

Trends in Adolescent Smoking in the United States: Data from the National Household Survey on Drug Abuse, 1994 through 1998

Andrea N. Kopstein

INTRODUCTION It is well documented that most smokers begin cigarette use in their adolescent years (U.S. DHHS, 1999). The prevalence of both past-year and past-month smoking increases dramatically throughout adolescence and young adulthood, peaking when people are in their late teens or early twenties. Beyond that point, the prevalence of current smoking declines. The steepest gradient for lifetime smoking is observed in the teenage years. In 1998, about 17 percent of 12- to 13-year-olds had ever smoked compared to 37 percent of 14- to 15-year-olds and 55 percent of adolescents ages 16 and 17 (U.S. DHHS, 2000).

This chapter uses data from the National Household Survey on Drug Abuse (NHSDA) to examine trends in cigarette and other tobacco product use among adolescents aged 12 to 17 (U.S. DHHS, 1998). Trends for variables associated with cigarette use were also examined for the same time period.

The NHSDA was first conducted by the federal government in 1971. The survey was fielded periodically until 1990, at which time data collection became annual. Since October of 1992, the NHSDA has been conducted by the Substance Abuse and Mental Health Services Administration (SAMHSA). The target population is United States civilian residents 12 years of age and older living in households, noninstitutional group quarters (*e.g.*, shelters, rooming houses, dormitories), and military bases. The survey collects data by administering questionnaires to a representative sample of this population at their place of residence. The NHSDA employs a multistage area probability sample, and data collection takes place continuously throughout the calendar year. From 1985 through 1998, Hispanics, Blacks, and adolescents were oversampled. The sample size of the NHSDA was expanded to 70,000 for the 1999 survey. The NHSDA uses self-administered answer sheets for the most sensitive portions of the survey.

SAMHSA continues to invest substantial resources for improving measurement of substance use and related issues. A series of methodological studies was conducted between 1988 and 1992. Based on the results from these studies, and consultation with drug researchers and other data users,

an improved instrument was fielded in 1994. One of the changes made in 1994 was putting cigarette use questions on self-administered answer sheets instead of having the interviewer administer them, as had been done prior to 1994. Therefore, the cigarette trends included in this paper will be limited to surveys conducted from 1994 through 1998. Estimates of adolescent cigarette use prior to 1994 are not comparable to the most recent years due to the change in data collection method (Brittingham *et al.*, 1998). The sample sizes for adolescents aged 12 to 17 years were 4,698 in 1994, 4,595 in 1995, 4,358 in 1996, 7,844 in 1997, and 6,788 in 1998. The adolescent interview response rate for each year was about 85 percent.

DATA ANALYSIS Statistical analyses were performed using SAS version 6.12 (SAS Institute, 1997) and SUDAAN version 7.5 (Shah *et al.*, 1997). Because of the sample design of the NHSDA, traditional methods of statistical analysis that assume simple random sampling are not applicable. It is necessary to use statistical methods that incorporate both survey weights and the complex sample design. SUDAAN was used to compute 95 percent confidence intervals and to test the difference between time periods at the critical level of $p < 0.05$.

Point estimates considered to be unreliable were omitted from all tables and are noted by asterisks (**). An estimate was considered unreliable if the relative standard error was greater than 17.5 percent of the log transformation of the estimated proportion.

Trend data are presented for cigarette use and smokeless tobacco use. Cigar use data are presented for the 1997 and 1998 survey years. Demographic characteristics used in this study included gender, age, and race/ethnicity. Data are presented for three major racial/ethnic groups: White non-Hispanic, Black non-Hispanic, and Hispanic. Tobacco use is also shown by population density, with large metropolitan areas being defined as Metropolitan Statistical Areas (MSAs) with populations of 1 million or more. Small metropolitan areas are MSAs with populations of less than 1 million, and nonmetropolitan areas are outside MSAs. Cigarette data are also presented for four U.S. geographic regions: Northeast, North Central, South, and West.

Table 4-1
Proportion of Adolescents Reporting Cigarette Smoking in the Month prior to Survey, by Age

Age (Years)	Smoked during Previous Month									
	1994		1995		1996		1997		1998	
	(N = 4,698)*		(N = 4,595)*		(N = 4,538)*		(N = 7,844)*		(N = 6,788)*	
	%	CI	%	CI	%	CI	%	CI	%	CI
12–17	18.9	(17.5-20.4)	20.2	(18.8-21.8)	18.3	(16.9-19.7)	19.9	(18.6-21.3)	18.2	(16.9-19.7)
12–13	9.40	(7.6-11.5)	10.7	(8.8-12.9)	7.30	(5.7-9.3)	9.70	(8.1-11.6)	8.00	(6.5-9.9)
14–15	19.7	(17.3-22.4)	20.5	(18.0-23.2)	18.4	(16.2-20.8)	19.5	(17.5-21.9)	18.2	(15.9-20.7)
16–17	28.6	(25.8-31.7)	30.1	(27.3-33.2)	28.4	(25.9-31.3)	30.3	(27.8-33.1)	29.3	(26.6-32.3)

*Total N for ages 12–17.

Note: CI = 95% confidence interval.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1994–1998.

Other variables investigated included those shown in the literature to be important predictors for tobacco use, including self-reported average grades in school and perceived risk for cigarette smoking (Brandon *et al.*, 1996; Pierce *et al.*, 1996). The perceived risk question for cigarette use asks, “How much do you think people risk harming themselves physically and in other ways when they smoke one or more packs of cigarettes per day?” The four answer choices range from “no risk” to “great risk.”

The NHSDA collects four different prevalence periods for substance use. The four time periods are lifetime use (at least once in one’s life), past year use (using a substance at least once in the 12 months prior to interview), past month use (using a substance at least once in the 30 days prior to survey), and daily use. An adolescent is considered a “current smoker” if he or she reported smoking at least once within the 30 days prior to the interview.

RESULTS The steepest gradient for smoking prevalence is observed in the teenage years. In Table 4-1, trends for current smoking are shown by age. In the 1998 NHSDA, 8.0 percent of 12- to 13-year-olds reported smoking in the 30 days prior to the survey compared to 18.2 percent of 14- to 15-year-olds and 29.3 percent of 16- to 17-year-olds. For the time period of 1994 to 1998, the prevalence of teen smoking was fairly stable for the two younger age groups. Among 16- to 17-year-olds, there was no statistically significant increase between 1994 and 1998, but the prevalence estimates went from 28.6 percent of this age group reporting current smoking in 1994 to 29.3 percent in 1998.

Trends for current smoking among 12- to 17-year-olds by gender and race/ethnicity are shown in Table 4-2. Among White non-Hispanic males, the proportion reporting current cigarette use did not significantly change during the 4-year time period (22.5 percent in 1994 to 20.0 percent in 1998). For White non-Hispanic females, current smoking has been relatively stable at about 21 to 23 percent since 1995. Current smoking among non-Hispanic Black males increased from 11.2 percent reporting current smoking in 1994 to 16.9 percent in 1998, but this difference was not statistically

Table 4-2

Proportion of Adolescents 12 to 17 Years of Age Reporting Cigarette Smoking in the Past Month, by Gender and Race/Ethnicity

Race/ Ethnicity & Gender	Smoked during Previous Month									
	1994		1995		1996		1997		1998	
	%	CI	%	CI	%	CI	%	CI	%	CI
Non-Hispanic White										
Males	22.5	(20.0-25.4)	22.8	(20.2-25.7)	19.3	(16.9-22.0)	19.8	(17.5-22.4)	20.0	(17.6-22.8)
Females	21.5	(19.0-24.4)	23.1	(20.4-26.1)	22.5	(19.9-25.4)	23.8	(21.4-26.4)	21.0	(18.4-24.0)
Non-Hispanic Black										
Males	11.2	(8.4-15.0)	13.4	(10.4-17.2)	15.0	(12.0-18.8)	17.1	(13.9-21.0)	16.9	(13.6-21.1)
Females	11.9	(8.9-15.8)	10.3	(7.6-13.8)	8.70	(6.5-11.7)	12.8	(10.1-16.3)	10.6	(8.1-13.8)
Hispanic										
Males	15.2	(11.8-19.6)	18.0	(14.2-22.7)	17.0	(13.7-21.0)	18.8	(15.6-22.6)	15.4	(12.6-18.8)
Females	13.5	(11.1-18.2)	13.0	(9.8-17.3)	12.5	(9.8-15.9)	13.1	(10.4-16.3)	14.7	(11.9-18.3)

Note: CI = 95% confidence interval.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1994–1998.

significant ($p < 0.07$). About 11 to 12 percent of non-Hispanic Black females have reported current smoking from 1994 to 1998. Current smoking has been reported by about 15 to 18 percent of Hispanic males since 1994. Among Hispanic females, current smoking has been relatively stable at about 13 to 15 percent since 1994.

Past year smokeless tobacco use trends are displayed in Table 4-3. Among White non-Hispanic males, the proportion reporting past-year smokeless tobacco use declined significantly ($p < 0.001$) from 15.0 percent in 1994 down to 8.8 percent in 1998. For White non-Hispanic females, rates for past year smokeless tobacco have remained at around 1 to 2 percent for 5 years. The use of smokeless tobacco remained at about 1 percent among non-Hispanic Black males during those 5 years and the level of use among non-Hispanic Black females has been so low that the estimates are statistically unreliable. Between 1994 and 1998, about 2 to 4 percent of Hispanic males were past-year smokeless tobacco users and less than 1 percent reported this behavior among Hispanic females.

Past-month (current) cigar use is shown in Table 4-4. Almost 9 percent of non-Hispanic White males and Hispanic males reported current cigar use in the 1998 survey compared to 4.7 percent of non-Hispanic Black males. Among White non-Hispanic females, 4.2 percent were current cigar smokers in 1998 compared to 2.3 percent of non-Hispanic Black females and 3.9 percent of Hispanic females.

Attitudes are known to be strong predictors of behavior. The data in Table 4-5 provide trends for the proportion of adolescents who reported that smoking a pack or more of cigarettes per day was of “great risk” to their health. None of the differences between 1994 and 1998 were statistically significant among adolescent males for any of the three racial/ethnic

Table 4-3

Proportion of Adolescents 12 to 17 Years of Age Reporting Smokeless Tobacco Use in the Past Year, by Gender and Race/Ethnicity

Race/ Ethnicity & Gender	Smoked during Previous Month									
	1994		1995		1996		1997		1998	
	%	CI	%	CI	%	CI	%	CI	%	CI
Non-Hispanic White										
Males	15.0	(12.9-17.4)	13.6	(11.6-16.1)	11.1	(9.2-13.4)	9.4 ^a	(7.8-11.2)	8.8	(7.1-10.9)
Females	2.1	(1.4-3.2)	2.0	(1.3-3.2)	**	(**)	2.2	(1.5-3.2)	0.9	(0.4-2.0)
Non-Hispanic Black										
Males	1.5	(0.4-5.2)	**	(**)	**	(**)	1.2	(0.5-2.6)	1.3	(0.5-3.4)
Females	**	(**)	**	(**)	0.4	(0.1-1.7)	0.5	(0.1-1.7)	**	(**)
Hispanic										
Males	4.0	(2.4-6.5)	3.8	(1.9-7.6)	0.9	(0.4-2.2)	4.5	(2.9-7.1)	2.1	(1.2-3.8)
Females	**	(**)	0.7	(0.2-2.4)	0.2	(0.1-1.3)	0.7	(0.1-3.2)	0.9	(0.4-2.0)

Note: CI = 95% confidence interval.

^a The difference between 1994 and 1997 is statistically different at $p < 0.01$.

** Low precision, no estimate shown.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1994–1998.

Table 4-4

Proportion of Adolescents 12 to 17 Years of Age Reporting Cigar Use in the Past Month, by Gender and Race/Ethnicity

Race/ Ethnicity & Gender	Smoked during Previous Month			
	1997		1998	
	%	CI	%	CI
Non-Hispanic White				
Males	7.0	(5.6-8.8)	8.5	(6.8-10.5)
Females	3.9	(2.9-5.3)	4.2	(3.1-5.8)
Non-Hispanic Black				
Males	4.1	(2.8-6.2)	4.7	(3.0-7.4)
Females	3.5	(2.1-5.7)	2.3	(1.3-3.9)
Hispanic				
Males	6.8	(4.9-9.4)	6.6	(4.7-9.3)
Females	2.2	(1.2- 4.0)	3.9	(2.5-5.9)

Note: CI = 95% confidence interval.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1994–1998.

Table 4-5

Proportion of Adolescents 12 to 17 Years of Age Reporting Perceived “Great Risk” from Smoking a Pack of Cigarettes a Day or More, by Gender and Race/Ethnicity

Race/ Ethnicity & Gender	Perceived “Great Risk” from Smoking									
	1994		1995		1996		1997		1998	
	%	CI	%	CI	%	CI	%	CI	%	CI
Non-Hispanic White										
Males	43.8	(40.7- 47.1)	N/A	N/A	47.8	(44.5-51.2)	47.5	(44.6-50.7)	49.2	(46.0-52.6)
Females	56.8	(53.6-60.2)	N/A	N/A	56.2	(53.0-59.6)	56.2	(53.3-59.2)	55.3	(51.9-58.8)
Non-Hispanic Black										
Males	51.1	(46.0-56.8)	N/A	N/A	57.3	(52.6-62.4)	56.2	(51.8-61.0)	54.1	(49.5-59.2)
Females	60.3	(55.6-65.3)	N/A	N/A	58.8	(54.1-63.8)	61.1	(56.9-65.6)	63.2	(59.0-67.8)
Hispanic										
Males	52.5	(47.5-58.0)	N/A	N/A	55.6	(50.9-60.7)	59.8	(55.7-64.2)	58.9	(54.8-63.3)
Females	61.2	(56.1-66.7)	N/A	N/A	63.9	(59.5-68.6)	57.9	(53.8-62.3)	64.5	(60.6-68.7)

Note: CI = 95% confidence interval.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1994–1998.

categories. Only 43.8 percent of White non-Hispanic males viewed this behavior as risky to their health in 1994, and 49.2 percent felt this way in 1998. The change during this time period for Black non-Hispanic males was from 51.1 percent to 54.1 percent and, among Hispanic males, the proportion associating “great risk” with smoking a pack a day or more was 52.5 percent in 1994 and 58.9 percent in 1998. Attitudes toward smoking were stable among female adolescents, with only about 56 percent of White non-Hispanic females reporting “great risk” compared to 63 percent of Black non-Hispanic females and 65 percent of Hispanic females.

Tables 4-6 and 4-7 show trends for cigarette smoking by population density and region of the country, respectively. For both genders and all three population density measures, there were no statistically significant changes in cigarette smoking prevalence between 1994 and 1998. As seen in Table 4-7, there were also no statistically significant changes in cigarette smoking prevalence between 1994 and 1998. In 1998, however, there was a difference by population density with significantly ($p < 0.05$) fewer adolescents smoking in large metropolitan statistical areas compared to non-metropolitan statistical areas.

Logistic regression analysis was used to examine the relationship between smoking cigarettes and self-reported academic achievement. The relative likelihood or odds ratio (by gender) is shown in Table 4-8. Using male and female adolescents who reported getting mostly As in school as reference categories in separate models, the data show the risk of smoking rises notably with decreasing grades, ranging from an odds ratio of about 2 for students who get mostly Bs to 5.5 for male students who get mostly Ds and 11.5 for females who get mostly Ds.

Table 4-6

Proportion of Adolescents 12 to 17 Years of Age Reporting Cigarette Smoking in the Past Month, by Gender and Population Density

Gender & Population Density	Reported Smoking Cigarettes during Previous Month									
	1994		1995		1996		1997		1998	
	%	CI	%	CI	%	CI	%	CI	%	CI
Large MSA										
Males	16.8	(14.1-20.1)	17.6	(14.5-21.2)	19.1	(16.3-22.3)	17.2	(14.8-20.2)	17.1	(14.4-20.1)
Females	16.0	(13.5-19.1)	18.0	(15.0-21.6)	15.5	(12.8-18.6)	17.6	(15.1-20.4)	14.2	(11.7-17.4) ^a
Small MSA										
Males	23.0	(19.4-27.3)	20.5	(17.3-24.4)	14.5	(11.9-17.7)	19.9	(16.9-23.5)	17.8	(14.9-21.4)
Females	19.7	(16.3-23.9)	20.0	(16.8-23.7)	20.0	(16.8-23.6)	23.3	(20.0-27.1)	19.3	(16.1-23.1)
Non-MSA										
Males	19.4	(15.9-23.7)	25.7	(21.9-30.1)	20.8	(17.0-25.5)	21.1	(17.7-25.3)	23.0	(19.1-27.7)
Females	20.0	(16.3-24.6)	22.1	(18.1-27.1)	22.6	(18.5-27.6)	22.2	(18.6-26.5)	21.9	(17.9-26.9)

Note: CI = 95% confidence interval.

^aThe difference between females in large metropolitan statistical areas and females in non-metropolitan statistical areas is significantly different at $p < 0.05$.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1994–1998.

Table 4-7

Proportion of Adolescents 12 to 17 Years of Age Reporting Cigarette Smoking in the Past Month, by Gender and Region

Gender & Region	Reported Smoking Cigarettes during Previous Month									
	1994		1995		1996		1997		1998	
	%	CI	%	CI	%	CI	%	CI	%	CI
Northeast										
Males	15.5	(11.7-20.6)	16.7	(12.4-22.5)	14.7	(10.9-19.7)	15.0	(11.2-20.1)	17.4	(13.2-23.0)
Females	20.0	(15.3-26.1)	19.8	(15.4-25.4)	16.7	(12.4-22.4)	17.2	(13.0-22.8)	18.8	(14.2-24.8)
Northcentral										
Males	19.1	(15.5-23.5)	24.9	(20.5-30.1)	19.4	(15.8-23.9)	20.6	(16.9-25.2)	23.2	(19.0-28.3)
Females	21.5	(17.6-26.3)	22.2	(18.0-27.4)	20.1	(16.4-24.6)	24.1	(20.3-28.7)	20.0	(15.9-25.2)
South										
Males	23.0	(19.5-26.9)	21.4	(18.4-24.8)	20.1	(17.1-23.5)	20.2	(17.4-23.4)	17.8	(15.0-21.2)
Females	17.2	(14.3-20.6)	17.9	(14.8-21.5)	19.8	(16.7-23.4)	21.0	(18.2-24.2)	18.1	(15.0-21.9)
West										
Males	18.1	(14.2-23.1)	18.2	(14.4-22.9)	14.9	(11.6-19.1)	18.9	(15.5-22.9)	16.5	(13.7-19.8)
Females	15.0	(11.4-19.7)	19.3	(15.4-24.3)	16.9	(13.4-21.3)	19.4	(15.9-23.7)	14.0	(11.5-17.1)

Note: CI = 95% confidence interval.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1994–1998.

Table 4-8

Odds of Being a Current Cigarette Smoker by Self-Reported Grades and Gender, 1997

Average Grades in School	Odds Ratio	
	Males	Females
Mostly As	1.00	1.00
Mostly Bs	2.38	1.85
Mostly Cs	4.10	3.24
Mostly Ds	5.54	11.5

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1994–1998.

Tables 4-9, 4-10, and 4-11 include incidence estimates calculated from the NHSDA. The methodology used for computation of these estimates is included in the footnotes at the bottom of each table. In Table 4-9, the age-specific rates of first use (per 1,000 person-years of exposure) are given by age group. For adolescents (12 to 17 years of age), the age-specific rate of first use has increased from 101.3 in 1965 to 139.1 in 1995. The age-specific rates of first daily use of cigarettes (per 1,000 years of exposure) are shown in Table 4-10 by age group. For adolescents, the rates of daily use have almost doubled from 44.0 in 1965 to 77.8 in 1996. Table 4-11 shows the incidence rates for first daily use of cigarettes by gender and age. For 12- to 17-year-old males, the rate of first daily use of cigarettes (per 1,000 years of exposure) increased from 56.2 in 1965 to 72.9 in 1996. For females, the increase has been more dramatic, with the rate going from 41.2 in 1965 to 82.6 in 1996. Standard errors for these incidence estimates are shown in Tables 4-12 through 4-14, which follow the text of this chapter.

DISCUSSION Although the prevalence of current cigarette smoking showed important differences by race/ethnicity and by age group, there were very few statistically significant changes between 1994 and 1998. White adolescents (both male and female) were more likely than Black or Hispanic teens to report current cigarette smoking in all five time periods. In general, adolescents living in non-metropolitan areas and small metropolitan areas reported higher rates of past month cigarette use than teens living in large metropolitan statistical areas. Teens in the South and North Central regions of the United States reported somewhat higher rates of current cigarette smoking in all five time periods, but, again, there were no significant changes over time.

Although males are generally less likely than females to see “great risk” to their health associated with heavy smoking (one or more packs per day), there were no changes between 1994 and 1998. As would be expected from the reported levels of smoking by race/ethnicity, White adolescents were less likely than their Black or Hispanic peers to associate “great risk” to their health from heavy smoking.

With the exception of White males, the prevalence of smokeless tobacco use is very low among adolescents. There was a significant decrease in past year smokeless tobacco use among White males ($p < 0.001$), with the

Table 4-9

Estimated Number (in 1000s) of Persons who First Used a Cigarette during Each Year, 1965–1995, Their Mean Age at First Use, and Annual Age-Specific Rates of First Use (per 1000 Person-Years of Exposure), Based on 1994–1997 NHSDAs

Year	Initiates (1000s)	Mean Age (Years)	Age-Specific Rate of First Use ¹		
			12–17	18–25	26–34
1965	2,974	16.0	101.3	112.9	19.8
1966	2,843	16.2	88.3	125.4	13.8
1967	3,229	15.6	112.9	114.6	9.5
1968	3,166	15.4	101.6	114.6	16.8
1969	3,362	15.5	111.0	122.3	8.3
1970	3,574	15.7	113.7	112.9	21.0
1971	3,472	15.2	119.3	102.1	9.4
1972	3,794	15.3	129.6	107.9	22.4
1973	3,395	15.5	114.8	87.2	16.8
1974	3,708	15.0	132.2	84.3	7.9
1975	3,650	15.2	125.0	95.7	7.3
1976	3,492	15.5	124.8	87.6	9.8
1977	3,428	15.7	126.9	87.8	14.6
1978	3,031	15.6	112.0	72.7	8.4
1979	2,997	15.7	111.0	83.8	9.7
1980	2,753	15.6	105.1	70.0	6.5
1981	2,735	15.6	107.0	66.7	7.0
1982	2,750	15.5	102.4	67.2	11.2
1983	2,739	15.1	106.0	64.5	4.5
1984	2,679	15.5	99.4	71.1	7.7
1985	2,816	15.5	111.3	69.4	7.8
1986	2,782	15.5	107.0	77.2	5.4
1987	2,566	16.1	98.6	66.1	12.6
1988	2,484	15.3	107.0	58.6	7.1
1989	2,503	16.3	99.5	60.9	8.5
1990	2,645	15.5	101.6	71.3	7.9
1991	2,567	16.0	100.5	66.4	11.1
1992	2,707	15.7	115.0	64.7	9.2
1993 ²	2,897	16.1	121.4	70.1	6.7
1994 ³	3,178	16.0	131.0	82.0	4.6
1995 ⁴	3,263	15.6	139.1	85.8	7.6

¹ The numerator of each rate equals the number of persons who first used the drug in the year (times 1000). The denominator of each rate equals the number of persons who were exposed to risk of first use during the year, weighted by their estimated exposure time measured in years. For example, for the age group 12–17 in 1990, the denominator is the sum of three components:

(1) those persons 12–17 years old in 1990 who first used the drug in 1989 or earlier, times a weight of zero. The weight is zero since they had zero exposure to the risk of first use in 1990.

(2) those who first used the drug in 1990 times a weight of 0.5. The weight of 0.5 assumes that these people, on average, first used the drug at mid-year and consequently have a half year of exposure (i.e., the first half of the year.)

(3) those who never used, or those who first used the drug in 1991 or later, times a weight of 1.0. The weight of 1.0 assumes their exposure to the risk of first use during 1990 was for the whole year.

Each person is also weighted by his/her sample weight.

² Estimated using 1995, 1996, and 1997 data only.

³ Estimated using 1996 and 1997 data only.

⁴ Estimated using 1997 data only.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1994–1997.

Table 4-10

Estimated Number (in 1000s) of Persons who Began Daily Cigarette Use during Each Year, 1965–1996, Their Mean Age at First Daily Use, and Annual Age-Specific Rates of First Daily Use (per 1000 Person-Years of Exposure), Based on 1994–1997 NHSDAs

Year	Initiates (1000s)	Mean Age (Years)	Age-Specific Rate of First Use ¹		
			12–17	18–25	26–34
1965	1,606	17.9	44.0	106.2	7.9
1966	1,716	17.9	42.6	117.0	6.0
1967	1,741	18.7	48.1	100.8	14.8
1968	2,268	18.5	49.7	155.2	6.4
1969	2,055	18.0	57.1	116.4	18.0
1970	1,910	17.3	52.5	101.9	6.5
1971	2,175	18.0	58.0	117.9	15.0
1972	2,004	17.9	57.7	95.4	25.4
1973	2,276	17.9	65.3	106.5	25.6
1974	2,403	18.9	66.2	109.2	23.7
1975	1,811	18.4	49.4	87.1	14.5
1976	1,976	18.1	54.8	93.1	17.6
1977	2,284	18.4	66.8	108.0	12.9
1978	1,984	18.3	59.6	88.1	14.4
1979	1,955	19.0	54.7	92.5	16.7
1980	1,704	18.7	51.6	81.7	10.5
1981	1,757	19.1	56.4	73.3	14.1
1982	1,586	18.7	49.2	73.3	11.9
1983	1,527	18.3	43.8	73.9	13.3
1984	1,547	18.4	52.3	65.4	11.1
1985	1,497	18.7	50.2	66.2	10.8
1986	1,561	18.0	56.7	69.5	10.0
1987	1,482	18.4	51.8	68.0	10.4
1988	1,384	18.5	51.2	60.8	11.4
1989	1,436	18.7	53.8	61.4	7.1
1990	1,503	18.3	57.8	63.6	13.9
1991	1,464	18.1	57.6	58.0	13.3
1992	1,651	18.2	61.9	69.1	11.9
1993	1,578	18.8	58.7	60.0	12.6
1994 ²	1,747	17.9	67.7	68.9	10.4
1995 ³	1,797	17.8	71.8	62.3	11.3
1996 ⁴	1,851	17.3	77.8	68.4	7.5

¹ The numerator of each rate equals the number of persons who first used the drug in the year (times 1000). The denominator of each rate equals the number of persons who were exposed to risk of first use during the year, weighted by their estimated exposure time measured in years. For example, for the age group 12–17 in 1990, the denominator is the sum of three components:

(1) those persons 12–17 years old in 1990 who first used the drug in 1989 or earlier, times a weight of zero. The weight is zero since they had zero exposure to the risk of first use in 1990.

(2) those who first used the drug in 1990 times a weight of 0.5. The weight of 0.5 assumes that these people, on average, first used the drug at mid-year and consequently have a half year of exposure (i.e., the first half of the year.)

(3) those who never used, or those who first used the drug in 1991 or later, times a weight of 1.0. The weight of 1.0 assumes their exposure to the risk of first use during 1990 was for the whole year.

Each person is also weighted by his/her sample weight.

² Estimated using 1995, 1996, and 1997 data only.

³ Estimated using 1996 and 1997 data only.

⁴ Estimated using 1997 data only.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1994–1997.

Table 4-11

Annual Age-Specific Rates of First Daily Use (per 1000 Person-Years of Exposure) of Persons who Began Daily Cigarette Use during Each Year 1962-1996 among the Total U.S. Population by Gender, Based on 1994-1997 NHSDAs

Year	Age Specific Rate of First Use ¹								
	Total			Male			Female		
	12-17	18-25	26-34	12-17	18-25	26-34	12-17	18-25	26-34
1962	48.3	129.8	13.9	56.5	150.6	*	41.2	120.7	11.0
1963	51.0	104.6	24.3	61.1	142.8	*	41.6	86.7	32.7
1964	34.7	93.5	17.3	40.3	152.3	*	29.1	63.9	22.1
1965	44.0	106.2	7.9	54.3	143.8	*	34.1	84.5	3.2
1966	42.6	117.0	6.0	62.8	189.0	**	22.4	76.8	8.4
1967	48.1	100.8	14.8	55.3	139.3	11.6	41.2	79.4	16.2
1968	49.7	155.2	6.4	64.7	202.0	4.7	35.4	127.7	7.1
1969	57.1	116.4	18.0	67.2	166.0	24.2	47.3	84.8	15.5
1970	52.5	101.9	6.5	68.6	136.3	10.0	38.1	78.2	5.2
1971	58.0	117.9	15.0	58.6	175.4	12.5	57.4	79.3	15.9
1972	57.7	95.4	25.4	63.5	117.5	9.8	52.5	80.2	31.3
1973	65.3	106.5	25.6	76.5	154.2	24.1	55.5	74.3	26.3
1974	66.2	109.2	23.7	68.4	119.9	20.7	64.3	101.8	25.1
1975	49.4	87.1	14.5	47.2	114.8	25.5	51.3	66.8	9.5
1976	54.8	93.1	17.6	45.9	101.6	18.5	62.9	86.7	17.1
1977	66.8	108.0	12.9	75.7	106.4	7.8	58.7	109.3	15.4
1978	59.6	88.1	14.4	56.8	108.4	15.4	62.1	72.2	13.8
1979	54.7	92.5	16.7	56.3	89.2	14.4	53.2	95.1	18.0
1980	51.6	81.7	10.5	52.0	90.7	12.3	51.3	74.3	9.3
1981	56.4	73.3	14.1	52.5	78.1	18.2	59.9	69.1	11.6
1982	49.2	73.3	11.9	49.1	84.6	19.8	49.3	63.4	7.0
1983	43.8	73.9	13.3	42.1	91.9	10.8	45.2	58.5	14.9
1984	52.3	65.4	11.1	52.9	81.9	10.6	51.8	51.4	11.5
1985	50.2	66.2	10.8	60.3	81.3	4.6	41.7	53.4	15.3
1986	56.7	69.5	10.0	52.0	82.6	8.6	60.7	58.8	11.1
1987	51.8	68.0	10.4	55.7	74.3	14.4	48.5	62.8	7.5
1988	51.2	60.8	11.4	57.2	76.4	14.4	45.8	48.3	9.0
1989	53.8	61.4	7.1	58.6	79.4	6.9	49.4	47.4	7.2
1990	57.8	63.6	13.9	59.6	84.5	14.2	56.0	48.1	13.6
1991	57.6	58.0	13.3	60.5	68.7	19.5	54.8	50.2	8.4

Table 4-11 (continued)

Year	Age Specific Rate of First Use ¹								
	Total			Male			Female		
	12-17	18-25	26-34	12-17	18-25	26-34	12-17	18-25	26-34
1992	61.9	69.1	11.9	61.9	77.5	14.4	61.9	62.9	10.0
1993	58.7	60.0	12.6	56.1	71.4	17.4	61.3	51.5	9.0
1994 ²	67.7	68.9	10.4	71.9	93.5	11.2	63.6	50.0	9.7
1995 ³	71.8	62.3	11.3	78.4	81.1	8.9	65.1	48.0	13.0
1996 ⁴	77.8	68.4	7.5	72.9	84.8	9.9	82.6	55.9	5.8

* Low Precision, no estimate reported.

** Estimate rounds to zero.

¹ The numerator of each rate equals the number of persons who first used the drug in the year (times 1000). The denominator of each rate equals the number of persons who were exposed to risk of first use during the year, weighted by their estimated exposure time measured in years. For example, for the age group 12-17 in 1990, the denominator is the sum of three components:

- (1) those persons 12-17 years old in 1990 who first used the drug in 1989 or earlier, times a weight of zero. The weight is zero since they had zero exposure to the risk of first use in 1990.
- (2) those who first used the drug in 1990 times a weight of 0.5. The weight of 0.5 assumes that these people, on average, first used the drug at mid-year and consequently have a half year of exposure (i.e., the first half of the year.)
- (3) those who never used, or those who first used the drug in 1991 or later, times a weight of 1.0. The weight of 1.0 assumes their exposure to the risk of first use during 1990 was for the whole year.

Each person is also weighted by his/her sample weight.

² Estimated using 1995, 1996, and 1997 data only.

³ Estimated using 1996 and 1997 data only.

⁴ Estimated using 1997 data only.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1994-1997.

past year rate dropping from 15 percent in 1994 to 8.8 percent in 1998. Table 4-4 includes the prevalence of cigar use by teens from the 1997 and 1998 surveys (cigar questions were added to the NHSDA in 1997). Cigars have been increasing in popularity for the last few years. White and Hispanic males are the most likely adolescents to report this behavior (8.5 and 6.6 percent, respectively).

Although the prevalence of past month cigarette smoking (current use) among adolescents has been relatively stable over time for all age, racial/ethnic, and gender groups in the NHSDA between 1994 and 1998, incidence estimates from this survey indicate there may be cause for concern. The trends for initiation of cigarette smoking (shown in Tables 4-10 through 4-12) indicate that an alarming number of adolescents become regular smokers each day. The incidence data included in this chapter indicate that more than 6,000 persons under the age of 18 try their first cigarette each day, and more than 3,000 persons under the age of 18 become daily smokers each day. Among persons 12 to 17 years of age, particularly the females, the incidence of first use of cigarettes and first daily use have been rising during the 1990s. Age-specific rates of regular smoking (first daily use) of cigarettes among 12- to 17-year-olds (per 1,000 years of exposure) have almost doubled in the last 30 years, from 44.0 in 1965 to 77.8 in 1996.

DATA LIMITATIONS An important potential source of bias is the underreporting of illicit behaviors such as cigarette use for persons less than 18 years of age (Bradburn *et al.*, 1987). While there are no objective criteria for validating the self-reports in this study, inferential evidence of their validity is available. Examples of such evidence include the large proportion of respondents admitting to the use of the tobacco products included, the near universal completion of survey items concerning tobacco use (NIDA, 1997), and the finding of predictable relationships between cigarette use and such items as self-reported grades. Underreporting bias has been reduced by allowing respondents to answer sensitive questions on self-administered answer sheets.

In a study published in 1998, Brittingham *et al.* analyzed data from the 1994 NHSDA. The main interview in the 1994 NHSDA included two versions of the smoking items. In one version, the interviewer administered the smoking questions and, in the other, the questions were self-administered. Even though cigarette use is legal for adults, self-administered questions produced higher estimates for the prevalence of cigarette smoking than interviewer-administered questions for respondents of all ages (Brittingham *et al.*, 1998).

**THE FOLLOWING PAGES CONTAIN
TABLES 4-12 THROUGH 4-14, WHICH
SHOW STANDARD ERRORS FOR
TABLES 4-9 THROUGH 4-11**

Table 4-12

Standard Errors of Estimated Number (in 1000s) of Persons who First Used a Cigarette during Each Year 1965–1995, Their Mean Age at First Use, and Annual Age-Specific Rates of First Use (per 1000 Person-Years of Exposure), Based on 1994–1997 NHSDAs

Year	Initiates (1000s)	Mean Age (Years)	Age-Specific Rate of First Use ¹		
			12–17	18–25	26–34
1965	190	0.4	7.6	13.9	9.0
1966	188	0.3	7.3	14.5	6.0
1967	176	0.3	7.4	11.1	6.3
1968	166	0.3	8.4	11.2	9.0
1969	185	0.3	7.9	12.4	4.4
1970	218	0.4	9.1	11.3	10.9
1971	185	0.2	7.8	11.0	3.0
1972	188	0.2	7.5	10.1	8.4
1973	149	0.3	6.9	7.7	4.8
1974	184	0.2	8.1	9.9	2.5
1975	177	0.2	7.7	9.6	2.7
1976	197	0.3	7.4	9.9	3.2
1977	153	0.2	6.0	9.4	3.8
1978	124	0.3	4.8	6.6	2.5
1979	124	0.2	5.7	8.9	3.6
1980	106	0.3	4.9	6.6	2.9
1981	115	0.3	5.2	6.4	1.9
1982	108	0.2	4.7	6.6	3.5
1983	110	0.2	5.3	4.8	1.4
1984	115	0.2	4.6	5.7	2.2
1985	110	0.2	5.2	4.0	3.1
1986	99	0.2	5.7	5.7	1.3
1987	102	0.3	4.9	4.7	3.0
1988	91	0.2	5.1	4.6	2.1
1989	94	0.4	4.8	4.4	1.7
1990	94	0.2	4.1	5.2	1.6
1991	116	0.3	4.5	5.6	4.0
1992	102	0.2	4.2	4.5	2.9
1993 ²	107	0.3	5.0	4.9	1.5
1994 ³	155	0.4	6.6	7.3	1.4
1995 ⁴	178	0.2	9.1	10.1	2.6

¹ The numerator of each rate equals the number of persons who first used the drug in the year (times 1000). The denominator of each rate equals the number of persons who were exposed to risk of first use during the year, weighted by their estimated exposure time measured in years. For example, for the age group 12–17 in 1990, the denominator is the sum of three components:

(1) those persons 12–17 years old in 1990 who first used the drug in 1989 or earlier, times a weight of zero. The weight is zero since they had zero exposure to the risk of first use in 1990.

(2) those who first used the drug in 1990 times a weight of 0.5. The weight of 0.5 assumes that these people, on average, first used the drug at mid-year and consequently have a half year of exposure (i.e., the first half of the year.)

(3) those who never used, or those who first used the drug in 1991 or later, times a weight of 1.0. The weight of 1.0 assumes their exposure to the risk of first use during 1990 was for the whole year.

Each person is also weighted by his/her sample weight.

² Estimated using 1995, 1996, and 1997 data only.

³ Estimated using 1996 and 1997 data only.

⁴ Estimated using 1997 data only.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1994–1997.

Table 4-13

Standard Errors of Estimated Number (in 1000s) of Persons who Began Daily Cigarette Use during Each Year 1965–1996, Their Mean Age at First Daily Use, and Annual Age-Specific Rates of First Daily Use (per 1000 Person-Years of Exposure), Based on 1994–1997 NHSDAs

Year	Initiates (1000s)	Mean Age (Years)	Age-Specific Rate of First Use ¹		
			12–17	18–25	26–34
1965	141	0.5	7.2	11.6	4.5
1966	139	0.3	4.9	13.9	2.7
1967	145	0.5	5.9	12.9	7.1
1968	162	0.5	5.9	14.5	2.7
1969	150	0.3	6.2	12.4	8.7
1970	128	0.3	5.1	10.5	3.2
1971	160	0.4	5.6	12.1	7.2
1972	141	0.3	5.1	9.0	8.7
1973	160	0.3	6.7	9.9	8.1
1974	167	0.6	6.0	10.7	5.5
1975	122	0.5	4.0	9.2	4.3
1976	124	0.3	4.2	8.4	4.4
1977	151	0.4	5.1	11.5	3.2
1978	109	0.5	3.9	7.7	3.3
1979	108	0.4	3.1	7.0	3.8
1980	94	0.5	3.4	6.9	3.2
1981	117	0.6	3.9	7.4	3.7
1982	101	0.7	3.4	7.8	4.6
1983	85	0.3	3.2	6.1	3.9
1984	73	0.4	3.6	4.0	2.5
1985	92	0.5	3.8	5.1	3.8
1986	67	0.3	3.9	4.6	2.5
1987	78	0.3	4.7	5.0	2.5
1988	70	0.5	3.8	4.5	1.9
1989	78	0.6	3.5	4.5	1.4
1990	71	0.3	3.6	4.4	2.5
1991	82	0.3	3.8	4.3	3.6
1992	83	0.3	4.0	4.2	2.2
1993	79	0.7	3.2	4.3	2.7
1994 ²	78	0.5	3.7	5.9	2.2
1995 ³	113	0.3	4.5	6.5	2.3
1996 ⁴	139	0.4	7.0	7.8	3.4

¹ The numerator of each rate equals the number of persons who first used the drug in the year (times 1000). The denominator of each rate equals the number of persons who were exposed to risk of first use during the year, weighted by their estimated exposure time measured in years. For example, for the age group 12–17 in 1990, the denominator is the sum of three components:

(1) those persons 12–17 years old in 1990 who first used the drug in 1989 or earlier, times a weight of zero. The weight is zero since they had zero exposure to the risk of first use in 1990.

(2) those who first used the drug in 1990 times a weight of 0.5. The weight of 0.5 assumes that these people, on average, first used the drug at mid-year and consequently have a half year of exposure (i.e., the first half of the year.)

(3) those who never used, or those who first used the drug in 1991 or later, times a weight of 1.0. The weight of 1.0 assumes their exposure to the risk of first use during 1990 was for the whole year.

Each person is also weighted by his/her sample weight.

² Estimated using 1995, 1996, and 1997 data only.

³ Estimated using 1996 and 1997 data only.

⁴ Estimated using 1997 data only.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1994–1997.

Table 4-14

Standard Errors of Annual Age-Specific Rates of First Daily Use (per 1000 Person-Years of Exposure) of Persons who Began Daily Cigarette Use during Each Year, 1962–1996, among the Total U.S. Population by Gender, Based on 1994–1997 NHSDAs

Year	Age Specific Rate of First Use ¹								
	Total			Male			Female		
	12–17	18–25	26–34	12–17	18–25	26–34	12–17	18–25	26–34
1962	6.0	20.3	6.6	9.3	39.4	*	7.8	23.7	5.8
1963	6.4	16.6	12.2	10.0	32.2	*	8.5	18.4	17.2
1964	5.1	13.4	9.5	7.9	29.8	*	6.0	12.1	13.3
1965	7.2	11.6	4.5	12.6	23.6	*	6.4	12.8	2.3
1966	4.9	13.9	2.7	8.6	27.7	**	4.8	14.3	3.8
1967	5.9	12.9	7.1	10.0	25.6	6.2	6.3	13.3	9.6
1968	5.9	14.5	2.7	9.7	29.1	3.4	6.9	16.0	3.5
1969	6.2	12.4	8.7	9.3	24.8	14.9	8.8	12.7	10.7
1970	5.1	10.5	3.2	10.9	20.4	7.9	5.6	10.6	3.2
1971	5.6	12.1	7.2	9.4	24.8	6.1	7.1	10.2	9.5
1972	5.1	9.0	8.7	8.1	16.7	7.3	6.6	9.0	11.9
1973	6.7	9.9	8.1	11.1	21.5	11.1	7.2	10.5	10.5
1974	6.0	10.7	5.5	8.7	18.3	9.3	7.7	12.7	6.9
1975	4.0	9.2	4.3	5.8	16.2	10.6	6.1	9.7	3.7
1976	4.2	8.4	4.4	6.0	13.0	8.5	6.3	10.4	5.3
1977	5.1	11.5	3.2	10.2	15.1	3.4	5.3	15.0	4.4
1978	3.9	7.7	3.3	6.8	14.2	5.1	4.4	9.3	4.3
1979	3.1	7.0	3.8	5.8	11.1	5.8	4.2	9.8	5.6
1980	3.4	6.9	3.2	5.6	12.7	6.8	3.9	7.9	3.2
1981	3.9	7.4	3.7	5.2	12.3	7.1	5.4	7.9	4.2
1982	3.4	7.8	4.6	4.9	12.3	10.9	4.8	7.0	3.0
1983	3.2	6.1	3.9	4.6	10.3	4.1	4.1	5.8	5.6
1984	3.6	4.0	2.5	6.1	7.2	4.4	4.4	4.5	3.6
1985	3.8	5.1	3.8	7.4	8.3	2.0	3.3	5.2	6.4
1986	3.9	4.6	2.5	5.4	7.6	3.5	5.2	5.1	3.2
1987	4.7	5.0	2.5	6.4	8.0	5.2	5.2	5.8	2.0
1988	3.8	4.5	1.9	5.7	8.1	5.2	4.3	4.5	2.5
1989	3.5	4.5	1.4	4.8	7.5	2.2	4.5	5.0	1.7
1990	3.6	4.4	2.5	5.6	7.5	3.4	4.5	4.9	3.7
1991	3.8	4.3	3.6	5.2	7.8	7.7	4.8	5.3	1.7

Table 4-14 (continued)

Year	Age Specific Rate of First Use ¹								
	Total			Male			Female		
	12-17	18-25	26-34	12-17	18-25	26-34	12-17	18-25	26-34
1992	4.0	4.2	2.2	5.4	7.1	3.6	4.8	5.6	3.1
1993	3.2	4.3	2.7	4.5	7.0	6.0	4.3	4.7	1.4
1994 ²	3.7	5.9	2.2	5.6	11.5	3.1	4.8	5.4	3.3
1995 ³	4.5	6.5	2.3	6.4	9.7	3.3	6.7	7.7	3.1
1996 ⁴	7.0	7.8	3.4	9.6	14.7	5.4	9.2	10.0	4.2

* Low Precision, no estimate reported.

** Estimate rounds to zero.

¹ The numerator of each rate equals the number of persons who first used the drug in the year (times 1000). The denominator of each rate equals the number of persons who were exposed to risk of first use during the year, weighted by their estimated exposure time measured in years. For example, for the age group 12-17 in 1990, the denominator is the sum of three components:

- (1) those persons 12-17 years old in 1990 who first used the drug in 1989 or earlier, times a weight of zero. The weight is zero since they had zero exposure to the risk of first use in 1990.
- (2) those who first used the drug in 1990 times a weight of 0.5. The weight of 0.5 assumes that these people, on average, first used the drug at mid-year and consequently have a half year of exposure (i.e., the first half of the year.)
- (3) those who never used, or those who first used the drug in 1991 or later, times a weight of 1.0. The weight of 1.0 assumes their exposure to the risk of first use during 1990 was for the whole year.

Each person is also weighted by his/her sample weight.

² Estimated using 1995, 1996, and 1997 data only.

³ Estimated using 1996 and 1997 data only.

⁴ Estimated using 1997 data only.

Source: SAMHSA, Office of Applied Studies, National Household Survey on Drug Abuse, 1994-1997.

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