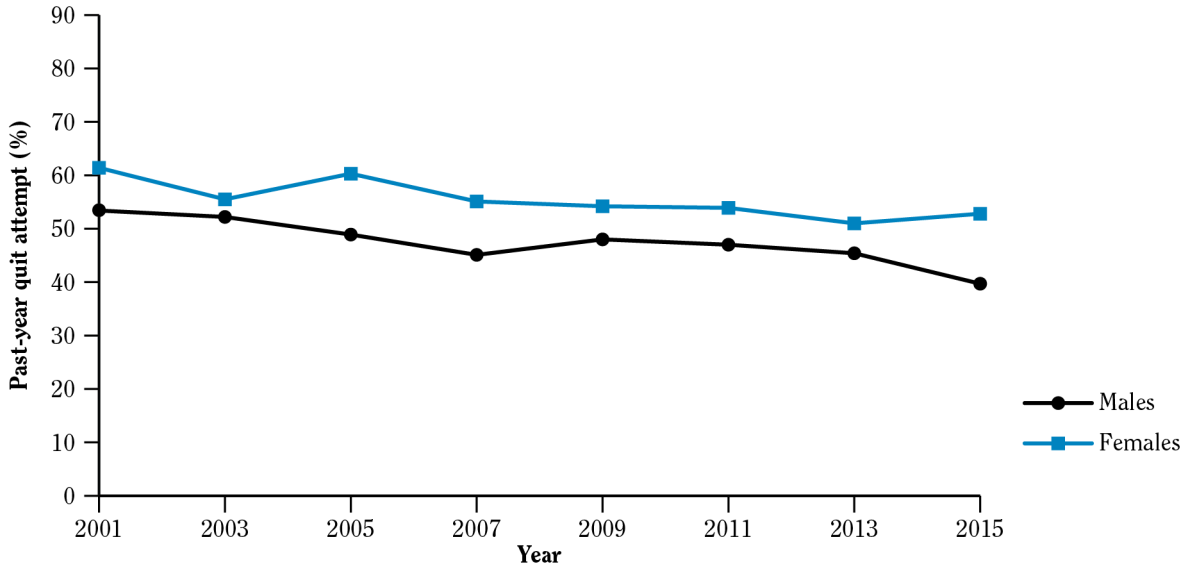
Source: NHIS, National Center for Health Statistics, public use data, 1997–2017.
[a]Current smokers who reported that they stopped smoking for >1 day during the past 12 months because they were trying to quit smoking and former smokers who quit during the past year.

Figure 2.11 Prevalence of past-year quit attempts[a] among adult cigarette smokers 18 years of age and older, by race/ethnicity; National Health Interview Survey (NHIS) 1997–2017; United States



Source: NHIS, National Center for Health Statistics, public use data, 1997–2017.
[a]Current smokers who reported that they stopped smoking for >1 day during the past 12 months because they were trying to quit smoking and former smokers who quit during the past year.

Figure 2.12 Prevalence of past-year quit attempts among students in grades 9–12 who currently smoke cigarettes[a], by sex; National Youth Risk Behavior Survey (YRBS) 2001–2015; United States



Source: YRBS, Centers for Disease Control and Prevention, public use data, 2001–2015.
[a]Respondents who reported that they had smoked cigarettes on at least 1 day during the 30 days before the survey and also reported that they had tried to quit smoking during the past 12 months.

the 2014–2015 TUS-CPS data found that, among current daily smokers or some-day smokers who had smoked on 12 or more days during the past 30 days and had tried to quit during the past year, the most common range of past-year quit attempts was two or three (40.4%). The percentages were 30.7% for one attempt and 28.9% for at least four attempts (Table 2.14).

According to findings using the 2014–2015 TUS-CPS data, for more than one-third of current smokers (daily smokers plus some-day smokers who had smoked for 12 or more days during the past month) who had tried to quit during the past year, their longest quit attempt lasted between 1 and 6 days (35.7%), and 10.7% had a quit attempt of 6 months or longer (Table 2.14). The percentage with a past-year quit attempt lasting 6 months or longer increased from 7.5% in 2001–2002 to 11.1% in 2006–2007 and 14.6% in 2010–2011 but declined to 10.7% in 2014–2015. The percentage with a past-year quit attempt lasting 30 days to less than 6 months also declined from 32.8% in 2010–2011 to 24.4% in 2015, and the percentage with a quit attempt of 1–6 days increased from 21.5% in 2010–2011 to 35.7% in 2014–2015.

Young Adults

Among young adult current cigarette smokers (daily smokers plus some-day smokers who had smoked on 12 or more days during the past 30 days) who had made a quit attempt during the past year, the distribution of quit attempts was similar to that for all adults (Table 2.15). For all years except 2006–2007, a smaller proportion of young adult smokers (compared with adult smokers overall) reported a longest quit attempt during the past year of 1–6 days. In contrast to adults overall, the prevalence of a long quit attempt—that is, 30 days to less than 6 months or 6 months or longer—did not change significantly over time.

Youth

Findings from the 2017 NYTS indicate that among high school current cigarette smokers who had tried to quit during the past year, more than one-fourth (27.0%) reported trying 10 or more times in the past year and slightly less than one-fourth reported trying to quit one time (24.8%) (Table 2.13a). In addition, approximately one-fifth reported trying to quit two times (19.5%) or three to five times (18.2%), and 10.5% reported trying to quit six to nine times. Among current cigarette smokers in middle school who tried to quit during the past year, one-third (33.3%) reported trying to quit 10 or more times, and a smaller percentage (15.3%) reported trying to quit one time. Although the prevalence of one or two quit attempts decreased from 2000 to 2004 among middle

Table 2.14 Quitting behaviors among current cigarette smokers[a] 18 years of age and older, by year; Tobacco Use Supplement to the Current Population Survey (TUS-CPS) 2001–2002, 2006–2007, 2010–2011, and 2014–2015; United States

Quitting behaviors	2001–2002: % (95% CI)	2006–2007: % (95% CI)	2010–2011: % (95% CI)	2014–2015: % (95% CI)
Ever tried to quit[b]	71.2 (70.5–71.8)	72.2 (71.6–72.9)	60.4 (59.6–61.2)	64.4 (63.6–65.2)
Tried to quit during the past year	NA	42.5 (41.8–43.3)	42.6 (41.8–43.3)	46.7 (45.9–47.5)
Tried to quit >1 days during the past year	50.0 (49.2–50.7)	35.5 (34.7–36.2)	37.2 (36.4–37.9)	41.3 (40.4–42.2)
Number of times tried to quit during the past year[c]				
1	31.9 (30.9–33.0)	36.1 (35.0–37.3)	32.3 (31.2–33.4)	30.7 (29.5–31.9)
2–3	40.7 (39.5–41.8)	37.9 (36.7–39.0)	41.2 (40.0–42.4)	40.4 (39.1–41.7)
≥4	27.4 (26.4–28.4)	26.0 (25.0–27.0)	26.5 (25.4– 27.6)	28.9 (27.7–30.1)
Duration of longest quit attempt during the past 12 months[c]				
1–6 days	35.1 (33.9–36.2)	33.4 (32.3–34.6)	21.5 (18.7–24.3)	35.7 (34.5–37.0)
7–29 days	32.7 (31.7–33.8)	30.0 (28.9–31.0)	31.1 (27.8–34.4)	29.1 (28.0–30.3)
30 days to <6 months	24.7 (23.8–25.6)	25.5 (24.6–26.5)	32.8 (29.4–36.2)	24.4 (23.3–25.6)
>6 months	7.5 (6.9–8.1)	11.1 (10.3–11.8)	14.6 (12.0–17.2)	10.7 (9.8–11.6)
Considered quitting within:[c]				
30 days	18.2 (17.6–18.7)	17.9 (17.3–18.5)	16.4 (15.9–16.9)	19.7 (18.9–20.4)
6 months	26.5 (26.0–27.1)	26.5 (25.9–27.1)	24.2 (23.6–24.9)	25.8 (25.1–26.5)
Not within 6 months	55.3 (54.6–56.0)	55.6 (54.9–56.3)	59.4 (58.6–60.2)	54.5 (53.7–55.3)
Level of interest in quitting[c]				
1 (not at all interested)	NA	20.2 (19.6–20.8)	23.2 (22.4–24.0)	22.5 (21.7–23.2)
2–5	NA	31.9 (31.3–32.6)	32.2 (31.5–33.0)	30.3 (29.6–31.1)
6–8	NA	23.3 (22.7–23.9)	21.3 (20.7–21.9)	22.5 (21.9–23.2)
9 or 10 (extremely interested)	NA	24.6 (24.0–25.2)	23.3 (22.6–23.9)	24.7 (24.0–25.4)
Think they would be likely to succeed in quitting if tried during the next 6 months[d]				
Not likely	NA	11.8 (11.3–12.3)	11.0 (10.4–11.6)	10.8 (10.1–11.4)
A little likely	NA	22.3 (21.6–23.0)	21.8 (21.0–22.5)	21.6 (20.9–22.3)
Somewhat likely	NA	37.1 (36.4–37.9)	37.9 (37.1–38.7)	38.4 (37.5–39.3)
Very likely	NA	28.8 (28.1–29.5)	29.3 (28.5–30.1)	29.3 (28.3–30.2)

Source: TUS-CPS, National Cancer Institute, public use data, 2001–2002, 2006–2007, 2010–2011, and 2014–2015.
Notes: **CI =** confidence interval; **NA =** not applicable.
[a]Smoked 12 or more days during the past 30 days and had tried to quit during the past year.
[b]For 2001–2002, estimates are from the question, "Have you ever stopped smoking for one day or longer because you were trying to quit smoking?" In other years, the question for current some-day smokers who smoked less than 12 days during past 30 days included, "Have you ever tried to quit smoking completely?" and for current daily smokers and some-day smokers who smoked 12 or more days during the past 30 days included, "Have you ever made a serious attempt to stop smoking because you were trying to quit—even if you stopped for less than a day?" Also, in 2006–2007, current daily smokers and some-day smokers who smoked less than 12 days/month were asked, "Have you ever stopped smoking one day or longer because you were trying to quit smoking?"
[c]Among current daily smokers and some-day smokers who smoked 12 or more days during the past 30 days who tried to quit during the past year.
[d]Among those who were interested in quitting.

Table 2.15 Quitting behaviors among current cigarette smokers[a] 18–24 years of age, by year; Tobacco Use Supplement to the Current Population Survey (TUS-CPS) 2001–2002, 2006–2007, 2010–2011, 2014–2015; United States

Quitting behaviors	2001–2002: % (95% CI)	2006–2007: % (95% CI)	2010–2011: % (95% CI)	2014–2015: % (95% CI)
Ever tried to quit[b]	67.7 (65.9–69.5)	65.7 (63.7–67.7)	56.7 (54.4–58.9)	61.6 (58.7–64.5)
Tried to quit during the past year	NA	50.1 (47.8–52.4)	47.9 (45.5–50.2)	52.6 (49.6–55.7)
Tried to quit ≥1 day during the past year	69.1 (67.0–71.3)	43.8 (41.5–46.1)	42.9 (40.5–45.4)	50.0 (46.7–53.2)
Number of times tried to quit during the past year[c]				
1	30.4 (28.2–32.6)	34.0 (30.8–37.3)	29.4 (25.9–32.9)	30.4 (26.2–34.5)
2–3	41.7 (39.2–44.2)	38.3 (35.2–41.5)	46.4 (42.5–50.2)	42.1 (37.6–46.7)
≥4	27.9 (25.6–30.1)	27.6 (24.8–30.5)	24.2 (20.9–27.6)	27.5 (23.5–31.4)
Duration of longest quit attempt during the past 12 months[c]				
1–6 days	30.7 (28.3–33.0)	26.0 (23.1–28.9)	20.1 (12.2–28.0)	25.5 (22.0–29.0)
7–29 days	34.5 (32.0–36.9)	32.9 (29.9–35.8)	32.0 (22.5–41.5)	34.0 (29.8–38.2)
30 days to <6 months	26.9 (24.5–29.3)	28.0 (25.2–30.9)	33.2 (24.2–42.2)	28.3 (24.7–31.8)
≥6 months	7.9 (6.5–9.4)	13.1 (10.8–15.3)	14.7 (8.4–21.1)	12.3 (9.2–15.3)
Considered quitting within:[c]				
30 days	20.3 (18.6–22.0)	17.5 (15.8–19.2)	16.6 (14.9–18.3)	19.1 (16.6–21.6)
6 months	27.8 (26.1–29.4)	25.4 (23.7–27.1)	23.8 (21.6–26.0)	24.6 (22.0–27.3)
Not within 6 months	52.0 (50.1–53.8)	57.1 (54.8–59.4)	59.6 (57.0–62.2)	56.3 (53.1–59.5)
Level of interest in quitting[c]				
1 (not at all interested)	NA	17.5 (15.9–19.1)	20.5 (18.3–22.7)	19.5(16.9–22.1)
2–5	NA	37.1 (35.0–39.1)	36.9 (34.5–39.3)	36.9 (33.8–40.0)
6–8	NA	27.6 (25.5–29.7)	24.8 (22.8–26.7)	23.8 (20.9–26.6)
9 or 10 (extremely interested)	NA	17.8 (16.1–19.4)	17.9 (16.0–19.8)	19.8 (17.2–22.4)
Think they would be likely to succeed in quitting if tried during the next 6 months[d]				
Not likely	NA	10.8 (9.2–12.5)	11.0 (10.4–11.6)	8.8 (6.7–10.9)
A little likely	NA	22.8 (20.9–24.6)	21.8 (21.0–22.5)	18.4 (16.0–20.9)
Somewhat likely	NA	38.1 (35.9–40.4)	37.9 (37.1–38.7)	39.3 (35.9–42.6)
Very likely	NA	28.3 (26.2–30.3)	29.3 (28.5–30.1)	33.5 (30.3–36.7)

Source: TUS-CPS, National Cancer Institute, public use data, 2001–2002, 2006–2007, 2010–2011, and 2014–2015.

Notes: **CI =** confidence interval; **NA =** not applicable.

[a]Smoked 100 cigarettes in their lifetime and currently smoked some days or every day.

[b]For 2001–2002, estimates are from the question, "Have you ever stopped smoking for one day or longer because you were trying to quit smoking?" In other years, questions for current some-day smokers who smoked less than 12 days during the past 30 days included, "Have you ever tried to quit smoking completely?" and for current daily smokers and some-day smokers who smoked 12 or more days during the past 30 days included, "Have you ever made a serious attempt to stop smoking because you were trying to quit—even if you stopped for less than a day?" Also, in 2006–2007, current daily smokers and some-day smokers who smoked less than 12 days/month were asked, "Have you ever stopped smoking one day or longer because you were trying to quit smoking?"

[c]Among current daily smokers and some-day smokers who smoked 12 or more days during the past 30 days who tried to quit during the past year.

[d]Among those who were interested in quitting.

and high school smokers who tried to quit during the past year, the prevalence of one or two quit attempts remained relatively stable from 2004 to 2017. In contrast, the prevalence of 10 or more quit attempts increased during 2000–2004 among current cigarette smokers in both middle school and high school who tried to quit in the past year and increased further among high school students from 19.0% in 2004 to 27.0% in 2017.

Interest in Quitting Smoking

Adults

NHIS data for 2015 indicated that 68.0% of current cigarette smokers were interested in quitting smoking completely (Table 2.11). However, when a 10-point scale was used for the 2014–2015 TUS-CPS (Table 2.14) to determine *any* interest, the estimate was somewhat higher (77.5%). In contrast to the prevalence of quit attempts, the prevalence of interest in quitting was highest among those 25–44 years of age (72.7%) and lowest among those 65 years of age and older (53.7%) and those 18–24 years of age (62.3%) (Table 2.11). This age difference was reflected in the results for health insurance: those with Medicare only were less interested in quitting (47.7) than those with other types of insurance. However, for 29 of the 30 demographic groups that were examined, only the group with Medicare only did not have a majority of current cigarette smokers who wanted to quit smoking completely. A more proximate measure of interest in quitting smoking may be whether the current cigarette smoker is interested in quitting in the next 30 days or 6 months. According to data from the 2014–2015 TUS-CPS, the majority of smokers were not considering quitting within 6 months (54.5%), 25.8% were considering quitting within 6 months, and 19.7% were considering quitting within 30 days (Table 2.14).

Young Adults

In 2015, an estimated 62.3% of young adult (18–24 years of age) current cigarette smokers wanted to stop smoking completely (Table 2.11); this measure did not vary across demographic subgroups (NHIS, public use data, 2015). According to data from the 2014–2015 TUS-CPS, young adult current cigarette smokers (daily smokers plus some-day smokers who had smoked on 12 or more days during the past 30 days) had a lower prevalence (19.8%) of having an extreme interest (determined by a report of "9" or "10" on a 10-point scale) in quitting smoking (Table 2.15) than adults overall (24.7%) (Table 2.14). The distribution of the periods in which young adult current smokers were considering quitting (i.e., within 30 days, within 6 months, or not within 6 months) (Table 2.15) was similar to that for adults overall (Table 2.14).

Youth

In the MTF Study, combined data from 2011 to 2017 (Table 2.16) indicated that 21.8% of high school seniors (12th graders) who were current smokers wanted to stop smoking "now." Seniors whose parents had the highest level of education were less likely to want to stop smoking immediately (15.0%) than were those whose parental education fell into the second-to-lowest category (26.4%) and the middle category (22.1%). Another measure related to interest in quitting in the MTF Study is whether the smoker thinks that he or she will be smoking in 5 years. The majority of high school seniors who were current smokers thought that they would probably or definitely not be smoking in 5 years (60.3%). The percentage who thought that they would not be smoking in 5 years increased with level of parental education, from 50.7% among those with the lowest level to 68.8% among those with the highest level.

According to NYTS, in 2017, 33.6% of students in grades 9–12 and 45.5% of students in grades 6–8 who were current cigarette smokers were considering quitting smoking in the next 30 days, and 18.3% of students in grades 9–12 and 18.4% of students in grades 6–8 were considering quitting in the next 6 months (Tables 2.13a and 2.13b).

Trends in Interest in Quitting Smoking

Adults

NHIS data showed no significant change from 2000 (70.0%) to 2015 (68.0%) in the prevalence of being interested in completely stopping cigarette smoking among adults 18 years of age and older (Babb et al. 2017). Similarly, during 2000–2015, no significant change was observed in the prevalence of being interested in quitting among men, women, Whites, and Hispanics (NHIS, public use data, 2000–2015). In contrast, interest in quitting increased among Blacks from 2000 (68.4%) to 2010 (75.6%), then remained stable in 2015 (72.8%) ($p < 0.05$ based on linear trend analysis; NHIS, public use data, 2000–2015). However, data from the TUS-CPS indicate that the proportion of current smokers who were considering quitting within the next 30 days may have slightly increased from 2001–2002 (18.2%) to 2014–2015 (19.7%) (Table 2.14).

Young Adults

Similar to changes observed for adults overall, no significant changes were observed from 2000 to 2015 in interest in quitting among young adults overall. Unlike changes observed for adults overall, no significant changes were observed among any demographic subgroups (NHIS, public use data, 2000–2015). As for considering quitting

Table 2.16 Prevalence of cessation behaviors and attitudes among high school seniors who are current cigarette smokers[a]; Monitoring the Future (MTF) Study 2011–2017 combined data; United States

Characteristic	Ever tried to quit smoking: % (95% CI)	Tried to stop but could not: % (95% CI)	Wants to stop smoking now: % (95% CI)	Will probably or definitely not smoke in 5 years: % (95% CI)
Total	44.8 (42.8–46.7)	22.1 (20.5–23.7)	21.8 (20.3–23.3)	60.3 (58.5–62.1)
Sex				
Male	43.9 (40.9–46.8)	21.3 (19.0–23.6)[b]	21.4 (19.3–23.5)	60.7 (58.3–63.2)
Female	44.2 (41.2–47.2)	21.3 (19.0–23.7)[b]	22.7 (20.3–25.1)	61.3 (58.6–64.0)
Race/ethnicity				
White, non-Hispanic	43.6 (41.1–46.1)	21.9 (19.9–23.9)	22.8 (20.9–24.8)	61.6 (59.4–63.7)
Black, non-Hispanic	47.7 (40.7–54.6)	24.9 (18.7–31.2)	20.4 (14.5–26.2)	60.7 (52.6–68.7)
Hispanic	42.8 (37.9–47.6)	17.8 (13.5–22.0)	18.0 (13.8–22.2)	59.1 (53.5–64.8)
Parental education[c]				
1–2 (low)	44.7 (39.0–50.5)	21.9 (17.0–26.8)	20.7 (16.1–25.4)	50.7 (44.8–56.6)
2.5–3	48.9 (45.2–52.5)	24.9 (21.7–28.2)	26.4 (22.9–30.0)	57.8 (54.0–61.6)
3.5–4	45.1 (41.7–48.4)	21.8 (19.1–24.4)	22.1 (19.2–25.0)	61.1 (58.1–64.1)
4.5–5	39.8 (36.0–43.6)	18.9 (16.0–21.9)	19.8 (16.6–23.0)	65.9 (62.3–69.5)
5–6 (high)	38.8 (32.4–45.2)	15.5 (11.2–19.9)	15.0 (11.1–18.9)	68.8 (62.9–74.8)
U.S. Census region				
Northeast	47.7 (43.9–51.6)	23.2 (20.1–26.3)	24.0 (20.7–27.3)	60.3 (56.2–64.4)
Midwest	43.6 (39.0–48.2)	22.0 (18.5–25.4)	21.7 (18.6–24.8)	61.3 (57.8–64.8)
South	45.2 (42.4–48.1)	23.0 (20.5–25.5)	22.6 (20.1–25.1)	58.5 (55.4–61.6)
West	42.6 (37.9–47.3)	19.2 (14.9–23.6)	18.4 (15.1–21.7)	62.7 (58.4–66.9)

Source: MTF Study, University of Michigan, Institute for Social Research, 2011–2017 (unpublished data).

Notes: **CI =** confidence interval. Data come from a randomly selected 33% of the entire sample (questions on cessation and attitudes were asked on two survey forms out of a total of six). The total weighted N for 30-day smoking is 4,320; variable-specific missing data reduce the sample size slightly overall and in results for each sociodemographic subgroup presented here.

[a]Based on responses to the question, "How frequently have you smoked cigarettes during the past 30 days?" Respondents who reported that they had smoked less than 1 cigarette per day or more were classified as current smokers.

[b]The overall percentage does not fall between the sex-specific percentages because of missing values for sex.

[c]Parental education is the average of a mother's education and a father's education based on answers from respondents about the highest level of education achieved by each parent, using the following scale: completed (1) grade school or less, (2) some high school, (3) high school, (4) some college, (5) college, and (6) graduate or professional school after college. Missing data were allowed for one of the two parents.

in the next 30 days, unlike adults overall, data from the TUS-CPS indicated that no significant change occurred over time in the prevalence of young adults who were considering quitting in the next 30 days (Table 2.15).

Youth

According to the MTF Study, the prevalence of high school seniors who were current smokers and wanted to stop smoking "now" decreased from 31.0% in 2000–2004 to 16.5% in 2015–2017 (Table 2.17). The proportion who believed they would probably or definitely not be smoking in 5 years was similar between 2000–2004 (63.2%) and 2015–2017 (65.4%). Using data from the NYTS, among current smokers in grades 9–12, the prevalence of considering quitting within 30 days decreased from 44.3% in 2009 to 33.6% in 2017 (Table 2.13a). Similarly, the prevalence in this group of wanting to quit in the next 6 months decreased from 32.5% in 2009 to 18.3% in 2017.

History of a Quit Attempt

Adults

According to the TUS-CPS, in 2001–2002, 71.2% of current adult cigarette smokers had ever tried to quit

Table 2.17 Prevalence of cessation behaviors and attitudes among high school seniors who are current cigarette smokers[a], by year; Monitoring the Future (MTF) Study 2000–2004, 2005–2009, 2010–2014, and 2015–2017 combined data; United States

Characteristic	2000–2004: % (95% CI)	2005–2009: % (95% CI)	2010–2014: % (95% CI)	2015–2017: % (95% CI)
Ever tried to quit smoking	49.6 (47.2–52.0)	44.2 (42.1–46.3)	45.0 (41.9–48.1)	40.2 (35.6–44.8)
Tried to stop but could not	28.8 (26.6–30.9)	22.3 (20.7–24.0)	22.9 (20.4–25.4)	17.6 (14.2–21.0)
Wants to stop smoking now	31.0 (28.9–33.2)	21.8 (20.2–23.4)	22.9 (20.5–25.2)	16.5 (13.3–19.7)
Will probably or definitely not smoke in 5 years	63.2 (61.0–65.4)	62.5 (60.7–64.4)	58.7 (56.1–61.3)	65.4 (61.0–69.8)

Source: MTF, University of Michigan, Institute for Social Research, 2001–2017 (unpublished data).
Notes: **CI =** confidence interval.
[a]Respondents who reported that they had smoked one cigarette per day or more.

smoking, even just once. This percentage remained relatively stable in 2006–2007 (72.2%), but by 2010–2011 it had decreased by more than 10 percentage points, to 60.4%. Although the percentage increased to 64.4% in 2014–2015, it was lower than in 2001–2002 or 2006–2007 (Table 2.14).

Young Adults

Through 2010–2011, young adult current smokers had a lower prevalence of ever having tried to quit smoking (Table 2.15) than adults overall (Table 2.14). But in 2014–2015, the prevalence among young adults of ever having tried to quit smoking (61.6%) (Table 2.15) was similar to that of adults overall (64.4%, Table 2.14). The patterns of change over time in ever trying to quit smoking were similar between young adult smokers (Table 2.15) and adults overall (Table 2.14).

Youth

The MTF Study found that in 2011–2017, 44.8% of high school seniors who were current smokers had ever tried to quit smoking (Table 2.16). A significant decrease in this percentage was seen from 2000–2004 (49.6%) to 2015–2017 (40.2%) (Table 2.17). Similarly, in 2015–2017, 17.6% of youth had tried to quit smoking but could not, which was lower than in 2000–2004 (28.8%) (Table 2.17). In 2011–2017, high school seniors with parents with the second-lowest level of parental education were more likely than students with parents in the two highest categories of parental education to have ever tried to quit (48.9% vs. 39.8% and 38.8%, respectively) (Table 2.16). In addition, high school seniors with parents with the second-lowest level of parental education were more likely to report that they had tried to quit but could not (24.9%) than those with parents in the highest category of parental education (15.5%).

Other Tobacco Products: Use and Cessation

Adults

Data from the 2017 NHIS indicate that 3.8% of adults currently smoked cigars, cigarillos, or filtered little cigars; 2.8% of U.S. adults currently used e-cigarettes; 2.1% used smokeless tobacco; 1.0% smoked regular pipes, water pipes, or hookahs; and 3.7% used 2 or more types of tobacco products (Wang et al. 2018a). The PATH Study found that in 2013–2014, 17.7% of U.S. adult respondents reported having ever tried e-cigarettes; among those, 3.8% of 18- to 24-year-old respondents reported becoming regular users of e-cigarettes (Kasza et al. 2017). In addition, 5.5% of adults in Wave 1 (2013–2014) of PATH reported currently using e-cigarettes (now uses e-cigarettes every day or some days); among those who used e-cigarettes, 42.2% reported infrequent use (current some-day use and used 0–2 days in the past 30 days), 36.5% reported moderate use (some-day use and used more than 2 days of the past 30 days), and 21.3% reported daily use (Coleman et al. 2017; Kasza et al. 2017). The 2013–2014 PATH Study also observed that the prevalence of current established use of cigarillos (1.7%; 95% CI, 1.5–1.8) was higher than the prevalence of use of filtered cigars (0.9%; 95% CI, 0.8–1.0), nonpremium cigars (other larger mass-market cigars) (0.8%; 95% CI, 0.7–0.8), and premium cigars (0.7%; 95 CI, 0.6–0.7) (the term "current established users" was defined as persons who had ever heard of the cigar type, ever smoked the cigar type "fairly regularly,"

and now smoked every day or some days) (Corey et al. 2017). In addition, in the 2013–2014 PATH Study, 31.9% of adults reported smoking hookahs during the past year, and among these, 10.7% were daily or weekly users, 13.7% were monthly users, 42.1% used every couple of months, and 33.5% used about once a year (Robinson et al. 2018).

For all four types of tobacco products (i.e., e-cigarettes, cigars, smokeless tobacco, pipes), NHIS 2017 prevalence was higher among men than women, decreased with age and, correspondingly, was lower among those with Medicare only than among those with other types of insurance (Wang et al. 2018a). However, when each type of cigar product was examined separately for the 2013–2014 PATH Study, only use of cigarillos decreased with age; use of filtered cigars increased with age; and prevalence of premium cigars and nonpremium cigars was the highest among persons 35–54 years of age (Corey et al. 2017). Prevalence of cigar smoking was higher among Blacks than among Whites and Hispanics (Wang et al. 2018a); however, for the 2013–2014 PATH Study, prevalence of premium and nonpremium cigar use was higher among Whites than Blacks (Corey et al. 2017).

Data from the 2017 NHIS indicate that smokeless tobacco use was higher among Whites than among Blacks and Hispanics (Wang et al. 2018a). E-cigarette use was also higher among Whites and persons of multiple races than Hispanics and Asians. Prevalence of pipe and/or hookah use was higher among Whites than Hispanics. Cigar use and smokeless tobacco use were higher in the Midwest than in the Northeast and the West, and the Midwest had a higher prevalence of pipe and/or hookah use than the Northeast. Data from the PATH Study suggest that there are urban–rural differences in the use of noncigarette tobacco products—for example, smokeless tobacco use was more prevalent in rural than urban counties; and the use of hookahs, cigarillos among women, and e-cigarettes among men was more prevalent in urban areas than in rural areas (Roberts et al. 2017).

Data from the 2017 NHIS indicate that the prevalence of e-cigarette and smokeless tobacco use was lower among those with a graduate degree than among those with an associate degree or lower level of education. E-cigarette use was higher among those with a GED than among those with any other level of education, and e-cigarette use was lower among those with an undergraduate degree than among those with a GED, a high school diploma, or those with some college and no degree. Smokeless tobacco use was also lower among those with an undergraduate degree than those with a high school diploma (Wang et al. 2018a). For the 2013–2014 PATH Study, use of premium cigars increased as level of education increased, and use of nonpremium cigars, cigarillos, and filtered cigars was greatest among those with some college or an associate degree (Corey et al. 2017). Among pregnant women in the 2013–2014 PATH Study, 4.9% used e-cigarettes, 2.5% used hookahs, and 2.3% used cigars (Kurti et al. 2017).

Cross-sectional evidence suggests that the majority of adult e-cigarette users in the United States are either current or former cigarette smokers. Among current adult e-cigarette users in the 2017 NHIS, 49.6% were current smokers of conventional cigarettes, 33.5% were former cigarette smokers, and 17.0% had never been cigarette smokers (NHIS, public use data, 2017).

Although significant declines in cigarette smoking have occurred among U.S. adults during the past 5 decades, the use of noncigarette tobacco products has increased in recent years (USDHHS 2014; Hu et al. 2016), making cessation of all tobacco products an important measure. In addition, health risk behaviors, similar to cigarette smokers, also tend to cluster among persons who use other tobacco products. For example, an analysis of patterns of alcohol, marijuana, and tobacco use in the PATH Study revealed that co-use of alcohol, cigarettes, and e-cigarettes was one of the top five use patterns among adults 25 years of age and older (Cohn et al. 2018). In addition, among young adults (18–24 years of age), mental health and substance use problems were associated with higher odds of alcohol and hookah co-use (OR = 1.48; 95% CI, 1.03–2.13; OR = 1.97; 95% CI, 1.04–3.74, respectively) than alcohol-only use. Among adults (25 years of age and older) and compared with alcohol-only users, mental health and substance use problems were associated with higher odds of alcohol, cigarette, and e-cigarette co-use (OR = 1.55; 95% CI, 1.24–1.93; OR = 2.22; 95% CI, 1.43–3.44, respectively) and with higher odds of alcohol and cigar co-use (OR = 1.60; 95% CI, 1.20–2.14; OR = 4.64; 95% CI, 3.10–6.94, respectively) (Cohn et al. 2018).

Data from the 2017 NHIS indicated that 8.0% of adults were former users of smokeless tobacco; 11.6% were former users of e-cigarette; 12.2% were former users of pipes, water pipes, or hookahs; and 23.7% were former users of cigars, cigarillos, or little cigars (NHIS, public use data, 2017). In contrast to the measure of former cigarette smoking, former users of noncigarette tobacco products was defined as persons who ever used the product but were not currently using. The quit ratio (defined as the ratio of former smokers to ever smokers) was 92.1% for pipes, water pipes, and hookahs; 86.2% for cigars, cigarillos, and little cigars; 79.4% for smokeless tobacco; and 80.6% for e-cigarettes (NHIS, public use data, 2017). The 2014–2015 TUS-CPS also examined the use of pipes: the prevalence of former use was 5.4% for a regular pipe and 4.1% for water or hookah pipes, and quit ratios were 93.9% for those who had used a regular pipe and 87.8% for those who had used a water or hookah pipe (TUS-CPS, public use data, 2014–2015). In the 2013–2014 PATH Study, among women

15–44 years of age, prevalence of former use was 3.8% for e-cigarettes, 3.2% for cigars, 6.9% for hookah, 1.2% for pipes, and 0.4% for smokeless tobacco and snus (Lopez et al. 2018). Initial prospective longitudinal evidence from Wave 1 (2013–2014) and Wave 2 (2014–2015) of the PATH Study indicated that 48.8% of U.S. adult e-cigarette users overall at Wave 1 had discontinued their use of e-cigarettes at Wave 2 (Coleman et al. 2018). Cessation of e-cigarettes at Wave 2 decreased with increasing frequency of e-cigarette use at Wave 1. In addition, adjusted prevalence ratios indicated that e-cigarette users who also used combustible tobacco products at Wave 1 and e-cigarette users who used customizable e-cigarette devices were less likely to quit e-cigarette use at Wave 2. Among dual users of e-cigarettes and conventional cigarettes at Wave 1, 44.3% had maintained dual use at Wave 2; 43.5% had discontinued the use of e-cigarettes but maintained smoking conventional cigarettes; 7.0% had discontinued both products; and 5.1% had discontinued conventional cigarettes but continued smoking e-cigarettes (Coleman et al. 2018).

Additional longitudinal data from Kurti and colleagues (2018) from the PATH Study indicated that 1-year quit rates among nonpregnant women 18–44 years of age who were established tobacco users (i.e., used product fairly regularly in the past and currently used) were highest for users of cigars (60.6%), followed by hookah users (45.4%) and e-cigarette users (32.8%). Quit rates for users of these products were higher than the 1-year quit rate (11.5%) among women who had smoked 100 or more cigarettes in their lifetime. In separate multivariate logistic regression models containing data on both established and experimental users (used product in the past but not fairly regularly and used some days or every day at the time of the survey), experimental use was associated with increased odds of quitting e-cigarette use, hookah use, cigar use, and all tobacco use at Wave 2 compared with established use. In addition, respondents who used illicit drugs were more likely to quit e-cigarettes at Wave 2 than those who did not use these drugs, and those who belonged to a racial/ethnic group other than White, Black, or Hispanic were less likely to quit hookah use at Wave 2. Women with lower levels of education were less likely than those with higher levels of education to quit hookah use and all tobacco use. Hispanic women were more likely to quit all tobacco use than White women (Kurti et al. 2018).

Additional key cessation measures for individual tobacco products other than cigarettes generally have not been included in national surveillance systems. The 2014–2015 TUS-CPS assessed past-year quit attempts for other tobacco products, but the population for these questions was limited to persons who used only one product. The 2012–2014 NHIS included a question about trying to quit all tobacco use during the past year, and the 2013–2014 NATS included a question about interest in quitting all tobacco products. In contrast, the PATH Study has data on interest and intentions to quit all tobacco products and on quit attempts, as well as longitudinal data on quitting, as described previously (Hyland et al. 2017).

In 2012–2014, 39.8% of persons who used two or more tobacco products (cigarettes, cigars, smokeless tobacco, or pipes) had tried to quit all tobacco use during the past year (NHIS, public use data, 2012–2014) (Table 2.18). Among cigarette smokers who also used another tobacco product, the prevalence of attempting to quit all tobacco products during the past year (40.1%) was lower than the prevalence of making an attempt to quit cigarette smoking (48.9%). This lower prevalence of trying to quit all tobacco use versus cigarette smoking was also observed among men; persons 25–64 years of age, Whites, Blacks, those with 12 or fewer years of education or a high school diploma, those living at or above the poverty level, those living in the South, and those without insurance. Similarly, the PATH Study found that adult users of more than one type of combustible tobacco product were less likely to try to quit tobacco use completely during the past year than cigarette-only users (OR = 0.82, $p < 0.05$) (Kypriotakis et al. 2018).

Among those who used two or more tobacco products, the associations between having tried to quit all tobacco product use during the past year and demographic characteristics (Table 2.18) were similar to those for a past-year attempt to quit cigarette smoking (Table 2.11), except for race/ethnicity; specifically, no differences were observed among Whites, Blacks, and Asians (38.8%, 39.5%, and 43.2%, respectively) (Table 2.18). Overall, the prevalence of trying to quit cigarette smoking during the past year did not differ significantly between those who smoked cigarettes only (47.1%) and cigarette smokers who used other tobacco products (48.9%) (Table 2.18). Thus, although cigarette smokers who use other tobacco products (i.e., cigars, smokeless tobacco, and pipes) have a similar prevalence of making a past-year cigarette quit attempt to that of cigarette-only smokers, they have a lower prevalence of trying to quit all tobacco use than trying to quit cigarette smoking during the past year.

The PATH Study, using Wave 1 data, also compared past-year tobacco quit attempts among adult users of various combinations of tobacco products and observed that cigarette-only (OR = 0.59, $p < 0.01$), smokeless tobacco-only (OR = 0.39, $p < 0.001$), and polycombustible tobacco users (OR = 0.48, $p < 0.001$) were less likely to attempt to quit than those who used both e-cigarettes and hookah (Kypriotakis et al. 2018). In addition, smokeless tobacco-only users were less likely to attempt to quit than cigarette-only users (OR = 0.66, $p < 0.001$).

Table 2.18 Prevalence of a past-year quit attempt for cigarette smoking[a] and all tobacco use[b] by type of tobacco used among adult current tobacco users 18 years of age and older, by selected demographic characteristics; National Health Interview Survey (NHIS) 2012–2014; United States

	Attempted to quit cigarette smoking		Attempted to quit all tobacco use	
Characteristic	**Cigarette-only smokers: % (95% CI)**	**Cigarette smokers who used other tobacco products: % (95% CI)**	**Cigarette smokers who used other tobacco products: % (95% CI)**	**Used ≥2 tobacco products: % (95% CI)**
Total	47.1 (46.0–48.3)	48.9 (46.3–51.6)	40.1 (37.7–42.6)	39.8 (37.5–42.1)
Sex				
Male	46.0 (44.4–47.7)	47.2 (44.3–50.2)	38.7 (36.0–41.5)	38.5 (36.0–41.1)
Female	48.2 (46.6–49.7)	55.3 (48.9–61.6)	45.2 (38.4–52.1)	45.0 (38.3–51.8)
Age group (years)				
18–24	54.3 (49.5–59.2)	57.6 (51.5–63.7)	50.6 (44.2–56.9)	50.3 (44.4–56.2)
25–44	50.3 (48.6–52.0)	49.7 (46.3–53.1)	40.3 (37.1–43.4)	39.5 (36.6–42.5)
45–64	44.3 (42.7–46.0)	43.0 (38.2–47.8)	33.4 (29.0–37.7)	33.8 (29.6–38.1)
≥65	38.3 (35.3–41.3)	31.4 (23.6–39.2)	23.7 (16.8–30.7)	23.0 (16.3–29.7)
Race/ethnicity				
White, non-Hispanic	45.0 (43.6–46.4)	47.8 (44.7–50.9)	39.3 (36.4–42.3)	38.8 (36.1–41.6)
Black, non-Hispanic	52.9 (50.4–55.5)	50.3 (44.8–55.7)	38.0 (32.6–43.3)	39.5 (34.2–44.8)
Hispanic	52.5 (49.5–55.5)	60.4 (52.6–68.2)	50.1 (42.0–58.1)	49.2 (41.5–56.8)
American Indian/Alaska Native, non-Hispanic	39.7 (28.3–51.2)	—[c]	—[c]	—[c]
Asian, non-Hispanic	51.6 (45.0–58.2)	48.8 (33.1–64.5)	43.4 (28.8–57.9)	43.2 (29.2–57.3)
Multiple races, non-Hispanic	51.1 (43.5–58.7)	39.8 (26.9–52.8)	35.8 (23.0–48.6)	35.3 (22.9–47.8)
Level of education[d]				
≤12 years (no diploma)	43.6 (41.3–45.8)	45.8 (39.5–52.0)	33.1 (27.8–38.4)	33.6 (28.3–38.8)
GED certificate	47.3 (42.9–51.4)	48.9 (39.6–58.1)	43.4 (34.3–52.5)	43.4 (34.4–52.4)
High school diploma	43.8 (41.6–46.0)	40.3 (35.9–44.7)	30.2 (26.0–34.4)	31.1 (26.9–35.3)
Some college (no degree)	47.7 (45.2–50.1)	49.6 (44.3–55.0)	39.4 (34.1–44.6)	39.0 (34.0–44.0)
Associate degree	50.6 (47.4–53.9)	51.5 (39.7–63.2)	42.9 (32.9–52.9)	42.4 (33.2–51.5)
Undergraduate degree	50.8 (47.5–54.1)	45.7 (38.6–52.8)	39.6 (32.8–46.3)	35.8 (29.4–42.3)
Graduate degree	47.4 (42.3–52.4)	40.7 (28.9–52.6)	36.3 (24.9–47.7)	35.0 (24.1–45.9)
Poverty status				
At or above poverty level	46.6 (45.2–48.0)	50.4 (47.1–53.8)	41.4 (38.2–44.7)	40.7 (37.7–43.7)
Below poverty level	49.0 (46.9–51.0)	43.9 (39.3–48.5)	35.7 (31.3–40.1)	36.6 (32.3–40.8)
U.S. Census region				
Northeast	48.0 (45.2–50.8)	50.2 (44.2–56.1)	39.9 (33.7–46.0)	37.6 (32.0–43.1)
Midwest	46.8 (44.4–49.3)	49.2 (43.5–55.0)	40.7 (35.5–45.9)	40.8 (35.8–45.9)
South	47.1 (45.3–48.8)	48.7 (44.5–52.9)	39.1 (35.1–43.1)	38.6 (34.8–42.5)
West	46.7 (44.0–49.3)	48.3 (43.5–53.0)	41.2 (37.1–45.3)	41.6 (37.8–45.4)
Health insurance coverage				
Private	47.1 (45.4–48.8)	51.0 (46.5–55.4)	43.1 (38.8–47.4)	41.9 (38.1–45.8)
Medicaid and those with Medicaid and Medicare	50.8 (48.4–53.2)	48.2 (42.5–54.0)	39.2 (33.5–44.8)	38.7 (33.2–44.3)

Table 2.18 Continued

Characteristic	Attempted to quit cigarette smoking		Attempted to quit all tobacco use	
	Cigarette-only smokers: % (95% CI)	Cigarette smokers who used other tobacco products: % (95% CI)	Cigarette smokers who used other tobacco products: % (95% CI)	Used ≥2 tobacco products: % (95% CI)
Health insurance coverage (continued)				
Medicare only	36.5 (31.8–41.3)	31.2 (17.4–45.1)	24.9 (12.2–37.6)	25.7 (13.7–37.8)
Other coverage	47.3 (43.3–51.4)	47.8 (38.9–56.6)	40.0 (31.0–49.0)	39.5 (30.8–48.3)
Uninsured	46.7 (44.5–49.0)	47.4 (43.2–51.6)	36.5 (32.5–40.5)	37.2 (33.2–41.1)

Source: NHIS, National Center for Health Statistics, public use data, 2015.
Notes: **CI =** confidence interval; **GED =** General Educational Development.
[a]Current cigarette smokers who reported that they stopped smoking for >1 day during the past 12 months because they were trying to quit smoking.
[b]Current users of at least two tobacco products—cigarettes, other smoked tobacco products (including cigars, pipes, water pipes or hookahs, very small cigars, bidis, cigarillos), and smokeless tobacco (including chewing tobacco, snuff, dip, snus, dissolvable tobacco)—who reported that they stopped using all kinds of tobacco products for >1 day during the past 12 months because they were trying to quit using tobacco.
[c]Prevalence estimates with a relative standard error ≥30% are not presented due to low precision.
[d]Among only adults 25 years of age and older.

Findings using data from the 2013–2014 NATS indicated that the majority (87.2%) of U.S. adults who used cigarettes and at least one other tobacco product were thinking about quitting all tobacco products for good (NATS, public use data, 2013–2014). This percentage was significantly higher than the comparable estimate for those who used at least two noncigarette tobacco products but no conventional cigarettes, which was 52.8%.

The PATH Study also examined adult tobacco users' intentions to quit at Wave 1 and observed that both polycombustible tobacco users and smokeless tobacco users were somewhat less likely to be interested in quitting (OR = 0.92, p <001; and OR = 0.94, p <0.01, respectively) than cigarette-only smokers (Kypriotakis et al. 2018). In addition, polycombustible tobacco users were also less likely than cigarette-only smokers and smokeless tobacco-only users to respond that they planned to quit for good (OR = 0.41, p <0.001; and OR = 0.48, p <0.01, respectively).

Young Adults

Findings using data from the 2017 NHIS indicated that quit ratios for young adults (18–24 years of age) who used other tobacco products ranged from 82.7% for pipes, 79.6% for e-cigarettes, 80.6% for cigars, and 63.4% for smokeless tobacco (NHIS, public use data, 2017). According to the 2014–2015 TUS-CPS, the prevalence of former use of a regular pipe among young adults was 3.6% (significantly lower than the prevalence among all adults of 5.4%), and the prevalence of former use of a water or hookah pipe was 9.5% (significantly higher than the prevalence among all adults of 4.1%) (TUS-CPS, public use data, 2014–2015). Data from the PATH Study indicated that among women who used tobacco at Wave 1, those 18–24 years of age were more likely to quit all tobacco use at Wave 2 than those 25–44 years of age (Kurti et al. 2018).

Similar to data on adults overall, data from the 2012–2014 NHIS indicated no differences in past-year quit attempts for cigarette smoking among young adult cigarette-only smokers and cigarette smokers who used another tobacco product (i.e., cigars, smokeless tobacco, and pipes) (NHIS, public use data, 2012–2014). In contrast to data on adults overall, no significant differences were observed between the prevalence of trying to quit all tobacco products (50.6%) and trying to quit cigarettes (57.6%) among young adult cigarette smokers who also used another tobacco product (NHIS, public use data, 2012–2014).

Youth

Data from the 2017 YRBS indicate that 13.2% of students in grades 9–12 were current users (used on at least 1 day during the 30 days before the survey) of e-cigarettes; 8.0% currently smoked cigars, cigarillos, or little cigars;

and 5.5% currently used chewing tobacco, snuff, dip, snus, or dissolvable tobacco products (Kann et al. 2018). For all three types of assessed tobacco products (e-cigarettes, cigars, and smokeless tobacco products), prevalence of current use was higher among male than among female students and increased as grade level increased. The prevalence of current e-cigarette and smokeless tobacco use was higher among Whites than among Blacks and Hispanics, and higher among Hispanics than among Blacks. Whites also had a higher prevalence of current cigar use than Hispanics (Kann et al. 2018). Among students in grades 9–12 who used at least two tobacco products (cigarettes, e-cigarettes, cigar products, or smokeless tobacco) (10.5% of students), 52.7% (95% CI, 47.9–57.5) had tried to quit all tobacco product use in the past year (YRBS, public use data, 2017). The prevalence of having tried to quit using all tobacco products in the past year was higher among 12th-grade students (61.9%) than among 9th-grade students (42.0%) (YRBS, public use data, 2017).

According to 2017 data from the NYTS, 9.2% of high school students and 2.4% of middle school students reported using two or more tobacco products, and e-cigarettes were the most commonly used tobacco product among high school (11.7%) and middle school (3.3%) students (Wang et al. 2018b). However, trends in the use of different tobacco products have varied. For example, decreases in cigarette and cigar smoking during 2011–2016 were offset by increases in hookah and e-cigarette use, resulting in no significant change in any tobacco use (Jamal et al. 2017). E-cigarette use has continued to increase among U.S. youth more recently. During 2017–2018, current use of e-cigarettes among high school students rose 77.8% (from 11.7% to 20.8%) and among middle school students rose 48.5% (from 3.3% to 4.9%) (Gentzke et al. 2019). This increase resulted in a corresponding increase in overall tobacco product use among middle and high school students during 2017–2018: Current use of any tobacco product increased 38.3% (from 19.6% to 27.1%) among high school students and 28.6% (from 5.6% to 7.2%) among middle school students (Gentzke et al. 2019).

The majority of high school and middle school students who used at least two tobacco products had tried to quit all tobacco use for at least 1 day during the past year (55.9% and 62.0%, respectively) (Table 2.19). Among users who had tried to quit all tobacco products during the past year, the distribution of their number of attempts (Table 2.19) was similar to the distribution for quitting cigarettes (Tables 2.13a and 2.13b). Similarly, among those who used at least two tobacco products, the distribution of the timeframes of when they considered quitting all tobacco products (Table 2.19) was similar to the distribution for quitting cigarettes (Tables 2.13a and 2.13b).

Table 2.19 Quitting behaviors among current users of two or more tobacco products,[a] by grade in school; National Youth Tobacco Survey (NYTS) 2017; United States

Quitting behaviors	High school (grades 9–12): % (95% CI)	Middle school (grades 6–8): % (95% CI)
Tried to quit all tobacco ≥1 days during the past year	55.9 (51.5–60.4)	62.0 (51.2–72.7)
Number of times tried to quit all tobacco during the past year[b]		
1	22.7 (16.8–28.6)	15.6 (7.5–23.7)
2	16.0 (10.2–21.9)	21.9 (9.5–34.4)
3–5	24.1 (17.4–30.9)	22.8 (13.6–32.0)
6–9	12.5 (8.1–16.9)	RSE >30%
>10	24.7 (20.1–29.3)	29.0 (16.2–41.7)
Considered quitting all tobacco within		
30 days	25.3 (19.7–30.9)	43.4 (27.9–58.9)
6 months	17.9 (12.4–23.3)	RSE >30%
Not within 6 months	56.8 (49.8–63.9)	39.4 (26.5–52.3)
Tried to quit cigarettes ≥1 day during the past year	63.1 (57.2–69.0)	68.2 (58.5–78.0)

Source: NYTS, Centers for Disease Control and Prevention, public use data, 2017.

Notes: **CI =** confidence interval; **RSE =** relative standard error.

[a]Among those who used at least two of the following tobacco products: cigarettes, e-cigarettes, cigars, cigarillos, little cigars, chewing tobacco, snuff, dip, bidis, hookahs, waterpipe with tobacco, pipe filled with tobacco, snus, dissolvable tobacco products.

[b]Among those who tried to quit all tobacco products at least once during the past year.

Clinical Interventions for Smoking Cessation: Prevalence and Trends

The *Clinical Practice Guideline for Treating Tobacco Use and Dependence (Clinical Practice Guideline)* recommends that healthcare providers screen all patients for tobacco use and deliver brief advice to quit to all tobacco users at every visit (Fiore et al. 2008). The *Clinical Practice Guideline* specifically recommends following the "5 A's" model to deliver a brief cessation intervention in the primary care setting (i.e., Ask about tobacco use, Advise to quit, Assess willingness to quit, Assist by offering counseling and medication, and Arrange for follow-up). Chapter 6 of this report provides detailed information about these clinical interventions.

Two types of national data are available to track screening for tobacco use and counseling on tobacco cessation by healthcare professionals. The first type depends on abstracting medical records from a sample of visits to office-based physicians (e.g., NAMCS), which is used to assess screening for tobacco use and the provision of information on tobacco and/or prescriptions or orders for cessation medication to identified users. The second type of national surveillance data involves self-reports and includes assessment by patients of the receipt of advice to quit and the other 5 A's, use of effective counseling and medications for cessation, and the use of unproven cessation strategies (datasets include NHIS, TUS-CPS, NATS, and NYTS).

Screening for Tobacco Use and Receipt of Advice to Quit from Health Professionals

Adults

Clinical Data from Abstractions of Medical Records

Reports from NAMCS that were based on the abstraction of medical records for outpatient visits to office-based physicians showed that, in 2009–2011, adults 18 years of age and older made an estimated 2.5 billion outpatient visits. NAMCS started including a panel of community health centers in 2006, which included visits to physicians and to non-physician clinicians. Data for office-based and community health center-based physicians were included in analyses for 2009–2011. According to the review, screening for tobacco use was documented in 66.6% of the outpatient visits (average annual estimate) (Table 2.20), an increase from 62.7% during 2005–2008 (CDC 2012). Of the total documented visits in 2009–2011, 16.4% were made by current tobacco users, a decrease from 17.6% in 2005–2008. Among outpatient visits made by patients who were identified as current tobacco users in 2009–2011, 20.1% reported counseling or education was ordered or provided during their visits, a percentage that reflects no change from 2005–2008 (CDC 2012), and 3.8% received a prescription or an order for cessation medication (Table 2.20).

These estimates were similar to estimates made by screening records for visits to outpatient departments of nonfederal general and short-stay hospitals. From 2005 to 2010, screening for tobacco use occurred in 63.0% of these visits; 24.5% of visits from patients who were identified as current tobacco users included counseling on tobacco, prescriptions or orders for cessation medication, or both (Jamal et al. 2015). No significant changes in these measures occurred in hospital outpatient visits during 2005–2010 (Jamal et al. 2015).

During 2009–2011 (Table 2.20), visits to psychiatrists had a lower proportion that included screening for tobacco use (56.3%) compared with visits to general and family practitioners (69.7%) or to obstetricians and gynecologists" (69.8%). Patients who were identified as current tobacco users varied by status of health insurance, as those with Medicaid/State Children's Health Insurance Program (SCHIP)/Children's Health Insurance Program (33.9%), those who were self-payers (23.6%), and those covered by other insurance (25.3%) were more likely to be current tobacco users than those with private insurance (15.3%) or Medicare (11.8%).

For office-based outpatient visits among current tobacco users (i.e., the patient was identified as a current tobacco user during screening), the prevalence of visits that included tobacco counseling was lower among patients 18–24 years of age (14.5%) than among patients 45–64 years of age (22.1%) (Table 2.20).

Visits by tobacco users with other types of insurance (9.4%) were less likely to include counseling than were visits among persons in any of the other insurance subgroups (e.g., worker's compensation, no charge/charity). Tobacco-using patients who visited their primary care physicians were more likely to receive counseling (25.0% of their visits) than were tobacco-using patients who visited doctors who were not their primary care physicians (16.2% of visits). A similar finding was made in

Table 2.20 Receipt of screening for tobacco use, counseling, and a prescription for a cessation medication during outpatient visits to office-based physicians among adults 18 years of age and older, by patient and physician characteristics; National Ambulatory Medical Care Survey (NAMCS) 2009–2011 combined data; United States

Characteristic	Visits with screening for tobacco use[a]: % (95% CI)	Visits with current tobacco use[b]: % (95% CI)	Visits with current tobacco use and tobacco counseling[c]: % (95% CI)	Visits with current tobacco use and prescription of cessation medication[d]: % (95% CI)
Total	66.6 (64.7–68.5)	16.4 (15.4–17.5)	20.1 (17.9–22.5)	3.8 (3.1–4.7)
Sex				
Male	65.7 (63.2–68.2)	19.8 (18.4–21.2)	19.8 (17.2–22.7)	3.7 (2.9–4.7)
Female	67.2 (64.7–69.6)	14.3 (13.3–15.3)	20.4 (17.9–23.1)	4.0 (3.1–5.1)
Age (in years)				
18–24	67.2 (63.9–70.3)	17.8 (16.0–19.9)	14.5 (10.9–18.9)	—[e]
25–44	68.2 (65.7–70.7)	19.8 (18.1–21.6)	18.7 (15.9–21.8)	4.4 (3.1–6.1)
45–64	66.6 (64.0–69.1)	20.1 (18.7–21.6)	22.1 (19.2–25.2)	4.5 (3.7–5.6)
≥65	65.3 (62.7–67.9)	9.1 (8.3–9.9)	19.9 (16.5–23.8)	1.3 (0.8–2.1)
Race/ethnicity				
White, non-Hispanic	67.8 (65.4–70.1)	17.1 (16.0–18.2)	20.0 (17.4–22.9)	4.1 (3.3–5.1)
Black, non-Hispanic	61.7 (56.2–66.9)	18.2 (16.1–20.5)	23.4 (18.8–28.7)	2.8 (1.5–4.9)
Hispanic	64.3 (60.5–68.0)	11.3 (9.9–12.8)	18.5 (13.8–24.4)	—[e]
Other race/multiple race, non-Hispanic	63.8 (55.8–71.1)	11.2 (8.6–14.5)	14.1 (8.6–22.2)	—[e]
Health insurance coverage				
Private insurance	68.3 (65.8–70.7)	15.3 (14.3–16.3)	20.4 (18.0–23.0)	4.2 (3.3–5.2)
Medicare	66.3 (63.5–69.0)	11.8 (10.8–12.9)	21.3 (18.0–24.9)	3.2 (2.2–4.7)
Medicaid/SCHIP/CHIP	66.1 (61.2–70.8)	33.9 (30.3–37.6)	23.0 (17.6–29.5)	4.5 (3.0–6.7)
Self-pay	61.5 (55.9–66.9)	23.6 (20.6–27.0)	19.3 (14.8–24.8)	4.7 (3.1–7.0)
Other[f]	66.1 (60.4–71.4)	25.3 (21.4–29.5)	9.4 (6.2–14.2)	—[e]
Patient's primary care physician				
Yes	69.9 (66.8–72.8)	18.3 (16.6–20.1)	24.7 (21.4–28.9)	5.1 (3.8–6.7)
No	66.6 (64.2–68.8)	14.8 (14.0–15.8)	16.2 (14.0–18.7)	2.8 (2.2–3.5)
Physician specialty				
General or family practice	69.7 (65.9–73.2)	21.6 (19.9–23.5)	22.1 (18.9–25.7)	4.8 (3.8–6.1)
Internal medicine	67.1 (60.7–72.9)	16.2 (13.9–18.9)	27.8 (22.3–34.1)	4.1 (2.5–6.9)
Obstetrics and gynecology	69.8 (64.4–74.7)	10.6 (9.0–12.5)	16.7 (11.1–24.3)	—[e]
Cardiovascular disease	67.8 (61.7–73.4)	12.3 (10.6–14.2)	38.6 (31.7–46.1)	—[e]
Psychiatry	56.3 (49.4–63.1)	23.9 (19.6–28.8)	28.8 (19.0–41.1)	13.3 (9.9–17.7)
All other specialties	64.8 (61.7–67.8)	14.6 (13.6–15.7)	12.9 (10.5–15.8)	2.1 (1.5–3.1)
Time spent with physician				
<20 minutes	64.8 (61.9–67.7)	15.8 (14.8–16.9)	17.6 (15.3–20.1)	3.3 (2.6–4.2)
≥20 minutes	68.8 (66.4–71.1)	17.0 (15.7–18.5)	22.8 (19.9–26.0)	4.4 (3.4–5.6)

Source: NAMCS, National Center for Health Statistics, public use data, 2009–2011.

Table 2.20 Continued

Note: **CHIP =** Children's Health Insurance Program; **CI =** confidence interval; **SCHIP =** State Children's Health Insurance Program.
[a]Visits during which the status (yes, no) of current tobacco use (cigarettes, cigars, or snuff or chewing tobacco) was recorded. Denominator includes current tobacco use, no current use, unknown, and blanks.
[b]Documented visits during which current tobacco use (smoking cigarettes or cigars or using snuff or chewing tobacco) was recorded.
[c]Tobacco counseling refers to the provision of any information related to tobacco use in any form, including cigarettes, cigars, snuff, and chewing tobacco, and also includes information about exposure to tobacco in the form of secondhand smoke, smoking cessation, and the prevention of tobacco use; referrals to other healthcare providers for smoking cessation programs are also included.
[d]Cessation medications include nicotine replacement therapy (nicotine patch, gum, lozenge, nasal spray, and inhaler), bupropion, and varenicline.
[e]Prevalence estimates with a relative standard error ≥30% are not presented due to low precision.
[f]Includes response options "Worker's compensation, No charge/Charity, Other."

the examination of the 2005–2010 data on visits to hospital outpatient departments (Jamal et al. 2015). Among patients who used tobacco, those who visited cardiovascular disease specialists were more likely to receive counseling on tobacco use (38.6%) than were patients who visited general and family practitioners (22.0%), obstetricians and gynecologists (16.7%), or all other specialists (12.9%). Similar differences by type of healthcare insurance, primary care physician, and physician specialty were observed in the 2005–2008 NAMCS (CDC 2012).

Among current smokers who visited office-based physicians, the percentage of visits at which tobacco cessation medications were prescribed varied by age group. The percentage was lower for visits by those 65 years of age and older compared with those 25–44 or 45–64 years of age (Table 2.20). Outpatient visits by current cigarette smokers that included a prescription of cessation medication also varied by whether the physician was the patient's primary care physician (5.1% of visits) or was not (2.8% of visits). Visits to psychiatrists had a higher proportion with prescribed medication (13.3%) than visits to all other specialists. These differences by age and physician specialty were also observed in the 2005–2008 NAMCS (CDC 2012).

Self-Reported Data from Cigarette Smokers

According to NHIS data, in 2015, 83.9% of adult cigarette smokers saw a physician or other health professional during the past year, and among this group, 57.2% reported receiving advice to quit smoking (Table 2.21). The prevalence of smokers who received advice to quit was higher among older age groups (45–64 years of age [65.7%] and those aged 65 years of age and older [65.7%]) than among younger age groups (18–24 years of age [44.4%] and 25–44 years of age [49.8%]). Whites were more likely to receive advice to quit (60.2%) than were Asians (34.2%), American Indians/Alaska Natives (38.1%), or Hispanics (42.2%) (Table 2.21). Smokers living in the Northeast were more likely to report being advised to quit smoking (65.1%) than smokers living in the West (50.6%) or the South (55.2%). In addition, the prevalence of smokers who received advice to quit was lower in the West (50.6%) than it was in the Midwest (60.0%). Uninsured smokers were less likely to report receiving advice to quit (44.1%) than smokers with any type of insurance (range: 56.8–69.2%). There were no significant differences in receipt of advice to quit between persons identifying as lesbian, gay, or bisexual (57.7%) (Table 2.22) and those identifying as heterosexual (57.1%). These demographic differences were similar to those seen in the 2010 NHIS, although sexual orientation was not assessed prior to the 2013 NHIS (CDC 2011).

According to the 2009–2010 NATS, the prevalence of self-reported receipt of advice from a health professional to quit smoking was 65.8% among current cigarette smokers who had seen a health professional during the past year (King et al. 2013). This figure is higher than the estimate using the 2010 NHIS, in which 48.3% of current cigarette smokers and former smokers who quit during the past year reported receiving cessation advice (CDC 2011). Appendix 2.1 discusses NATS and NHIS, and Appendix 2.2 discusses methodologic features that may have contributed to this difference, including that NATS was a tobacco-focused survey that may have contributed to a social desirability bias among cigarette smokers to answer that they received cessation advice. Using data from the 2010–2011 TUS-CPS, 64.8% of current cigarette smokers reported receiving advice to quit (TUS-CPS, public use data, 2010–2011), which was similar to the estimate from the 2009–2010 NATS. Although the TUS-CPS was another tobacco-focused survey and may have been subject to social desirability bias, it is also possible that data from NHIS may underestimate the prevalence of cigarette smokers receiving advice to quit.

Also using the 2009–2010 NATS, 87.9% of current smokers who visited a health professional recalled being asked if they smoked cigarettes, and 42.6% recalled being asked if they wanted to quit (King et al. 2013). Among

Table 2.21 Prevalence of receiving a health professional's advice to quit smoking[a] and use of counseling[b] and medications[c] for cessation among cigarette smokers 18 years of age and older, by selected characteristics; National Health Interview Survey (NHIS) 2015; United States

Characteristic	Received health professional's advice to quit: % (95% CI)	Used counseling: % (95% CI)	Used medication: % (95% CI)	Used counseling and/or medication: % (95% CI)
Overall	57.2 (55.3–59.1)	6.8 (5.7–7.9)	29.0 (26.8–31.2)	31.2 (28.9–33.5)
Sex				
Men	55.2 (52.5–57.9)	5.8 (4.3–7.4)	27.0 (24.0–30.0)	29.1 (26.0–32.2)
Women	59.3 (56.6–61.9)	7.9 (6.4–9.5)	31.3 (28.2–34.3)	33.6 (30.5–36.6)
Age group (in years)				
18–24	44.4 (37.1–51.6)	—[c]	15.6 (9.5–21.7)	16.8 (10.6–23.0)
25–44	49.8 (46.6–53.0)	6.1 (4.5–7.8)	25.5 (22.2–28.7)	27.4 (24.1–30.8)
45–64	65.7 (62.9–68.4)	8.8 (6.9–11.1)	37.7 (34.0–41.4)	40.2 (36.4–43.9)
≥65	65.7 (61.4–70.0)	9.2 (5.3–13.1)	33.7 (27.7–39.7)	37.0 (31.0–43.1)
Race/ethnicity				
White, non-Hispanic	60.2 (58.0–62.4)	6.9 (5.5–8.3)	32.6 (29.8–35.4)	34.3 (31.4–37.2)
Black, non-Hispanic	55.7 (50.2–61.1)	7.6 (4.5–10.8)	25.2 (20.1–30.3)	28.9 (23.5–34.4)
Hispanic	42.2 (37.0–47.5)	5.1 (2.4–7.7)	16.6 (12.4–20.9)	19.2 (14.4–24.0)
American Indian/Alaska Native, non-Hispanic	38.1 (21.4–54.8)	—[c]	—[c]	—[c]
Asian, non-Hispanic[d]	34.2 (24.2–44.3)	—[c]	17.4 (9.4–25.4)	20.5 (12.2–28.8)
Multiple races, non-Hispanic	69.6 (59.2–80.1)	—[c]	22.1 (10.5–33.6)	24.6 (12.7–36.4)
Level of education[e]				
≤12 years (no diploma)	60.8 (56.6–65.1)	5.4 (3.1–7.6)	26.5 (21.8–31.2)	28.7 (23.8–33.6)
GED certificate	61.6 (52.4–70.7)	—[c]	30.8 (21.5–40.1)	31.4 (22.0–40.7)
High school diploma	58.1 (53.9–62.3)	7.0 (4.7–9.4)	30.3 (25.5–35.1)	33.1 (28.1–38.1)
Some college (no degree)	59.1 (55.3–63.0)	8.6 (6.0–11.1)	32.5 (28.1–36.9)	34.6 (30.1–39.2)
Associate degree	61.6 (56.4–66.8)	8.6 (5.1–12.2)	33.2 (27.4–39.0)	36.0 (29.8–42.3)
Undergraduate degree	52.6 (46.6–58.5)	7.4 (3.7–11.1)	33.2 (26.5–39.8)	35.1 (28.4–41.7)
Graduate degree	57.7 (48.5–66.8)	—[c]	32.8 (22.9–42.6)	35.9 (25.7–46.0)
Poverty status				
At or above poverty level	57.8 (55.6–60.1)	6.8 (5.6–8.1)	29.5 (27.1–31.8)	31.7 (29.2–34.2)
Below poverty level	54.7 (50.7–58.7)	6.7 (4.6–8.9)	27.0 (21.6–31.6)	29.0 (24.2–33.7)
U.S. Census region				
Northeast	65.1 (60.2–70.1)	8.2 (4.9–11.5)	34.7 (27.9–41.5)	37.6 (30.9–44.2)
Midwest	60.0 (56.1–63.9)	4.9 (3.0–6.8)	28.9 (24.9–32.8)	30.2 (26.1–34.4)
South	55.2 (52.2–58.2)	7.2 (5.3–9.0)	27.2 (23.8–30.6)	29.3 (25.7–33.0)
West	50.6 (46.9–54.4)	7.5 (5.1–9.9)	28.0 (23.1–32.8)	30.7 (25.5–35.9)
Health insurance coverage				
Private	56.8 (54.0–59.5)	6.8 (5.3–8.3)	29.9 (27.0–32.7)	32.1 (29.1–35.1)
Medicaid and dual eligibles	59.9 (55.7–64.1)	8.0 (5.3–10.7)	32.2 (27.3–37.2)	34.5 (29.3–39.6)
Medicare Advantage	66.6 (56.5–76.6)	—[c]	26.5 (15.5–37.4)	31.6 (19.7–43.4)

Table 2.21 Continued

Characteristic	Received health professional's advice to quit: % (95% CI)	Used counseling: % (95% CI)	Used medication: % (95% CI)	Used counseling and/or medication: % (95% CI)
Health insurance coverage (continued)				
Medicare only (excluding Advantage)	62.0 (51.7–72.3)	—[c]	28.5 (15.5–41.5)	35.9 (22.6–49.1)
Other coverage	69.2 (62.8–75.7)	5.2 (2.7–7.7)	34.9 (26.2–43.6)	36.0 (27.3–44.7)
Uninsured	44.1 (38.8–49.3)	4.3 (2.2–6.4)	20.0 (15.6–24.6)	21.4 (17.0–25.8)

Source: Babb and colleagues (2017).

Notes: **CI =** confidence interval; **GED =** General Educational Development.

[a]Reported receiving advice from a medical doctor, dentist, or other health professional to quit smoking or quit using other kinds of tobacco among current smokers and those who quit during the past year who saw a doctor or other health professional during the past year.

[b]Used one-on-one counseling; attended a stop-smoking clinic, class, or support group; and/or sought a telephone helpline or quitline during the past year among current smokers who tried to quit during the past year or used when stopped smoking among former smokers who quit during the past 2 years.

[c]Used nicotine patch, nicotine gum or lozenge, nicotine-containing nasal spray or inhaler, varenicline (U.S. trade name Chantix), and/or bupropion (including trade names Zyban and Wellbutrin) during the past year among current smokers who tried to quit during the past year or used when they stopped smoking among former smokers who quit during the past 2 years.

[d]Does not include Native Hawaiians or Other Pacific Islanders.

[e]Among only adults 25 years of age and older.

those wanting to quit, 78.2% were offered assistance, and 17.5% were scheduled for follow-up. Among persons who received assistance, 50.6% were provided with access to booklets, videos, websites, or other information; 37.5% were referred to a quitline, class, program, or counseling; and 57.8% received recommendations or prescriptions for cessation medication. Thus, in the 5 A's model of clinician cessation intervention, the prevalence of provider intervention was higher for asking, assessing, and assisting than for more time-comprehensive and time-intensive components, such as scheduling for follow-up.

Trends

For 2000–2015, NHIS data indicate a nonlinear (quadratic) trend in the prevalence of receiving advice to quit smoking. Among adult current cigarette smokers who had visited a healthcare professional during the past year, prevalence of receiving advice to quit smoking increased from 52.4% in 2000 to 57.0% in 2005, decreased to 48.2% in 2010, but then increased again to 57.2% in 2015 (Babb et al. 2017). These trends did not differ by sex (NHIS, public use data, 2000–2015). Similar trends were observed among Whites, Blacks, and Hispanics. However, among Asians, advice from healthcare professionals to quit decreased linearly over time, from 54.7% in 2000 to 34.2% in 2015 (NHIS, public use data, 2000–2015).

Young Adults

Clinical Data Obtained by Abstracting Medical Records

According to combined data for 2004–2010 from NAMCS, an average of 65.7% of physician visits among patients 18–21 years of age included screening for tobacco use; among these, an average of 16.1% visits were made by current tobacco users (Jamal et al. 2014). Among visits made by persons identified as current tobacco users, 19.1% received any assistance with cessation, including counseling on tobacco in the form of health education ordered or provided at the visit, a prescription or order for a cessation medication, or both.

Using 2004–2010 data from NAMCS, Jamal and colleagues (2014) examined physician visits among 11- to 21-year-old patients and found that a higher proportion of visits included screening for tobacco use among patients with private insurance (71.0%) and Medicaid or SCHIP (69.6%) than among patients with other types of insurance (59.9%). In addition, a higher proportion of visits to a patient's primary care physician included screening for tobacco use (72.7%) compared with visits with nonprimary care physicians (67.9%), and a higher proportion of visits to a pediatrician (74.7%) included tobacco screening compared with visits to general or family practitioners

Table 2.22 Prevalence of interest in quitting[a], past-year quit attempt[b], receipt of a health professional's advice to quit[c], use of counseling[d] and/or medication[e], quit ratio[f], and recent successful cessation[g] among smokers 18 years of age and older, by selected subpopulations; National Health Interview Survey (NHIS) 2015, 2017; United States

Subpopulation	Interested in quitting: % (95% CI) (2015)	Past-year quit attempt: % (95% CI) (2017)	Received health professional's advice to quit: % (95% CI) (2015)	Used counseling and/or medication: % (95% CI) (2015)	Quit ratio: % (95% CI) (2017)	Recent successful cessation: % (95% CI) (2017)
Cigarette smoking frequency[h]						
Some-day smokers	71.0 (67.4–74.7)	58.5 (54.5–62.5)	44.6 (40.2–49.0)	24.2 (19.7–28.7)	NA	NA
Daily smokers, 1–4 cpd	71.8 (65.0–78.7)	59.8 (52.0–67.6)	51.3 (43.7–59.0)	33.6 (24.4–42.7)	NA	NA
Daily smokers, 5–14 cpd	68.8 (65.6–72.0)	49.8 (46.5–53.2)	64.5 (61.1–67.8)	36.2 (31.5–41.0)	NA	NA
Daily smokers, 15–24 cpd	66.3 (62.6–70.0)	40.2 (36.7–43.7)	68.4 (64.4–72.3)	42.5 (36.5–48.4)	NA	NA
Daily smokers, ≥25 cpd	55.6 (48.1–63.2)	29.5 (22.6–36.4)	79.3 (73.1–85.6)	46.7 (32.5–60.9)	NA	NA
Usually smokes menthol[h]						
Yes	71.3 (68.1–74.5)	NA	58.6 (54.8–62.4)	32.8 (28.4–37.1)	NA	NA
No	67.3 (64.7–69.9)	NA	62.8 (60.4–65.3)	35.9 (31.6–38.7)	NA	NA
No usual type	40.0 (28.2–51.9)	NA	34.1 (21.8–46.4)	—[i]	NA	NA
Serious psychological distress						
Yes (Kessler score[j] ≥13)	67.4 (61.3–73.5)	58.2 (51.8–64.6)	70.1 (64.5–75.8)	41.6 (33.7–49.5)	40.7 (35.4–46.1)	7.2 (3.9–10.5)
No (Kessler score <13)	68.2 (66.0–70.3)	55.0 (53.1–56.9)	55.7 (53.7–57.7)	30.1 (27.8–32.5)	63.0 (61.6–64.3)	7.7 (6.7–8.8)
Chronic illness diagnosis						
Any smoking-related chronic disease[k]	67.9 (65.1–70.8)	56.5 (54.0–58.9)	67.3 (64.7–69.8)	35.4 (32.0–38.8)	65.2 (63.6–66.8)	6.8 (5.6–8.0)
Other chronic disease[l]	69.4 (66.6–72.2)	55.8 (53.3–58.3)	66.5 (64.0–69.1)	37.2 (33.6–40.7)	67.6 (66.1–69.1)	6.5 (5.0–7.9)
No chronic disease	69.3 (66.8–71.8)	56.1 (54.0–58.3)	64.8 (62.6–67.1)	36.1 (33.0–39.2)	64.8 (63.4–66.2)	6.7 (5.5–7.8)
Disability/limitation[m]						
Yes	66.4 (61.4–71.3)	54.0 (50.0–58.0)	71.8 (67.4–76.2)	39.0 (32.1–45.9)	59.4 (56.7–62.1)	5.4 (3.5–7.4)
No	66.8 (63.5–70.2)	54.6 (51.9–57.2)	53.6 (50.5–56.8)	28.5 (25.1–31.9)	62.6 (60.7–64.4)	8.4 (6.8–9.9)
Sexual orientation						
Heterosexual	68.1 (65.9–70.2)	55.4 (53.4–57.3)	57.1 (55.1–59.1)	31.7 (29.3–34.1)	62.1 (60.8–63.4)	7.5 (6.4–8.5)
Lesbian/gay/bisexual	66.7 (56.9–76.6)	54.6 (46.4–62.9)	57.7 (48.5–66.9)	14.5 (7.9–21.1)	50.6 (44.1–57.0)	—[i]

Table 2.22 Continued

Subpopulation	Interested in quitting: % (95% CI) (2015)	Past-year quit attempt: % (95% CI) (2017)	Received health professional's advice to quit: % (95% CI) (2015)	Used counseling and/or medication: % (95% CI) (2015)	Quit ratio: % (95% CI) (2017)	Recent successful cessation: % (95% CI) (2017)
Binge drinking (past month)						
Yes	70.1 (66.0–74.2)	54.8 (51.2–58.4)	53.5 (49.3–57.7)	29.9 (25.2–34.5)	51.5 (48.7–54.4)	6.4 (4.8–8.1)
No	67.2 (64.8–69.6)	55.8 (53.6–58.0)	58.8 (56.6–61.0)	32.1 (29.5–34.7)	64.8 (63.4–66.1)	8.0 (6.7–9.2)

Source: NHIS, National Center for Health Statistics, public use data, 2015, 2017; Babb and colleagues (2017).

Notes: **CI =** confidence interval; **cpd =** cigarettes smoked per day;

[a]Current smokers who reported that they stopped smoking for >1 day during the past 12 months because they were trying to quit smoking and former smokers who quit during the past year.

[b]Current smokers who reported that they wanted to stop smoking completely.

[c]Received advice from a medical doctor, dentist, or other health professional to quit smoking or quit using other kinds of tobacco among current smokers and those who quit during the past year who saw a doctor or other health professional during the past year.

[d]Used one-on-one counseling; attended a stop-smoking clinic, class, or support group; and/or sought a telephone helpline or quitline during the past year among current smokers who tried to quit during the past year or among former smokers who quit during the past 2 years.

[e]Used nicotine patch, nicotine gum or lozenge, nicotine-containing nasal spray or inhaler, varenicline (U.S. trade name Chantix), and/or bupropion (including trade names Zyban and Wellbutrin) during the past year among current smokers who tried to quit during the past year or among former smokers who quit during the past 2 years.

[f]The percentage of ever smokers who have quit smoking. Defined as the number of former smokers divided by the number of ever smokers.

[g]Having smoked during the past year but having been quit for at least 6 months at the time of the survey interview. The denominator in the prevalence calculation includes all persons who smoked during the past year (i.e., both current cigarette smokers and former smokers who reported quitting during the past year).

[h]Analysis limited to current smokers.

[i]Prevalence estimates with a relative standard error ≥30% are not presented due to low precision.

[j]The Kessler Psychological Distress Scale was developed for mental health screening in population surveys. The 10-item questionnaire is intended to yield a global measure of distress based on questions about anxiety and depressive symptoms that a person has experienced in the most recent 4-week period.

[k]Includes lung cancer, other tobacco-related cancers (bladder, cervical, colon, esophageal, kidney, larynx-windpipe, leukemia, liver, mouth/tongue/lip, pancreas, rectum, stomach, throat-pharynx, and uterine), coronary heart disease, stroke, emphysema, chronic bronchitis, asthma, diabetes, and arthritis.

[l]Includes hypertension, other heart condition or heart disease, ulcer, and cancers including blood, bone, brain, breast, gallbladder, lymphoma, melanoma, ovarian, prostate, skin (non-melanoma and other), soft tissue, testicular, thyroid, and other.

[m]Defined on the basis of self-reported presence of selected limitations, including vision, hearing, cognition, and movement. Limitations in performing activities of daily living were defined on the basis of responses to the following question: "Does [person] have difficulty dressing or bathing?" Limitations in performing instrumental activities of daily living were defined on the basis of responses to the following question: "Because of a physical, mental, or emotional condition, does [person] have difficulty doing errands alone such as visiting a doctor's office or shopping?" Any disability was defined as a "yes" response pertaining to at least one of the limitations (vision, hearing, cognition, movement, activities of daily living, or instrumental activities of daily living). Results include responses from a random sample of half of the respondents from the 2017 Person File who were asked about limitations and weights from the Family Disability Questions File.

or internal medicine physicians (68.3%), psychiatrists (62.4%), or physicians in all other specialties, except obstetrics and gynecology (65.0%). A higher proportion of visits in which preventive care was the major reason for the visit (28.9%) included cessation assistance (including counseling, medication, or both) compared with visits for other reasons (16.7%) (Jamal et al. 2014).

Data from Self-Reports of Cigarette Smokers

Among young adult current cigarette smokers (18–24 years of age), differences in the prevalence of receiving a health professional's advice to quit were similar to differences in the advice received by all adults in 2015. However, regional differences were more pronounced, as 28.6% of smokers in the South were advised to quit compared with 66.7% of smokers in the Northeast and 57.3% of smokers in the Midwest (NHIS, public use data, 2015).

Trends

Among adults 18–24 years of age, NHIS data for 2000–2015 indicated that trends in receiving advice from a provider to quit among men were similar to the quadratic trends among all adults (Babb et al. 2017), but there was no significant increase among women from 2010 (42.4%) to 2015 (42.0%) (NHIS, public use data, 2000–2015).

Youth

Clinical Data Obtained by Abstracting Medical Records

According to combined data for 2004–2010 from NAMCS, an average of 71.5% of outpatient visits by patients 11–17 years of age included screening for tobacco use; among these, an average of 3.0% outpatient visits were made by current tobacco users (Jamal et al. 2014). Among visits made by persons identified as current tobacco users, 21.8% included the receipt of any cessation assistance, including tobacco counseling in the form of health education ordered or provided at the visit, a prescription or order for a cessation medication, or both. Using 2004–2010 data from NAMCS, Jamal and colleagues (2014) examined demographic differences in the screening and provision of education and/or medication among visits by patients 11–21 years of age; these were discussed previously in the section on young adults.

Self-Reported Data

In 2015, according to data from the NYTS, 46.2% of high school students and 23.9% of middle school students who had visited a healthcare provider during the past year, were asked at any visit during that year if they had used tobacco (Tables 2.23a and 2.23b). Twelfth-grade students (54.3%) were more likely than 9th-grade students (40.6%) and 10th-grade students (41.6%) to report being asked about tobacco use. This question was not asked in the 2016 or 2017 NYTS.

According to 2017 data from the NYTS, 31.4% of high school students and 28.1% of middle school students who had smoked cigarettes during the past 30 days had been advised by a doctor, dentist, or nurse not to use tobacco. The prevalence of receiving advice to quit was similar between these students and students who used any type of tobacco (29.5% of high school students and 24.6% of middle school students) (NYTS, public use data, 2017). According to data from the 2011 NYTS, high school students who smoked on more than 19 days during the past 30 days were more likely to receive a health professional's advice to not use tobacco (54.0%) than those who smoked on 1–19 of the past 30 days (33.0%) (Schauer et al. 2014a). According to the 2013 NSDUH, 26.3% of past-30-day tobacco users 12–17 years of age were screened for tobacco use and advised to quit (Collins et al. 2017). Furthermore, males were more likely to be advised to quit than females, and Hispanics were less likely to be advised to quit than Whites.

Use of Counseling and Medications to Quit Smoking

Adults

In 2015, according to data from the NHIS, the use of cessation counseling and/or medication among current smokers who had tried to quit during the past year and former smokers who had successfully quit during the past 2 years was 31.2% (Table 2.21). In all, 6.8% had used counseling, 29.0% had used medications, and 4.7% had used both (Babb et al. 2017). Counseling services (alone or in combination) included a telephone quitline (4.1%); one-on-one counseling (2.8%); and a stop-smoking clinic, class, or support group (2.4%). Medications included the seven FDA-approved medications for smoking cessation (alone or in combination); the prevalence of medication use was 16.6% for the nicotine patch, 12.5% for nicotine gum or lozenges, 2.4% for nicotine nasal spray or inhaler, 7.9% for varenicline, and 2.7% for bupropion.

According to NHIS, in 2015, the use of effective treatment (counseling and/or medications) was lower among persons 18–24 years of age (16.8%) than in any of the other age groups (Table 2.21). In addition, prevalence of the use of counseling and/or medication was lower among smokers 25–44 years of age (27.4%) than among smokers 45–64 years of age (40.2%) or those 65 years of age and

Table 2.23a Prevalence of being asked about tobacco use[a] and being advised not to use tobacco[b] among high school students (grades 9–12) who saw a healthcare provider during the past year, by grade in school; National Youth Tobacco Survey (NYTS) 2015; United States

Characteristic	Asked about tobacco use: % (95% CI)	Current cigarette smokers advised not to use tobacco: % (95% CI)
Total	46.2 (43.6–48.8)	30.2 (28.0–32.4)
Sex		
Male	45.2 (42.2–48.2)	34.1 (27.3–41.0)
Female	47.4 (44.4–50.4)	32.9 (26.4–39.4)
Grade		
9	40.6 (36.8–44.4)	27.2 (18.9–35.5)
10	41.6 (38.2–45.0)	28.6 (19.7–37.5)
11	49.7 (46.1–53.4)	38.1 (29.8–46.3)
12	54.3 (51.5–57.2)	36.6 (28.8–44.3)
Race/ethnicity		
White, non-Hispanic	47.5 (44.2–50.8)	33.1 (27.8–38.4)
Black, non-Hispanic	45.9 (42.0–49.9)	33.5 (16.8–50.2)
Other, non-Hispanic	44.8 (40.2–49.4)	33.5 (14.9–52.1)
Hispanic	44.3 (40.5–48.1)	35.4 (24.6–46.1)

Source: NYTS, public use data, 2015.
Notes: This question was not asked in the 2016 or 2017 NYTS. **CI =** confidence interval.
[a]Being asked about tobacco use was defined as being asked at any visit to a doctor, dentist, or nurse during the past year if the student used tobacco that is smoked or put in the mouth.
[b]Being advised not to use tobacco was defined as being advised by a doctor, dentist, or nurse during the past 12 months not to use tobacco that is smoked or put in the mouth among current cigarette smokers (smoked cigarettes during the 30 days preceding the survey).

Table 2.23b Prevalence of being asked about tobacco use[a] and being advised not to use tobacco[b] among middle school students (grades 6–8) who saw a healthcare provider during the past year, by grade in school; National Youth Tobacco Survey (NYTS) 2015; United States

Characteristic	Asked about tobacco use: % (95% CI)	Current cigarette smokers advised not to use tobacco: % (95% CI)
Total	23.9 (21.9–26.0)	22.9 (21.0–24.8)
Sex		
Male	23.4 (21.2–25.5)	31.5 (17.0–46.0)
Female	24.7 (22.1–27.2)	25.6 (14.7–36.5)
Race/ethnicity		
White, non-Hispanic	24.0 (20.9–27.0)	26.5 (17.5–35.4)
Black, non-Hispanic	28.6 (24.0–33.2)	—[c]
Other, non-Hispanic	21.2 (17.4–25.0)	—[c]
Hispanic	23.5 (21.3–25.8)	—[c]

Source: NYTS, public use data, 2015.
Notes: This question was not asked in the 2016 or 2017 NYTS. **CI =** confidence interval; **RSE =** relative standard error.
[a]Being asked about tobacco use was defined as being asked at any visit to a doctor, dentist, or nurse during the past year if the student used tobacco that is smoked or put in the mouth.
[b]Being advised not to use tobacco was defined as being advised by a doctor, dentist, or nurse during the past 12 months not to use tobacco that is smoked or put in the mouth among current cigarette smokers (smoked cigarettes during the 30 days preceding the survey).
[c]Data are not shown because sample size was <50 and the relative standard error of the estimate was >30%.

older (37.0%). Hispanics used effective treatments less often than Whites (19.2% vs. 34.3%). Uninsured smokers were less likely to use effective treatments (21.4%) than were smokers who were privately insured (32.1%), had Medicaid (34.5%), or had other coverage (36.0%). Use of counseling and/or medication was also lower among lesbian, gay, and bisexual smokers than among heterosexuals (14.5% vs. 31.7%) (Table 2.22).

According to data from the 2014–2015 TUS-CPS, the prevalence of using a telephone quitline for cessation was 3.5% among current cigarette smokers who had tried to quit during the past year (Table 2.24), a figure that was quite similar to the prevalence using the 2015 NHIS for using such a quitline among current smokers who had tried to quit during the past year combined with former smokers who had quit during the past 2 years (4.1%) (Babb et al. 2017). Use of a telephone quitline by current cigarette smokers during the last time they tried to quit within the past year was higher among women (4.2%) than men (2.8%), among those 45–64 years of age (4.4%) than those aged 65 years and older (2.1%), and among those living below the poverty level (5.2%) than among those living at or above the poverty level (3.0%) (Table 2.24).

Young Adults

In 2015, according to data from the NHIS, 16.8% of young adult current smokers 18–24 years of age who had tried to quit during the past year and former smokers who successfully quit during the past 2 years used cessation counseling and/or medications (Table 2.21) (Babb et al. 2017). This included 15.6% who used only medications, but because of small numbers and low precision (relative standard error ≥30%), the percentages who used either counseling only or both counseling and medication could not be estimated (Babb et al. 2017). Regardless, both percentages were lower than those for smokers 25 years of age and older (Babb et al. 2017). The association between demographic characteristics and treatment use among young adults could not be examined using 2015 NHIS data because of small sample sizes and the low precision of estimates (relative standard error ≥30%).

Youth

In 2015, according to data from the NYTS, 17.8% of high school current cigarette smokers who had tried to quit during the past year used a program, counseling, and/or medication to quit during the past 12 months, and 69.9% reported that they had "tried to quit on my own or quit cold turkey" (Table 2.25). Among middle school students, 30.4% of current cigarette smokers used a program, counseling, and/or medication to quit, and 81.9% tried to quit cold turkey. However, caution is warranted in interpreting these results because a large proportion of middle school students reported using both a strategy to quit and quitting cold turkey, suggesting that they had different interpretations of what was meant by "quitting on their own" or quitting cold turkey.

Among high school students who were current cigarette smokers and had attempted to quit during the past year, the use of a program, counseling, and/or medication was higher among males (22.8%; 95% CI, 15.6–30.1) than females (8.9%; 95% CI, 4.2–13.6) (NYTS, public use data, 2015; not shown in Table 2.25). Estimates for other demographic characteristics were of low precision and therefore were not examined (relative standard error ≥30%).

Trends Among Adults

The prevalence among current cigarette smokers of using effective cessation treatments increased nonlinearly during 2000–2015. A significant increase was observed from 2000 (21.9%) to 2010 (31.7%), but there was no change during 2010–2015 (31.2%) (Babb et al. 2017). A similar trend was observed among women (2000, 22.4%; 2005, 32.7%; 2010, 35.1%; and 2015, 33.6%). Among men, a linear increase in the use of effective treatments was seen from 2000 (21.4%) to 2015 (29.1%) (NHIS, public use data, 2000–2015). Trends in the use of cessation aids also differed by race/ethnicity: Trends among Whites and Hispanics were similar to those for adults overall, but a linear increase was observed for Blacks (Figure 2.13). Data from Nielsen Retail Management Services showed sales of NRT gum, lozenge, and patch totaled $1.0 billion in 2018 (adjusted for inflation to 2018 dollars) (Figure 2.14). From Quarter 2 of 2014 to Quarter 4 of 2018, NRT gum had the highest sales followed by NRT lozenge and NRT patch. During this time period, sales of NRT gum increased steadily from Quarter 2 of 2014 to Quarter 4 of 2015, peaked in Quarter 2 of 2016 at $145.6 million, and then decreased through Quarter 4 of 2018 ($132.0 million). In contrast, sales of NRT lozenge increased fairly steadily from Quarter 2 of 2014 to Quarter 4 of 2018, when sales peaked at $78.2 million. Sales of NRT patch appeared to have a seasonal pattern from 2014 to 2018, as sales peaked in the first quarter of each year and then generally declined throughout the year. Sales of NRT patch peaked in Quarter 1 of 2016 ($48.3 million) but then decreased generally through 2018 despite its annual first-quarter peaks.

Trends Among Young Adults

Among young adults 18–24 years of age, trends in the use of effective cessation treatments among female smokers and White smokers were similar to trends among adults overall; but among men, use of effective cessation

Table 2.24 Prevalence of using strategies to quit cigarette smoking[a] among current cigarette smokers[b] 18 years of age and older who tried to quit during the past year, by selected characteristics; Tobacco Use Supplement to the Current Population Survey (TUS-CPS) 2014–2015; United States

Characteristic	Used telephone quitline: % (95% CI)	Used Internet or web-based program or tool: % (95% CI)	Used switching to smokeless tobacco: % (95% CI)	Used switching to cigar or pipe: % (95% CI)	Used switching to e-cigarettes: % (95% CI)
Overall	3.5 (3.1–3.9)	2.1 (1.8–2.4)	5.4 (4.8–6.0)	2.7 (2.4–3.1)	34.7 (33.6–35.7)
Sex					
Men	2.8 (2.3–3.4)	1.7 (1.3–2.1)	7.7 (6.7–8.7)	4.0 (3.3–4.6)	32.7 (31.2–34.3)
Women	4.2 (3.6–4.7)	2.5 (2.0–3.0)	3.0 (2.4–3.5)	1.5 (1.0–1.9)	36.8 (35.3–38.3)
Age group (in years)					
18–24	2.7 (1.4–4.0)	2.4 (1.1–3.6)	7.8 (5.6–10.0)	3.7 (2.2–5.1)	39.2 (35.2–43.2)
25–44	3.2 (2.6–3.8)	2.3 (1.7–2.8)	5.8 (4.8–6.7)	2.3 (1.7–2.8)	38.0 (36.3–39.8)
45–64	4.4 (3.7–5.1)	1.9 (1.4–2.4)	4.5 (3.8–5.3)	3.0 (2.4–3.6)	32.2 (30.6–33.7)
≥65	2.1 (1.2–3.0)	1.8 (1.0–2.6)	3.8 (2.5–5.1)	2.5 (1.6–3.5)	23.7 (20.7–26.7)
Race/ethnicity					
White, non-Hispanic	3.2 (2.8–3.7)	2.1 (1.7–2.5)	5.5 (4.8–6.1)	2.5 (2.0–2.9)	38.8 (37.6–40.0)
Black, non-Hispanic	4.0 (2.8–5.2)	2.3 (1.3–3.2)	4.6 (3.3–6.0)	4.0 (2.7–5.3)	23.1 (20.3–25.9)
Hispanic	4.3 (2.6–6.1)	2.2 (1.0–3.3)	4.7 (3.0–6.5)	3.0 (1.5–4.4)	22.8 (19.6–26.0)
American Indian/Alaska Native, non-Hispanic	—[c]	—[c]	—[c]	—[c]	24.5 (16.7–32.2)
Asian, non-Hispanic	—[c]	—[c]	—[c]	—[c]	25.4 (18.1–32.7)
Multiple races, non-Hispanic	—[c]	—[c]	—[c]	—[c]	50.6 (42.4–58.9)
Level of education[d]					
≤12 years (no diploma)	4.3 (3.2–5.3)	1.0 (0.6–1.5)	4.5 (3.4–5.7)	3.5 (2.4–4.5)	28.4 (25.9–31.0)
High school diploma	3.0 (2.4–3.7)	1.7 (1.2–2.2)	5.5 (4.6–6.5)	2.6 (2.0–3.2)	34.6 (32.7–36.4)
Some college (no degree)	3.2 (2.5–4.0)	2.5 (1.8–3.2)	5.9 (4.8–7.1)	2.9 (2.1–3.8)	37.8 (35.4–40.2)
Associate degree	4.6 (3.1–6.1)	2.2 (0.9–3.6)	5.2 (3.8–6.7)	2.0 (0.9–3.0)	37.7 (34.8–40.6)
Undergraduate degree	3.5 (2.2–4.8)	4.1 (2.7–5.5)	5.0 (3.4–6.6)	2.0 (0.9–3.1)	35.7 (32.3–39.1)
Graduate degree	3.1 (0.5–5.8)	3.4 (1.2–5.7)	6.2 (2.8–9.6)	3.5 (1.3–5.7)	32.4 (26.3–38.6)
Poverty status					
At or above poverty level	3.0 (2.6–3.4)	2.1 (1.7–2.5)	5.5 (4.9–6.1)	2.4 (2.0–2.8)	35.1 (34.0–36.3)
Below poverty level	5.2 (4.2–6.2)	2.1 (1.5–2.6)	5.1 (4.1–6.1)	3.9 (2.9–4.8)	33.2 (30.7–35.7)
U.S. Census region					
Northeast	3.9 (2.7–5.0)	2.3 (1.4–3.1)	4.7 (3.4–6.1)	3.0 (1.9–4.1)	32.2 (29.2–35.1)
Midwest	3.1 (2.3–3.9)	1.7 (1.2–2.3)	5.6 (4.4–6.8)	2.2 (1.5–2.8)	35.6 (33.5–37.7)
South	3.2 (2.7–3.8)	2.2 (1.6–2.7)	5.3 (4.5–6.2)	3.1 (2.4–3.7)	35.3 (33.5–37.1)
West	4.2 (3.2–5.1)	2.4 (1.6–3.2)	5.9 (4.7–7.2)	2.6 (1.7–3.5)	34.5 (31.7–37.2)

Source: TUS-CPS, National Cancer Institute, public use data, 2014–2015.

Notes: **CI =** confidence interval.

[a]Used during their last quit attempt among those who tried to quit for at least 1 day during the past 12 months.

[b]Persons who reported smoking more than 100 cigarettes during their lifetime and who, at the time of the interview, reported smoking every day or some days.

[c]Prevalence estimates with a relative standard error ≥30% are not presented due to low precision.

[d]Among only adults 25 years of age and older.

Table 2.25 Strategies used to quit smoking among high school and middle school current cigarette smokers[a] who tried to quit during the past year; National Youth Tobacco Survey (NYTS) 2000, 2004, 2009, and 2015; United States

Quitting behaviors	2000: % (95% CI)	2004: % (95% CI)	2009: % (95% CI)	2015: % (95% CI)
High school (grades 9–12)				
Used a program, counseling, and/or medication[b]	16.5 (15.0–18.0)	11.8 (9.3–14.3)	10.2 (6.7– 13.7)	17.8 (12.9–22.7)
Attended a program in my school	4.7 (3.8–5.6)	2.6 (1.2–4.0)	—[c]	—[c]
Used nicotine gum, nicotine patch, or any medicine to quit	12.2 (10.9–13.5)	8.9 (6.9–10.9)	7.8 (5.0–10.7)	10.8 (7.1–14.5)
Tried to quit on my own or quit "cold turkey"	NA	NA	NA	69.9 (58.3–81.5)
Middle school (grades 6–8)				
Used a program, counseling, and/or medication[b]	31.8 (27.8–35.9)	17.4 (13.8–20.9)	26.1 (19.4–32.7)	30.4 (18.4–42.3)
Attended a program in my school	9.9 (7.4–12.5)	3.0 (1.6–4.3)	—[c]	—[c]
Used nicotine gum, nicotine patch, or any medicine to quit	19.7 (16.4–23.0)	13.4 (10.5–16.2)	19.7 (13.1–26.2)	23.7 (13.4–33.9)
Tried to quit on my own or quit "cold turkey"	NA	NA	NA	81.9 (77.4–86.4)

Source: NYTS, Centers for Disease Control and Prevention, public use data, 2000, 2004, 2009, and 2015.
Notes: **CI =** confidence interval; **NA =** not available.
[a]Smoked cigarettes during the past 30 days.
[b]Attended a program in school or a program in the community; called a telephone helpline or telephone quitline; and/or used nicotine gum, nicotine patch, and/or any medication to quit.
[c]Prevalence estimates with a relative standard error ≥30% are not presented due to low precision.

treatments increased from 2000 (5.7%) to 2005 (15.9%) and then remained unchanged through 2015 (17.2%) (NHIS, public use data, 2000–2015). Estimates for other racial/ethnic groups are not presented because of low precision (relative standard error ≥30%).

Trends Among Youth

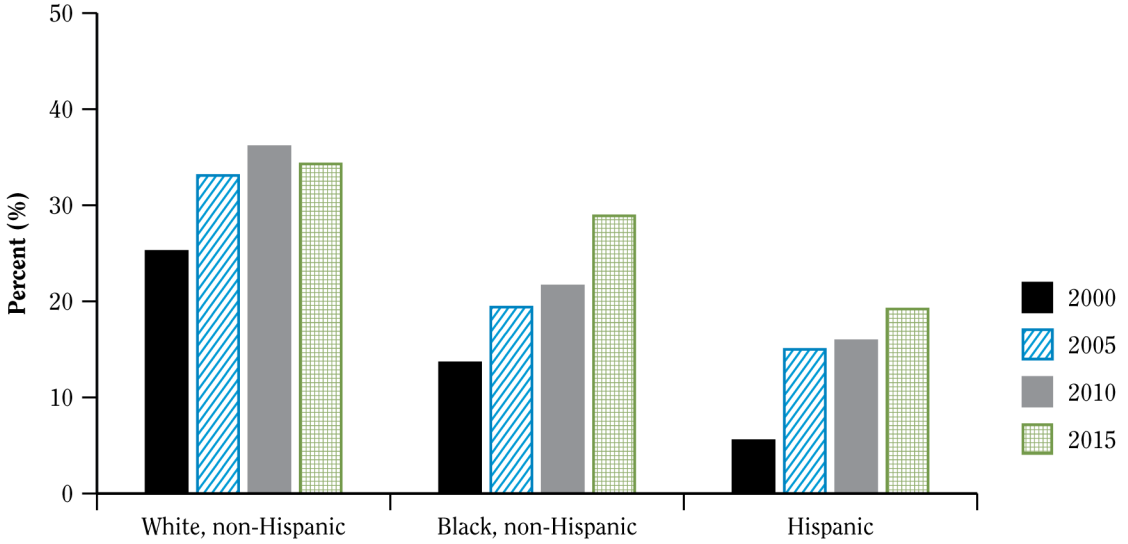
Use of cessation treatments (e.g., school or community programs, telephone quitlines, nicotine patches, nicotine gum, or any other medications) among high school and middle school students decreased during 2000–2004, and the use of cessation treatments in 2015 was similar to that seen in 2000 (Table 2.25).

Use of Other Cessation Strategies

Adults

According to the 2014–2015 TUS-CPS, among adult cigarette smokers who tried to quit smoking during the past year, switching to e-cigarettes was the most prevalent strategy (34.7%) used the last time they tried to quit (Table 2.24), despite inconclusive data on the efficacy of these products for promoting long-term cessation (see Chapter 7) (Hartmann-Boyce et al. 2016; Kalkhoran and Glantz 2016; Coleman et al. 2017; Verplaetse et al. 2018; Young-Wolff et al. 2018; Berry et al. 2019). The percentage of adult smokers switching to e-cigarettes was similar to the percentage of adult cigarette smokers (as estimated in the 2015 NHIS) who used any evidence-based cessation treatment (31.2%) (Table 2.21). According to the TUS-CPS data, switching to e-cigarettes in an attempt to quit smoking conventional cigarettes was more common among women (36.8%) than men (32.7%). Cigarette smokers younger than 45 years of age were more likely to try to quit by switching to e-cigarettes than were older smokers, and their use of e-cigarettes to try to quit was greater than their use of proven cessation treatments (Table 2.21). Whites (38.8%) and persons of multiple races (50.6%) were more likely than smokers of all other racial/ethnic groups to switch to e-cigarettes in an attempt to quit (Table 2.24), and the percentage of those who switched to e-cigarettes in an attempt to quit was

Figure 2.13 Prevalence of use of counseling or medications for cessation[a] among adult smokers 18 years of age and older, by race/ethnicity; National Health Interview Survey (NHIS) 2000–2015; United States

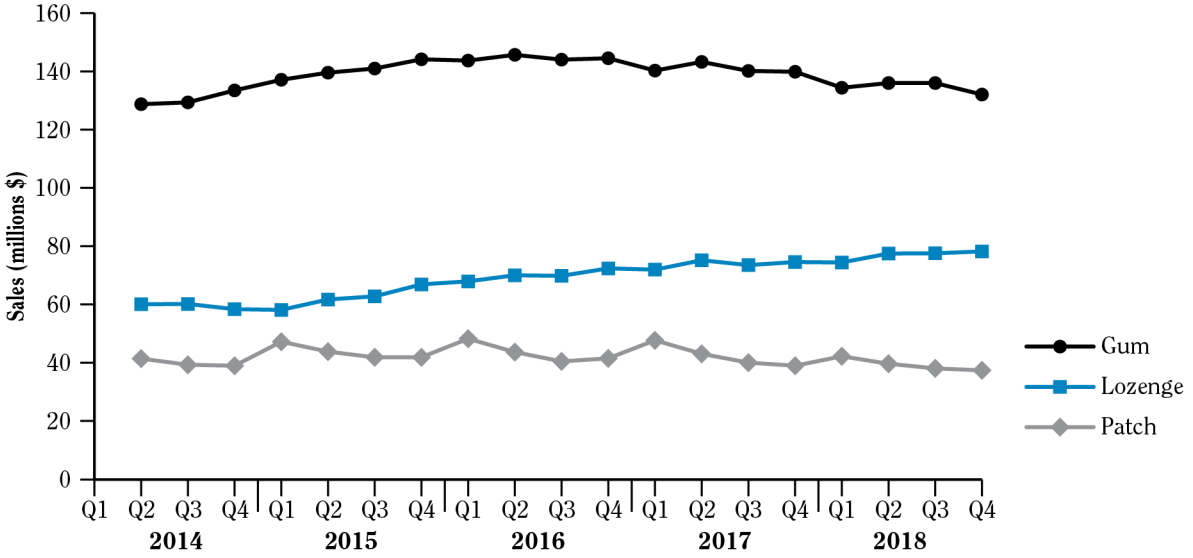


Source: NHIS, National Center for Health Statistics, public use data, 2000, 2005, 2010, and 2015.
[a]For 2010 and 2015, used one-on-one counseling; a stop-smoking clinic, class, or support group; telephone helpline or quitline; nicotine patch, nicotine gum, or lozenge; nicotine-containing nasal spray or inhaler; or varenicline (U.S. trade name Chantix) and/or bupropion (including trade names Zyban and Wellbutrin) during the past year among current smokers who tried to quit during the past year or among former smokers who quit during the past 2 years. For 2005, the list included a nicotine tablet and excluded varenicline, as that drug was not approved by the Food and Drug Administration until 2006. For 2000, the list included a stop-smoking program and excluded a stop-smoking class or support group, nicotine lozenge (not approved by the Food and Drug Administration until 2002), and varenicline.

higher than the percentage of smokers who used effective cessation treatments (Table 2.21) for both groups. Persons with 12 or fewer years of education (with no high school diploma) were less likely to switch to e-cigarettes in an attempt to quit smoking than those with higher levels of education, with the exception of those with a graduate degree (Table 2.24). The use of e-cigarettes for cessation was also a commonly reported strategy among cigarette smokers in Wave 1 of the PATH Study: 25.2% reported using e-cigarettes to quit, and 23.5% reported using an FDA-approved cessation medication—NRT (18.7%), varenicline (5.7%), or bupropion (3.1%) (Benmarhnia et al. 2018). Similar to the TUS-CPS, younger (18–34 years of age) cigarette smokers in the PATH Study who were trying to quit had a higher prevalence of using e-cigarettes as a cessation aid than those 35 years of age and older (Benmarhnia et al. 2018). In their analysis of data from the PATH Study, Harlow and colleagues (2018) observed that, among cigarette-only smokers at Wave 1, Whites, persons with greater than a high school education, and persons living at or above 200% of the poverty level were more likely to become exclusive e-cigarette users at Wave 2 than Blacks and Hispanics, persons with a high school education or GED, and persons living below the poverty level, respectively. Whites were also more likely than Blacks and Hispanics to become dual users of e-cigarettes and cigarettes at Wave 2, and Whites were more likely to have quit conventional cigarettes (with no uptake of e-cigarettes) than Blacks at Wave 2. Persons with greater than high school education and those living at or above 200% of the poverty level were also more likely to quit conventional cigarettes (with no uptake of e-cigarettes) than those with lower levels of education and persons with less income, respectively.

According to 2013–2014 data from the NATS, among former smokers who quit during the past year and had ever used e-cigarettes, 45.9% had completely switched to e-cigarettes from conventional cigarettes at some time during the past 12 months (NATS, public use data, 2013–2014). Among the recent former smokers who reported having switched to e-cigarettes during the past year, 66.0% were current e-cigarette users (NATS, public use data, 2013–2014). In contrast, among recent former smokers who had ever used e-cigarettes but did not report switching to e-cigarettes during the past year, just 13.4% were current e-cigarette users (NATS, public use

Figure 2.14 Quarterly, inflation-adjusted[a] dollar sales of over-the-counter nicotine replacement therapy, by type; Quarter 2, 2014–Quarter 4, 2018; United States



Source: FDA CTP's licensed Nielsen Retail Measurement Services data.
Note: Nielsen Retail Measurement Services data, including projected sales from expanded all outlet combined and convenience stores. Types of outlets include food and grocery stores, drug stores, mass merchandizers, club stores, dollar stores, military commissaries, and convenience stores. Data do not include food stores with annual sales volume <$2 million, certain specialty food stores, drug stores with annual volume <$1 million, certain club stores, certain dollar stores, and Internet sales (including those from point-of-sale retailers). Data do not include the category of "other" NRT, which represented 0.07% of sales during this period. Nielsen did not participate in the data analysis, summary, or interpretation. **CTP =** Center for Tobacco Products; **FDA =** U.S. Food and Drug Administration; **NRT =** nicotine replacement therapy.
[a]Adjusted to 2018 dollars using data from the Bureau of Labor Statistics on the Consumer Price Index for all items.

data, 2013–2014). In their analysis of data from the PATH Study, Harlow and colleagues (2018) found that cigarette smokers at Wave 1 who reported new use of e-cigarettes at Wave 2 had almost the same prevalence of quitting cigarettes from Wave 1 to Wave 2 (8.06%) as those who did not begin using e-cigarettes at Wave 2 (8.42%). However, using multivariate logistic regression models, Berry and colleagues (2019) found that adult cigarette smokers who initiated daily e-cigarette use at Wave 1 had 7.88 times the odds of having quit cigarette smoking at Wave 2 than those who did not use e-cigarettes. In contrast, adult cigarette smokers who initiated experimental e-cigarette use (current e-cigarette use but no regular use) were less likely to quit cigarette smoking than those who were not using e-cigarettes (OR = 0.51; 95% CI, 0.26–1.00). Similarly, findings from Wave 1 to Wave 2 of the PATH Study indicated that cigarette smokers who were daily e-cigarette users at Wave 1 had higher odds of quitting cigarette smoking at Wave 2 (OR = 1.56; 95% CI, 1.12–2.18) than never e-cigarette users. But among men, former cigarette smokers who were daily or nondaily e-cigarette users at Wave 1 were more likely than men who were never e-cigarette users to relapse to cigarette smoking at Wave 2 (OR = 2.96; 95% CI, 1.49–5.86 and OR = 3.05; 95% CI, 1.29–7.17, respectively) (Verplaetse et al. 2018).

According to the 2014–2015 TUS-CPS data, more cigarette smokers reported switching to e-cigarettes (31.2%) in an attempt to quit than switching to smokeless tobacco (5.4%), switching to cigars or pipes (2.7%), or using the Internet or a web-based program or tool (2.1%) (Table 2.24). The estimate for switching to smokeless tobacco in an attempt to quit cigarette smoking is similar to that from the 2013–2014 NATS, where 4.9% of former cigarette smokers who had quit during the past year had switched to smokeless tobacco to quit smoking (NATS, public use data, 2013–2014). According to data from the 2014–2015 TUS-CPS, higher percentages of men than women switched to cigars or pipes in an attempt to quit (4.0% vs. 1.5%) or switched to smokeless tobacco in an attempt to quit (7.7% vs. 3.0%) (Table 2.24). Also, 18- to 24-year-old smokers were more likely to switch to smokeless tobacco in an attempt to quit than smokers who were 45 years of age and older. In addition, persons living below the poverty level were more likely to switch to cigars or

pipes (3.9%) in an attempt to quit than those living at or above the poverty level (2.4%). Finally, smokers with an undergraduate degree (4.1%) were more likely to use the Internet for help with cessation than those with a high school education or less.

Although the estimate for use of specific Internet or web-based programs or tools for quitting smoking was low (2.1%) in the 2014–2015 TUS-CPS (Table 2.24), according to the 2017 HINTS, 43.7% of current cigarette smokers who were 18 years of age and older and were Internet users had used the Internet during the past 12 months to look for information about quitting smoking. Of note, the HINTS did not ask whether they used specific Internet programs or tools in their quit attempt (Graham and Amato 2018).

Data from the 2010–2011 TUS-CPS assessed different cessation strategies from those described above for the 2014–2015 version. According to the 2010–2011 TUS-CPS, the most common cessation strategy among smokers who had tried to quit during the past year was trying to quit abruptly (78.0%), followed by gradually reducing consumption (43.0%) and receiving help from friends and family (32.4%) (Schauer et al. 2015). In the 2013–2014 PATH Study, the three most prevalent cessation methods among current smokers who tried to quit in the past 12 months and former smokers who quit during the past 12 months were unaided quit attempts (i.e., no reported use of support or cessation strategy) (47.1% and 47.7%, respectively), support from friends and family (18.7% and 16.5%, respectively), and use of other tobacco products (18.3% and 24.8%, respectively) (Rodu and Plurphanswat 2017).

Young Adults

According to the 2014–2015 TUS-CPS, the prevalence of young adults' (18–24 years of age) use of other cessation strategies, including switching to another tobacco product and using the Internet, was similar to the estimates for adults overall (Table 2.24). Similar to the case with adults overall, no differences in use were observed by race/ethnicity and geographic region among young adults; however, estimates were of low statistical precision for other cessation strategies among young adults, and e-cigarette use could not be examined by poverty status because estimates were of low precision (relative standard error ≥30%) and statistically unstable (TUS-CPS, public use data, 2014–2015). In contrast to findings for all adults (Table 2.24), the prevalence of switching to e-cigarettes in an attempt to quit cigarette smoking among young adults did not differ by sex (men: 38.7%; 95% CI, 33.1–44.3; women: 39.8%; 95% CI, 33.8–45.8) (TUS-CPS, public use data, 2014–2015).

Youth

Unlike surveillance systems for adults, surveillance systems that focus on youth do not assess whether cigarette smokers in that age group who were trying to quit during the past year had switched to another tobacco product. However, in the 2017 NYTS, among youth who had ever used e-cigarettes, an estimated 5.3% of middle school students (grades 6–8) and 5.6% of high school students (grades 9–12) reported one of the reasons they had used e-cigarettes was to try to quit using other tobacco products (NYTS, public use data, 2017).

Key Disparities in Cessation Among Adults

In addition to the disparities in key measures of cessation by age, race/ethnicity, geographic region, status of health insurance, and sexual orientation that were described previously, important disparities exist by the amount and frequency of cigarette smoking and other health-related and demographic factors (Babb et al. 2017).

With regard to the frequency of cigarette smoking, in 2015, current daily smokers who smoked >25 cigarettes per day had a lower prevalence of being interested in quitting (55.6%) than current some-day smokers (71.0%) and daily smokers of 1–14 cigarettes per day (daily, 1–4 cigarettes per day: 71.8%; daily, 5–14 cigarettes per day: 68.8%) (Table 2.22). In addition, in 2017, current daily smokers who smoked >25 cigarettes per day had a lower prevalence of a past-year quit attempt (29.5%) than some-day smokers (58.5%) and daily smokers of lesser amounts (daily, 1–4 cigarettes per day: 59.8%; daily, 5–14 cigarettes per day: 49.8%; daily, 15–24 cigarettes per day: 30.2%). In contrast, in 2017, both the prevalence of having received advice to quit and use of counseling and/or medication for cessation increased with the frequency and amount of smoking. Current some-day smokers had the lowest prevalence of using counseling and/or medications (24.2% vs. 46.7% for daily smokers who smoked 25 or more cigarettes per day), a finding likely related to (a) their lower prevalence of receiving advice from a health professional and (b) the lack of evidence for medication utilization by some-day smokers (Fiore et al. 2008).

Persons who had serious psychological distress, a smoking-related chronic disease, or a disability/limitation were more likely to receive a health professional's advice to quit than those without these conditions (70.1% vs. 55.7%, 67.3% vs. 64.8%, and 71.8% vs. 53.6%, respectively) (Table 2.22). This may be because such persons have more

contact with the healthcare system and because quitting could improve, or avoid exacerbating, conditions that are related to smoking. Those who had serious psychological distress or a disability/limitation were more likely to use cessation treatments than those without such conditions (41.6% vs. 30.1% and 39.0% vs. 28.5%, respectively).

Disparities also exist in rates of quitting smoking while pregnant. In a study based on birth certificates, which included 46 states and the District of Columbia, 10.9% of women who gave birth in 2014 smoked during the 3 months before pregnancy (Curtin and Mathews 2016). Of these women, 24.2% reported smoking no cigarettes during each trimester of pregnancy and thus presumably quit before becoming pregnant, and 20.6% of women who smoked in the first or second trimesters quit by the third trimester. By level of education, cessation during the 3 months before pregnancy was lowest among those with less than a high school education (14.1%) and highest among those with a bachelor's degree or more education (53.7%). By insurance status, cessation was lowest among those with Medicaid insurance or who self-paid (18.9% and 17.3%, respectively) and highest among those with private insurance (38.3%). In addition, Asian women cigarette smokers were more than twice as likely to quit during the 3 months before their pregnancy (45.0%) as American Indian or Alaska Native women (21.8%). In an analysis of data from the PATH Study, Kurti and colleagues (2018) observed that, among nonpregnant women, 18–44 years of age who used tobacco at Wave 1 and became pregnant at Wave 2, 98.3% had quit hookah use, 88.0% had quit cigar use, 81.3% had quit e-cigarette use, and 58.7% had quit any tobacco use. The prevalence of quitting hookah, cigars, and e-cigarettes was higher than the prevalence of quitting cigarettes (53.4%).

Residing in a rural or nonmetropolitan area as opposed to an urban area or a metropolitan area is also associated with cessation-related disparities. According to the 2017 BRFSS, the quit ratio (see the "Quit Ratio" section earlier in this chapter) and the prevalence of a past-year quit attempt were significantly lower among cigarette smokers who lived in micropolitan (54.8% and 61.1%, respectively) and rural (54.8% and 62.2%, respectively) counties than among those who lived in large fringe (62.8% and 66.2%, respectively) or large central metropolitan areas (59.9% and 68.2%, respectively) (Table 2.26). Quit ratios were also lower among persons in micropolitan and rural counties than among those in small and medium metropolitan counties, and prevalence of a past-year quit attempt was also lower among persons in micropolitan counties than among those in medium metropolitan counties. In addition, recent successful cessation was significantly higher among persons living in large metropolitan fringe areas (5.9%) compared with those living in micropolitan (4.3%) counties.

Table 2.26 Percentage of ever cigarette smokers 18 years of age and older who quit smoking (quit ratio)[a] and prevalence of recent successful cessation[b] and a past-year quit attempt,[c] by urban or rural status; Behavioral Risk Factor Surveillance System (BRFSS) 2017; United States

	Quit ratio: % (95% CI)	Recent successful cessation: % (95% CI)	Past-year quit attempt: % (95% CI)
Overall	59.3 (58.8–59.8)	5.3 (5.0–5.7)	65.5 (64.7–66.2)
Large metropolitan center	59.9 (58.6–61.1)	5.8 (5.0–6.7)	68.2 (66.5–69.9)
Large fringe metropolitan	62.8 (61.8–63.8)	5.9 (5.2–6.7)	66.2 (64.7–67.6)
Medium metropolitan	59.4 (58.5–60.3)	5.1 (4.6–5.8)	65.3 (63.9–66.6)
Small metropolitan	57.5 (56.3–58.7)	5.1 (4.5–5.9)	63.8 (62.0–65.6)
Micropolitan	54.8 (53.6–56.1)	4.3 (3.6–5.1)	61.1 (59.4–62.9)
Noncore	54.8 (53.4–56.2)	4.5 (3.8–5.3)	62.6 (60.7–64.5)

Source: BRFSS, Centers for Disease Control and Prevention, public use data, 2017.

Notes: **CI =** confidence interval. A metropolitan statistical area is defined as a group of counties that contain at least one urbanized area of 50,000 or more inhabitants. A micropolitan statistical area is defined as a group of counties that contain at least one urban cluster of at least 10,000 but less than 50,000 inhabitants.

[a]Quit ratio is calculated as the proportion of current smokers who reported having stopped smoking for >1 day during the past year because they were trying to quit smoking, and former smokers who quit smoking during the past year (numerator), among all current and former smokers who only quit in the past year (denominator).

[b]The percentage of former smokers who quit smoking for >6 months during the past year among current smokers and former smokers who quit during the past year.

[c]Current smokers who reported that they stopped smoking for >1 day during the past 12 months because they were trying to quit smoking and former smokers who quit during the past year.

Summary of the Evidence and Implications

In the United States, 61.7% of adults who have ever been a cigarette smoker have now quit, highlighting the marked progress in smoking cessation observed in this chapter. Among adults, past-year quit attempts and recent (i.e., recent successful cessation) and longer term (i.e., quit ratio) cessation measures have increased over the past 2 decades. Nevertheless, survey data indicate that several subpopulations—including those with less education, racial/ethnic minorities, and those who are older in age—are less likely to try to quit each year than those in the general population. These disparities, in turn, may be affected by other variables, such as receiving advice from a health professional to quit smoking, using evidence-based resources, and patterns and frequency of cigarette smoking.

Disparities across cessation-related variables existed by level of educational attainment, which is closely correlated with income, poverty, overall socioeconomic status, status of health insurance, and geographic location. Notably, smokers with the lowest levels of education (<12 years or GED certificate) had significantly lower quit ratios compared with smokers with the highest levels of education (undergraduate or graduate degree).

These socioeconomic disparities also may be partly explained by emerging geographic disparities, given that rural populations, who tend to have lower socioeconomic status (U.S. Department of the Census 2016), have lower quit ratios and a lower prevalence of recent successful cessation than metropolitan populations, despite having a similar prevalence of past-year quit attempts. In addition, quit ratios and the prevalence of recent successful cessation and past-year quit attempts vary widely across U.S. states and territories. These variations might be linked to differences in state and local tobacco control policies, healthcare coverage and policies, and historical relationships of resident populations with tobacco (e.g., growers of tobacco). Tobacco growing, pervasive tobacco advertising and marketing (e.g., sponsorships of rodeos and auto races), and more prevalent exposure to secondhand smoke in public and private settings may also be influential environmental factors that make quitting more difficult among rural residents compared with urban residents (Chaloupka et al. 2002; Roeseler et al. 2010; USDHHS 2011; Vander Weg et al. 2011). Rural areas may also have fewer resources, including a more limited capacity to implement comprehensive tobacco control programs (American Lung Association 2012).

Persons of lower socioeconomic status, including lower levels of education, have a higher incidence of lung cancer and other tobacco-related diseases than persons in higher socioeconomic groups (Clegg et al. 2009; Singh et al. 2011), making persons of lower socioeconomic status a critical population for treating nicotine dependence. Challenges to quitting smoking among this subpopulation may include heavier patterns of cigarette smoking and earlier initiation (Siahpush et al. 2010; Ham et al. 2011). In addition, predatory marketing by the tobacco industry, reflected in part by an increased density of retail outlets and more retail and point-of-sale promotions in low-income areas, may contribute to an environment that is challenging for successful cessation (Brown-Johnson et al. 2014; Center for Public Health Systems Science 2014, 2016).

Disparities also exist by race/ethnicity. For example, Black adult smokers have a higher prevalence of past-year quit attempts than White adult smokers. However, prevalence of recent successful cessation does not vary by race/ethnicity, suggesting that a higher percentage of Black adults are trying to quit cigarette smoking than White adults but are less successful. This may also be reflected in the lower quit ratio among Blacks compared with Whites. The use of menthol cigarettes may play a role in this disparity, as Black smokers are more likely to use menthol cigarettes than other racial/ethnic groups (Giovino et al. 2015); however, research findings on the relation between menthol use and successful cessation are mixed (Delnevo et al. 2011; Levy et al. 2011; Keeler et al. 2017). Although data presented in this chapter show that Blacks who smoke menthol cigarettes are just as likely to try to quit smoking as those who do not smoke menthol cigarettes (Table 2.12), menthol use might increase dependence on nicotine and make quitting more difficult (Hoffman and Simmons 2011). In addition, similar to targeting populations with low socioeconomic status, predatory marketing by the tobacco industry is common in geographic areas with large numbers of Black residents, which may negatively influence cessation (Yu et al. 2010; Richardson et al. 2015; Alexander et al. 2016).

Age is another demographic factor with pronounced cessation disparities. To date, both past-year quit attempts and recent successful cessation decrease as adult cigarette smokers' ages increase. Although quitting smoking at any age is beneficial, smokers who quit by the time they are 35–44 years of age avoid most of the risk of dying from a smoking-related disease (Doll et al. 2004; Jha et al. 2013). Continued public health strategies that specifically target adults 45 years of age and older are needed to increase quit attempts, given the inverse relationships between age and both quit attempts and the prevalence of recent successful cessation. In addition, among youth, trends in past-year

quit attempts have remained stable or slightly declined, depending on the data source. More research is needed to better understand how the growing use of other tobacco products will affect cigarette smoking cessation and to assess cessation from other tobacco products that youth and young adults are using regularly.

Factors contributing to the previously noted disparities could also be affected by a health professional's advice to quit tobacco and by the use of evidence-based cessation approaches, such as counseling and medication. For example, receiving advice from a health professional to quit smoking and using evidence-based cessation resources increased from 2000 to 2015; however, 42.8% of cigarette smokers who saw a healthcare professional during the past year did not receive advice to quit, and less than one-third (31.2%) of cigarette smokers who tried to quit during the past year used evidence-based cessation resources. Cigarette smokers younger than 45 years of age were less likely than older cigarette smokers to be advised to quit or to use an evidence-based cessation treatment. One potential explanation for these findings is that young adult cigarette smokers are more likely than older smokers to be some-day smokers (also called intermittent or nondaily smokers) and light daily smokers (smoking <5 cigarettes per day) (Babb et al. 2017).

Data presented previously in this chapter suggest that light daily and some-day smokers are among the most interested in quitting, and they have the highest prevalence of past-year quit attempts. Nevertheless, many do not consider themselves to be smokers (Levinson et al. 2007; Smith et al. 2012) and, thus, may not be identified as a smoker by clinical screening. Furthermore, light daily and nondaily smokers may be able to abstain from cigarettes on some days but continue smoking on other days. As discussed in Chapter 6, existing clinical guidance concludes that there is insufficient evidence for the use of pharmacotherapy to assist with cessation in light smokers (Fiore et al. 2008). Given these challenges and the increasing prevalence of some-day and light daily smokers, new approaches may be needed to help persons in these subgroups quit successfully.

Clinical interventions may also play an important role in helping youth quit smoking cigarettes. Although screening for tobacco use among 11- to 17-year-olds is fairly high in ambulatory care settings (71.5%), only approximately 20% of tobacco users were provided assistance for tobacco cessation (Jamal et al. 2014). The 2008 update of the *Clinical Practice Guideline on Treating Tobacco Dependence* recommends that clinicians provide counseling interventions to aid youth smokers in quitting (Fiore et al. 2008). Far less is known about how to help youth quit compared with how to help adults, and use of effective cessation strategies is lower among youth than adults (Fiore et al. 2008). Because many youth, like the young adults discussed previously, are some-day smokers, more research is needed on how to address these occasional users and on effective and appropriate clinical interventions for youth overall.

Data presented in this chapter suggest that fewer than 2 of every 3 of adult smokers who saw a healthcare provider in the past year were advised to quit smoking, fewer than 1 of every 3 reported using cessation medications to help them quit, and fewer than 1 of every 10 reported using counseling. Taken together, these findings reinforce the need for the implementation of additional public health interventions that aim to increase cessation counseling in clinical settings and the number of quit attempts among adults and youth (Fiore et al. 2008; The Community Guide 2014).

Encouraging and helping tobacco users to quit remains the quickest approach to reducing tobacco-related disease, death, and healthcare costs (Institute of Medicine 2007), including through both individual (see Chapter 6) and population-based (see Chapter 7) interventions. However, as is noted in this chapter, use of tobacco cessation resources among persons who use tobacco remains low: among adults, 18 years of age and older, only 29.0% used cessation medication, just 6.8% used any counseling, and only 4.1% used a telephone-based quitline, which is a freely available resource in all states (see Chapter 6). Use of counseling and/or medication was lower among young adults (16.6%) than among all adults (31.2%) (Babb et al. 2017). To further increase cessation among adults and youth, public health efforts can continue the aforementioned strategies and encourage healthcare providers to consistently identify smokers, advise them to quit, and offer them cessation treatments (Fiore et al. 2008; U.S. Preventive Services Task Force 2015). Nevertheless, it is also important to recognize that a majority of cigarette smokers who quit do so without using evidence-based treatments. As is described in Chapter 6, identifying ways to continue to promote quit attempts to help cigarette smokers in quitting, even among those who do not intend to use treatment or are not interested in using treatment, is still needed. Furthermore, continuing to include questions in population-based surveys to assess (a) the prevalence of tobacco screening and interventions and (b) the proportion of smokers who use cessation counseling and medication is needed for ongoing tracking of smokers' engagement with evidence-based treatments that can improve the odds of quitting and staying quit.

Importantly, this chapter's review of epidemiologic data focused on cigarette smoking because measures of other tobacco product use and cessation are limited. Therefore, many of the analyses centered on cigarettes may underestimate the impact that the use of other tobacco

products, such as little cigars and e-cigarettes, has on tobacco cessation. Although limited national surveillance data are available on cessation of noncigarette tobacco products, survey data indicate that adult cigarette smokers who use cigars, smokeless tobacco, and/or pipes are less likely to try to quit all tobacco products than to try to quit cigarette smoking; however, this is not the case among young adult cigarette smokers, who are as likely to try to quit all tobacco products as they are to try to quit cigarette smoking (NYTS, public use data, 2017). Polytobacco use, which is the use of two or more tobacco products, is now common (3.7% in 2017) (Wang et al. 2018a), especially among youth and young adults (USDHHS 2014), and e-cigarettes have been the most prevalent tobacco product used among middle and high school students since 2014 (Wang et al. 2018b). Therefore, enhanced national surveillance of both use and cessation of these tobacco products is warranted (USDHHS 2014), Since the PATH Study is a nationally representative, longitudinal cohort study of adults and youth 12 years of age and older, it will continue to contribute key information on patterns of use of these tobacco products, including initiation, cessation, relapse, and transitions between tobacco products (Hyland et al. 2017; Coleman et al. 2018; Kurti et al. 2018; Kypriotakis et al. 2018; Lopez et al. 2018). However, comprehensive surveillance of all of the diverse tobacco products being used by the American public is essential to effectively inform tobacco control policies, planning, and practices.

In addition, continued surveillance of the use of switching to other tobacco products by smokers who are trying to quit cigarettes is needed. Switching to smokeless tobacco and cigars as a quit strategy is relatively uncommon (see "Other Tobacco Products: Use and Cessation" in this chapter). However, switching to e-cigarettes in an attempt to quit cigarette smoking (34.7% in 2014–2015) was as popular a cessation strategy among those who tried to quit during the past year as was the use of counseling and/or the seven FDA-approved smoking cessation medications (31.2% in 2015) (Fiore et al. 2008; Babb et al. 2017), even though the efficacy of using e-cigarettes for smoking cessation is inconclusive. For example, switching to e-cigarettes in an attempt to quit cigarette smoking is the most prevalent cessation strategy among all demographic groups, despite the lack of clear evidence for the long-term effectiveness and safety of e-cigarettes as a cessation approach (Hartmann-Boyce et al. 2016; Kalkhoran and Glantz 2016). More research is needed to better understand the patterns of usage of noncigarette products and their relationship with quitting cigarettes and all tobacco use. In addition, research is needed to understand long-term outcomes among cigarette smokers who report switching to noncigarette products to quit cigarette smoking, including dual usage, the substitution of noncigarette products use for cigarette smoking, and the potential use of noncigarette products as temporary cessation aids with eventual cessation of all tobacco use. The findings on the use of switching to another tobacco product to quit conventional cigarettes underscore the pressing need to (a) consider more effective and efficient ways to reach smokers with evidence-based cessation support and (b) continue to research the efficacy of emerging strategies to reduce combustible tobacco use.

Conclusions

1. In the United States, more than three out of every five adults who were ever cigarette smokers have quit smoking.

2. Past-year quit attempts and recent and longer term cessation have increased over the past 2 decades among adult cigarette smokers.

3. Marked disparities in cessation behaviors, such as making a past-year quit attempt and achieving recent successful cessation, persist across certain population subgroups defined by educational attainment, poverty status, age, health insurance status, race/ethnicity, and geography.

4. Advice from health professionals to quit smoking has increased since 2000; however, four out of every nine adult cigarette smokers who saw a health professional during the past year did not receive advice to quit.

5. Use of evidence-based cessation counseling and/or medications has increased among adult cigarette smokers since 2000; however, more than two-thirds of adult cigarette smokers who tried to quit during the past year did not use evidence-based treatment.

6. A large proportion of adult smokers report using non-evidence-based approaches when trying to quit smoking, such as switching to other tobacco products.

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Chapter 2 Appendices

Appendix 2.1: Sources of Data

Data summarized in this chapter come from two national surveys, the National Health Interview Survey (NHIS) and the National Youth Risk Behavior Survey (YRBS) (Table 2.1), which are described below. After descriptions of NHIS and YRBS, brief summaries of other national surveys that provided limited information for this chapter are provided.

National Health Interview Survey

NHIS, a multipurpose survey conducted by the National Center for Health Statistics of the Centers for Disease Control and Prevention (CDC), is the principal source of information on the health of the civilian, noninstitutionalized population of the United States. NHIS has been conducted continuously since 1957. Questions on smoking have been included in selected survey years since 1965, and detailed items allowing classification by race/ethnicity have been included since 1978. Information on quit attempts among all cigarette smokers has been assessed since 1991. Detailed questions on tobacco use cessation are included in a CCS to NHIS, which was initiated in 1987 and subsequently conducted in 1992, 2000, 2005, 2010, and 2015, with relatively consistent questions on cessation included from 2000 to 2015. Face-to-face interviews are used to collect confidential data from a representative sample of the population using the place of residence of individual respondents.

The sampling plan follows a multistage area probability design that permits the representative sampling of households and noninstitutional group living quarters (e.g., college dormitories) in all 50 states and the District of Columbia. Non-Hispanic African American or Black, Hispanic or Latino, and Asian persons were oversampled during 2006–2015. For each family included in NHIS, one sample child (younger than 18 years of age) and one sample adult are randomly selected, and information on each is collected. For children and those adults not capable of doing so, information is provided by a knowledgeable adult family member. Since 1974, only self-reports of cigarette smoking and use of other tobacco products have been used, and thus no proxy data have been used since that year on questions of importance to this report. Since 1997, NHIS has been conducted using computer-assisted personal interviewing by interviewers from the U.S. Census Bureau; sampling and interviewing are continuous throughout each year. CDC (2017c) has detailed information on NHIS questionnaires and sampling on its website.

Youth Risk Behavior Surveillance System

Developed in 1990 by CDC, the Youth Risk Behavior Surveillance System (YRBSS) monitors priority health risk behaviors, including past-year quit attempts among current cigarette smokers, among high school students in the United States. In addition to the surveys that are conducted by state, local, territorial, and tribal health and education agencies, there is the national YRBS conducted by CDC. The current report includes data from the national YRBS only, which has a sampling frame of all public and private school students in grades 9–12 in the 50 states and the District of Columbia. A three-stage cluster sample design is used to sample (1) large-sized counties or groups of smaller adjacent counties, (2) public and private schools with a probability proportional to the schools' enrollment, and (3) one or two randomly selected classes in each grade. Examples of classes include homerooms, classes of a required discipline (e.g., English or social studies), and all classes meeting during a required period (e.g., second period). All students in a sampled class are eligible to participate. Oversampling is used to achieve sufficiently large subsamples of Black or African American and Hispanic or Latino students to enable separate analyses of these subgroups. Schools that decline to participate in the original sample are not replaced. Students complete self-administered, paper-and-pencil questionnaires and record their answers directly in the questionnaire booklet (CDC 2013). Local procedures to obtain the permission of parents are followed. Trained personnel administer the questionnaires to students in their classrooms for the national survey. The participation of students is both voluntary and anonymous (CDC 2013).

Tobacco Use Supplement to the Current Population Survey

The Tobacco Use Supplement to the Current Population Survey (TUS-CPS) is a National Cancer Institute-sponsored survey of tobacco use that has been administered as part of the U.S. Census Bureau's Current Population Survey approximately every 3–4 years since 1992–1993 (since 2000, surveys were conducted for 2001–2002, 2003, 2006–2007, 2010–2011, and 2014–2015). In each cycle, the TUS-CPS collects nationally representative data from about 240,000 adults (data collected between

1992 and 2006 also included youth 15–17 years of age). About two-thirds of respondents complete the questionnaire by telephone, and responses for the remaining one-third are obtained through in-person interviews. More detailed information about the TUS-CPS is available from the National Cancer Institute (NCI) (n.d.b).

Behavioral Risk Factor Surveillance System

In 1984, CDC initiated the state-based Behavioral Risk Factor Surveillance System (BRFSS), a cross-sectional telephone survey that state health departments conduct monthly over landline and cellular telephones (included since 2011), using a standardized questionnaire and technical and methodologic assistance provided by CDC. The BRFSS is used to collect data among U.S. adults 18 years of age and older regarding their risk behaviors and preventive health practices that can affect their health status. Data from respondents are forwarded to CDC to be aggregated for each state, returned with standard tabulations, and published at year's end by each state. In 2011, BRFSS adopted new methods, including the addition of cellular telephone households to its sample, and used new methods of weighting to adjust survey data for differences between the demographic characteristics of respondents and the survey population (CDC 2012). As a result of these methodologic changes, data from 2011 to 2017 cannot be compared with years before 2011. In 2017, more than 450,000 interviews were conducted with respondents from all 50 states, the District of Columbia, and participating U.S. territories and other geographic areas. The number of completed interviews at each site ranged from 1,508 to 22,059, and the median response rate was 45.9%. For this Surgeon General's report, data have been weighted to reflect the age, race/ethnicity, and sex distribution of each participating state. CDC (2017a) offers detailed information about the BRFSS.

National Adult Tobacco Survey

The 2013–2014 National Adult Tobacco Survey (NATS)—a stratified, random-digit-dialed (RDD), telephone survey of noninstitutionalized adults 18 years of age and older—was conducted from October 2013 to October 2014. The survey was part of a collaborative effort between CDC and the U.S. Food and Drug Administration (FDA). The survey sought to determine the prevalence and correlates of tobacco use behaviors among a nationally representative sample of U.S. adults. The 2013–2014 NATS included 75,233 respondents (70% landline, 30% cellular), and the overall response rate was 36.1% (47.6%, landline; 17.1%, cellular). Data were weighted to provide nationally representative estimates of prevalence. Detailed information on NATS is available at CDC (2016).

National Ambulatory Medical Care Survey

The National Ambulatory Medical Care Survey (NAMCS), conducted by CDC's National Center for Health Statistics, is a survey designed to meet the need for objective, reliable information about the provision and use of ambulatory medical care services in the United States. Findings are based on a sample of visits to nonfederal, office-based physicians who are primarily engaged in direct patient care. Abstraction of medical records includes documentation of screening for tobacco use, counseling on tobacco cessation in the form of health education ordered or provided during the visit, and tobacco cessation medications ordered or continued during the visit. In 2009, 32,281 records were abstracted from a sample of 3,319 physicians, with a response rate of 62.4% (in 2010, 31,229 records were abstracted from a sample of 3,525 physicians, with a response rate of 57.3%, and in 2011, 30,872 records were abstracted from a sample of 3,819 physicians, with a response rate of 54.1%). CDC (2017b) offers on its website more detailed information about NAMCS.

Population Assessment of Tobacco and Health Study

The Population Assessment of Tobacco and Health (PATH) Study was launched in October 2011 through a collaboration between the FDA Center for Tobacco Products and the National Institutes of Health, National Institute for Drug Abuse. PATH is a nationally representative, longitudinal cohort study that uses computer-assisted interviews to collect information from approximately 49,000 current, never, and former tobacco users, including noninstitutionalized youth (12–17 years of age) and adults (18 years of age and older). The study also collects biospecimens (i.e., buccal cell, urine, blood) from consenting adults. Wave 1 of data collection was completed in 2014 (September 2013–December 2014), and four subsequent waves have been completed: Wave 2 (October 2014–October 2015), Wave 3 (October 2015–October 2016), Wave 4 (December 2016–November 2017), and an additional wave among only 12- to 17-year-old youth (December 2017 to November 2018).

The goal of the Path Study is to monitor and assess behavioral and biological between-person differences and within-person changes over time in tobacco product use patterns and behaviors, attitudes and risk perceptions, tobacco-related biomarkers of exposure and harm, and health conditions. The findings may inform FDA regulatory activities related to product standards (e.g., toxicity, appeal, abuse liability/addictiveness), health warnings, and the authorization of new and modified risk tobacco products, as well as FDA's public education efforts.

Health Information National Trends Survey

The Health Information National Trends Survey (HINTS) was developed by the Health Communication and Informatics Research Branch of the Division of Cancer Control and Population Sciences of NCI. The HINTS is a biennial, cross-sectional survey that routinely collects data about the use of cancer-related information, including information on quitting smoking, from a nationally representative sample of adults 18 years of age and older in the civilian noninstitutionalized population of the United States. Data from the survey are used to assess the impact of the health information environment. There have been nine iterations of the HINTS: in 2003, 2005, 2007, 2011, 2012, 2013, 2014, 2015, and 2017. The 2017 survey, which was used for this report, was conducted primarily by telephone (95%) with incentives promised of either $0, $5, or $15 upon survey completion (there were 3,335 completed surveys, a 25.0% response rate). More detailed information about the HINTS is available from NCI (n.d.a).

Monitoring the Future Study

The Monitoring the Future (MTF) Study, conducted annually since its inception in 1975, is conducted by the University of Michigan's Institute for Social Research and supported through grants from the National Institute on Drug Abuse. The MTF—a study of American youth, college students, and adults through 45 years of age—monitors changes in the beliefs, attitudes, and behaviors relevant to drug use and other health and social issues among young persons in the United States. This report presents data on high school seniors from confidential, self-administered paper-and-pencil questionnaires used to survey nationally representative samples of 12th-grade students in public and private schools in 48 of the 50 states (all but Alaska and Hawaii). From 2011 to 2015, the years used in this report, sample sizes for the 12th-grade students (from 121 to 129 schools) who participated in the MTF Study ranged from 13,015 to 14,855, and response rates ranged from 82% to 83% (Miech et al. 2016).

National Youth Tobacco Survey

The National Youth Tobacco Survey (NYTS) was developed by CDC to assist with the evaluation of the National Tobacco Control Program (NTCP) and state tobacco control programs. CDC and FDA have co-administered the survey since 2011. The NYTS, which provides nationally representative data on tobacco-related behaviors among middle school (grades 6–8) and high school (grades 9–12) students, was first conducted in fall 1999 and was subsequently conducted in 2000, 2002, 2004, 2006, 2009, and 2011–2017. The NYTS sampling frame consists of all students enrolled in public, Catholic, and other private middle schools and high schools (grades 6–12) in the 50 states and Washington, D.C. Participation is voluntary and anonymous. Participants complete a self-administered paper-and-pencil questionnaire and record their responses on a computer-scannable questionnaire booklet. For the NYTS years used in this report (2000, 2004, 2009, 2015, and 2017), sample sizes were as low as 17,711 and as high as 35,828; the number of participating schools ranged from 185 to 324; and response rates ranged from 63.4% to 84.8% (Office on Smoking and Health et al. 2001; CDC 2010; Singh et al. 2016).

Appendix 2.2: Measures of Cessation

Validity of Measures of Cessation Among Youth

All of the data on cessation among youth that are presented in this report are based on self-reported responses to questionnaires. Because tobacco use is viewed by many as a socially undesirable behavior, there is a risk of inaccurate or dishonest responses. Because it was not feasible to verify the self-reported data included here, it is important for researchers to interpret these data with some caution and an understanding of possible sources of inaccuracy. Many factors can affect the validity of self-reported data—factors that can be categorized as cognitive or situational. Cognitive processes that affect responses include comprehension of the question, retrieval of relevant information from memory, decision making about the adequacy of the information retrieved, and the generation of a response (Brener et al. 2003). Each of these processes can contribute to errors in responses and, subsequently, to problems with validity.

Situational factors that affect the validity of self-reported data refer to characteristics of the external environment in which the survey is being conducted. These include the setting (i.e., school or home based), the method (i.e., self-administered questionnaire or in-person interview), the social desirability of the behavior being reported, and the perception of privacy and/or confidentiality of responses (U.S. Department of Health and Human Services [USDHHS] 1994; Brener et al. 2003).

Many studies have found that youth are more likely to report engaging in sensitive behaviors when a survey is completed in a school setting rather than in their homes (Gfroerer et al. 1997; Hedges and Jarvis 1998; Kann et al. 2002). A study that compared the school-based National Youth Risk Behavior Survey (YRBS) with the household-based YRBS supplement to the National Health Interview Survey (NHIS) found that the school-based survey produced a significantly higher reporting of many sensitive behaviors, such as driving after drinking alcohol, binge drinking, and current use of marijuana and cocaine (Brener et al. 2006). Four measures of various stages of the smoking uptake process were higher in the school-based survey, but estimates for current cigarette use and frequent cigarette use, although elevated in the school-based survey, did not differ significantly from estimates generated in the household-based survey. Few differences in nonsensitive behaviors were observed. Two other studies (Gfroerer et al. 1997; Brener et al. 2003) indicated that, although estimates based on self-reports of current use of alcohol and illicit drugs were higher in school-based than in household-based surveys, estimates of current cigarette smoking were quite similar across settings. It is noteworthy that all three of these studies use self-administered rather than interviewer-administered interviews/questionnaires. Nevertheless, the privacy that school surveys provide is important, especially if smoking becomes more socially unacceptable over time. Household-based surveys, however, are more likely to include youth who drop out of school or are frequently absent from school, and youth in these groups are more likely to smoke. In addition, the Population Assessment of Tobacco and Health (PATH) Study (which uses audio, computer-administered self-interviews in a respondent's household) recently conducted a reliability and validity study of current use of a variety of tobacco products among youth 12–17 years of age, finding high levels of agreement across interviews conducted 6–24 days apart (Tourangeau et al. 2018). There was also a high level of agreement between self-reported current tobacco use and salivary cotinine tests among a combined sample of adults and youth (87.5% of the reports and tests agreed).

Overall, the factors described above may affect point estimates of cessation. If these factors remain stable over the years, however, they should not affect the trends seen over time.

Validity of Measures of Tobacco Use Among Adults

All of the data on tobacco use among adults presented in this report were based on self-reported responses to questionnaires. Biochemical validation studies suggest that data on self-reported cigarette smoking are generally valid, except in certain situations, such as when data are collected in conjunction with intense smoking cessation programs or with certain populations, such as pregnant women (Velicer et al. 1992; Kendrick et al. 1995). Misclassification may also be more common among intermittent smokers, who may not classify themselves as smokers because they do not perceive themselves as being addicted or because of social desirability bias. Additionally, smokers may misreport the number of cigarettes they smoke per day because of "digit preference" (a preference for multiples of 10) (Klesges et al. 1995). Although self-reported data have been found to adequately reflect cigarette smoking patterns (including whether a respondent who has smoked in the past is currently not smoking) (Connor Gorber et al. 2009; Wong et al. 2012; Tourangeau et al. 2018), few studies have examined the validity of other cessation measures (Brigham et al. 2010;

Persoskie and Nelson 2013). It should be noted, however, that much of the research literature on the validity of self-reported data is restricted to cigarette smoking—and not measures of cessation or other tobacco products. However, among adult tobacco users, a recent PATH Study found high levels of agreement at initial interview and subsequent re-interview 6–24 days later between self-reported current use of cigarettes, electronic nicotine products, traditional cigars, cigarillos, filtered cigars, pipes, snus, hookahs, and smokeless tobacco (Tourangeau et al. 2018). High agreement was also found for self-reported information on current tobacco use and salivary cotinine among a combined sample of youth and adults (Tourangeau et al. 2018). Thus, a discussion of the factors that may affect validity is important so that the data presented in this report are interpreted with some caution and an understanding of possible sources of inaccuracy. Clearly, many factors can affect the validity of self-reported data, such as response biases and the particular methodologic features of the surveys. For example, methodologic differences in survey administration include but are not limited to timing, order of survey questions, sampling, mode of data collection (e.g., computer-assisted personal interviewing vs. computer-assisted telephone interviewing), participation rates, and operational definitions (Ryan et al. 2012). In addition, responses to questions may be subject to more social desirability biases in surveys that are focused solely on tobacco use versus those where tobacco use is just one of several health behaviors being assessed, as research has found that the context in which sensitive questions are asked can effect responses to survey questions (Tourangeau and Yan 2007; Krumpal 2013).

Definitions

Measures of cessation differ between surveys of youth and those focused on adults. Three surveys (NHIS, Behavioral Risk Factor Surveillance System [BRFSS], and Tobacco Use Supplement to the Current Population Survey [TUS-CPS]) included in this chapter provide information about cessation among adults and young adults, while three other surveys (YRBS, Monitoring the Future [MTF] Study, and National Youth Tobacco Survey [NYTS]) provide information about smoking among youth. For each smoking measure, the definitions used in the various surveys are summarized below.

Current and Former Cigarette Smoking

Adults and Young Adults

In NHIS from 1965 to 1991, current cigarette smokers were defined as respondents who had 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 cigarettes every day, some days, or not at all. Persons who smoked every day or some days were classified as current cigarette smokers.

Also in NHIS, former cigarette smokers were those who reported smoking at least 100 cigarettes during their lifetime but currently did not smoke.

Youth

The YRBS defines current cigarette smoking among students as having smoked cigarettes on at least 1 day during the 30 days before the survey. To be classified as a current smoker, students had to answer "yes" to questions about ever smoking and current smoking. In addition, students who were current smokers and reported smoking on 20 or more of the past 30 days were categorized as current frequent cigarette smokers. This measure was examined for youth because current frequent cigarette smokers most likely have a more established pattern of use and are more likely to smoke as adults, thereby potentially representing the future group of adult smokers who are trying to quit.

Former smoking among youth in the YRBS was categorized as either (a) former daily smokers, representing those who had an established pattern of smoking daily but were not currently smoking and perhaps reflecting youth who had quit smoking; and (b) former nondaily smokers, who may contain a higher proportion of youth who experimented with smoking, in addition to those who quit smoking. Students who answered "yes" to ever smoke and "no" to currently smoke were categorized as (a) former daily smokers, if they answered "yes" to ever daily; or (b) former nondaily smokers, if they answered "no" to ever daily.

Quit Ratio

Adults

In NHIS, the quit ratio is defined as the ratio of former smokers to ever smokers; ever smokers were those who had smoked at least 100 cigarettes in their lifetimes. Former smokers were defined as ever smokers who did not currently smoke at the time of the survey. Because smoking behaviors are less established among youth and young adults, this measure was not examined for those groups.

Recent Successful Cessation

Adults and Young Adults

In NHIS, the recent smoking cessation percentage includes in the numerator only former smokers who quit smoking 6–12 months ago (i.e., persons who reported

having smoked 100 cigarettes in their life but were not smoking at time of interview and had quit smoking 6–12 months prior). The denominator for this measure includes both current smokers who smoked for at least 2 years and former smokers who quit during the past year. This measure was not examined for youth. Because the BRFSS did not include a question about the length of time that current cigarette smokers had smoked, the estimate from BRFSS does not include this restriction in its denominator and, therefore, is not comparable to the estimate from NHIS. Nevertheless, when the restriction of having smoked for at least 2 years is removed from the denominator in NHIS, the resulting estimate of the prevalence of recent successful cessation is 7.4% (95% CI, 6.4–8.4%) (NHIS, NCHS, public use data, 2017), which is similar to the estimate with this restriction (7.6%, 95% CI, 6.6–8.6%) (Table 2.13).

Cessation Continuum

Using TUS-CPS data, a cessation continuum was constructed to more completely describe the dynamic process of smoking cessation. This measure was examined only for adult current smokers. The continuum included the proportion of current smokers who had ever tried to quit smoking, whether they had attempted to quit during the past year, and their current interest in quitting.

Past-Year Quit Attempts

Adults and Young Adults

NHIS defines past-year quit attempts among current smokers as those who answer "yes" to, "During the past 12 months, have you quit 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?" This measure also includes former smokers who quit during the past year. It is important to note that in addition to excluding those who may have quit for 1 day during the past year, this measure does not include past-year quit attempts of less than 1 day. Therefore, the measure may underestimate quit-attempt prevalence. Data from the 2014–2015 TUS-CPS indicated that among current cigarette smokers, the prevalence of past-year quit attempts increased by 5.4 percentage points from 41.3% to 46.7% when self-reported quit attempts of less than 1 day were included (Table 2.14). Questions defining past-year quit attempts in the 2014–2015 TUS-CPS included asking some-day smokers who smoked fewer than 12 days in the past 30 days, "During the past 12 months, have you tried to quit smoking completely?" and asking daily smokers and some-day smokers who smoked on 12 or more days during the past 30 days, "During the past 12 months, have you stopped smoking for one day or longer because you were trying to quit smoking?" Those who answered "no" to this question were asked, "During the past 12 months, have you made a serious attempt to stop smoking because you were trying to quit—even if you stopped for less than a day?" Quit attempts of less than 1 day comprised 12.9% of past-year quit attempts among current daily smokers and some-day smokers who smoked on 12 or more days during the past 30 days (TUS-CPS, public use data, 2014–2015).

It is also important to note that Table 2.14 estimates past-year quit attempt prevalence in 2014–2015 TUS-CPS only among current smokers and does not include former smokers who quit in the past year; therefore, the quit attempt prevalence in Table 2.14 (41.3%) is much lower than the quit attempt prevalence in Table 2.11, which is estimated from the 2015 NHIS and includes former smokers who quit during the past year (55.4%). However, the absence of former smokers who quit during the past year from the 2014–2015 TUS-CPS estimate does not entirely explain the difference in prevalence. In the combined 2014–2015 NHIS among current smokers only, the quit attempt prevalence was 48.9% (NHIS, public use data, 2014–2015), which was still above the quit attempt prevalence of 41.3% among the same group in the 2014–2015 TUS-CPS.

Youth

In the YRBS, students were asked the question, "During the past 12 months, did you ever try to quit smoking cigarettes?"

The NYTS defines past-year quit attempts as those made by current smokers who reported having tried to quit smoking for a day or longer during the past year.

Number and Duration of Quit Attempts

Adults and Young Adults

In the 2014–2015 TUS-CPS, among current daily smokers and some-day smokers who smoked at least 12 or more days during the past 30 days, the question, "How many TIMES during the past 12 months have you stopped smoking for one day or longer because you were trying to quit smoking?" was asked of those who responded "yes" to the question, "During the past 12 months, have you stopped smoking for one day or longer because you were trying to quit smoking?"

Duration of quit attempts was examined with the questions, "During the past 12 months, what is the length of time of this single quit attempt where you stopped smoking because you were trying to quit smoking" and "Thinking of those attempts during the past 12 months,

what was the length of time of the one attempt that lasted the longest?"

Youth

In the 2017 NYTS, middle and high school students who were current smokers and had tried to quit smoking during the past year were asked, "During the past 12 months, how many times have you stopped using all tobacco products for one day or longer because you were trying to quit all tobacco products for good?" The response options were "I did not smoke cigarettes during the past 12 months," "I did not try to quit during the past 12 months," "1 time," "2 times," "3 to 5 times," "6 to 9 times," and "10 or more times."

Interest in Quitting

Adults and Young Adults

In the 2014–2015 TUS-CPS, among current daily and some-day smokers, interest in quitting was assessed using a 10-point scale. Participants were asked, "Overall, on a scale from 1 to 10, where 1 is not at all interested and 10 is extremely interested, how interested are you in quitting smoking?"

NHIS defines interest in quitting as current smokers who reported that they wanted to stop smoking completely.

Youth

In the 2011–2015 MTF Study, interest in quitting was assessed by asking high school seniors who were current smokers whether they wanted to stop smoking "now." Another measure included in this survey concerned whether the smoker thought that he or she would be smoking in 5 years.

In the 2015 NYTS, interest in quitting was assessed by asking current smokers, "Are you seriously thinking about quitting cigarettes?"

Ever Tried to Quit Smoking

Adults and Young Adults

In the 2001–2002 TUS-CPS, estimates for ever trying to quit smoking relied on one question, "Have you ever stopped smoking for one day or longer because you were trying to quit smoking?" In other years, questions for current some-day smokers who had smoked fewer than 12 days during the past 30 days were asked, "Have you ever tried to quit smoking completely?" and current daily smokers and some-day smokers who had smoked 12 or more days during the past 30 were asked, "Have you ever made a serious attempt to stop smoking because you were trying to quit—even if you stopped for less than a day?" For the 2006–2007 TUS-CPS, current daily smokers and some-day smokers who smoked 12 or more days during the past 30 days were also asked, "Have you ever stopped smoking one day or longer because you were trying to quit smoking?"

Youth

In the MTF Study, high school seniors who were current smokers were asked if they had ever tried to quit smoking.

Cessation of Other Tobacco Products

Adults and Young Adults

In NHIS, cessation of other tobacco products was examined using past-year quit attempts ("During the past 12 months, have you stopped using all kinds of tobacco products for more than one day because you were trying to quit using tobacco?" "All kinds" meant trying to quit using tobacco completely, including smoking cigarettes, smoking products other than cigarettes, and using smokeless tobacco products.). This question was asked of current cigarette smokers who used another tobacco product or who used two or more tobacco products.

Screening for Tobacco Use

Adults and Young Adults

Screening for tobacco use was examined using 2009–2011 NAMCS data, based on abstraction of medical records for visits to office-based physicians during which current tobacco use (smoked cigarettes or cigars or used snuff or chewing tobacco) or no current use was recorded. The same measure was used for youth. Because of methodologic changes, this chapter does not report the most recent NAMCS data (2012–2013).

Advice to Quit—Clinical Data from Abstractions of Medical Records

Adults and Young Adults

Using 2009–2011 NAMCS data, receipt of advice to quit was based on abstraction of medical records for visits to office-based physicians by identified current tobacco users (i.e., the patient was identified as a current tobacco user during screening). Receipt of advice is defined as visits where tobacco counseling was recorded. Tobacco counseling refers to any information provided that related to tobacco use in any form, including cigarettes, cigars, snuff, and chewing tobacco, and on exposure to tobacco

in the form of secondhand smoke, smoking cessation, and prevention of tobacco use, as well as referrals to other healthcare providers for smoking cessation programs. The same measure was used for youth. Because of methodologic changes, this chapter does not report the most recent NAMCS data (2012–2013).

Advice to Quit—Self-Reported Data

Adults and Young Adults

In the 2015 NHIS, receipt of advice to quit was assessed among current smokers and former smokers who quit during the past year and also saw a doctor or other health professional during the past year. Receipt of advice to quit was defined as having been given advice from a medical doctor, dentist, or other health professional to quit smoking or to quit using other kinds of tobacco among current cigarette smokers and former smokers who quit during the past year.

Youth

In the 2013 NYTS, high school and middle school students were asked whether at any visit to a doctor, dentist, or nurse during the time covered by the survey, they had been asked by the provider whether they used tobacco that is smoked or put in the mouth. A separate measure, being advised not to use tobacco, was defined using current cigarette smokers (smoked cigarettes during the 30 days preceding the survey) as being advised by a doctor, dentist, or nurse during the past 12 months not to use tobacco that is smoked or put in the mouth.

Use of Counseling and Medications to Quit Smoking

Adults and Young Adults

To define the use of counseling, NHIS considers two groups, current smokers who tried to quit during the past year and former smokers who quit during the past 2 years. Counseling is defined as having used one-on-one counseling; a stop-smoking clinic, class, or support group; and/or a telephone helpline or quitline during the past year, among current smokers who tried to quit in the past year and among former smokers who quit in the past 2 years. The 2014–2015 TUS-CPS asked current smokers who tried to quit during the past year about their use of a telephone helpline or quitline the last time they tried to quit.

NHIS defines use of medications as having used during the past year the nicotine patch, nicotine gum or lozenge, a nicotine-containing nasal spray or inhaler, varenicline (U.S. trade name Chantix), and/or bupropion (including trade names Zyban and Wellbutrin).

Youth

The 2000, 2004, and 2009 NYTS asked high school and middle school students if they did any of the following during the past 12 months to help themselves stop smoking: attend a program in their school, attend a program in their community, call a helpline or quitline, use nicotine gum or lozenge, use a nicotine patch, and/or use any medication. (In 2000, the strategies of using nicotine gum and using a nicotine patch were asked together as one strategy.) The same cessation strategies were assessed in the 2015 NYTS but the question changed to, "In the past 12 months, did you do any of the following to help you quit using tobacco of any kind for good?" and the word "telephone" was added before "helpline" and "quitline."

Use of Other Cessation Strategies

Adults and Young Adults

The 2014–2015 TUS-CPS asked current smokers who tried to quit during the past year about their use of the Internet or a web-based program or tool the last time they tried to quit. Current smokers were also asked if they did any of the following the last time they tried to quit: tried to quit by switching to (a) smokeless tobacco, such as chewing tobacco, snuff, or snus; (b) regular cigars, cigarillos, little filtered cigars, or any pipes filled with tobacco, and (c) electronic or e-cigarettes. The survey did not operationalize what switching meant (i.e., completely switching vs. dual use while reducing cigarette smoking).

Youth

The 2015 NYTS asked high school and middle school students if they had tried to quit "on my own" or cold turkey during the past 12 months to help themselves quit using tobacco of any kind for good. The 2015 NYTS also asked if one of the reasons why they had used e-cigarettes was to try to quit using tobacco products, such as cigarettes.

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