

Trends and Patterns of Tobacco Use in the United States

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ABSTRACT: This review summarizes recent trends and current patterns of tobacco use in the United States. Although adult smoking dropped between 1965 and 1990, from 50% to 28% of men and from 35% to 23% of women, the past decade has seen little further progress. In 2000, 25.7% of US men and 21.0% of women were smokers. Adolescent smoking has been declining since the late 1990s, but nearly 30% of high school seniors still smoke. In 2000, 4.4% of US men and 0.3% of women used snuff or chewing tobacco. Although adolescent smokeless tobacco use has declined in recent years, 14.8% of male high school students

were current users in 2001. In 2001, 22.1% of male high school students and 8.5% of women students were current cigar smokers. Bidis and kreteks may be gaining popularity among young people, and more than 15% of adolescent smokers use these tobacco products. Despite recent progress, tobacco use remains prevalent in the United States. State and local governments need to invest adequate resources in the full range of tobacco control activities. **KEY INDEXING TERMS:** Smoking; Tobacco; Smokeless; Prevalence; Adolescent; Adult. [Am J Med Sci 2003;326(4):248–254.]

Tobacco use continues to have devastating societal effects in the United States. More than 440,000 deaths each year in this country are attributable to cigarette smoking, making it the leading cause of preventable mortality.¹ Annual smoking-attributable personal health-care expenditures exceed \$75 billion, with nearly \$82 billion in mortality-related productivity losses attributable to smoking.¹ In addition, smokeless tobacco, cigars, and other tobacco products are widely used in the United States, despite being established as risk factors for cancer and many other health effects.^{2,3} Although some progress has been made in reducing tobacco use, the gains are modest and not consistent across all segments of American society.

Successful tobacco control efforts require reliable surveillance data for planning action and monitoring progress. The purpose of this review is to summarize recent trends in the use of tobacco products in the United States, examine current patterns for using these products, and highlight potential emerging problems.

Cigarette Smoking

Adults.

After the first US Surgeon General's report on the health effects of smoking in 1964,⁴ smoking began to decline after decades of increasing prevalence (Figure 1). In 1965, more than 50% of US men and 35% of US women were current smokers. By 1990, the prevalence of smoking declined to 28% for men and 23% among women. Unfortunately, the past decade has seen very little further progress in reducing the prevalence of smoking among adults. In 2000, 25.7% of US men and 21.0% of women were smokers (Table 1).⁵

During the past 25 years, trends in smoking differed widely by level of education. The age-adjusted prevalence of smoking among adults with less than a high school degree declined from 43.7% in 1974 to 31.9% in 2000, whereas the prevalence among college graduates dropped from 27.2% to 10.9% during that period.⁶ The gap between college graduates and groups with less than a college degree has increased since 1974. In 2000, the prevalence of smoking was highest among adults with a General Educational Development (GED) diploma (47.2%) and lowest among adults with a graduate degree (8.4%) (Table 1).⁵

Among men, the prevalence of smoking was nearly the same for non-Hispanic whites, non-Hispanic blacks, and Hispanics in 2000, between 24.0% and 26.1% (Table 1).⁵ Smoking was less common among Hispanic women (13.3%) than among non-Hispanic white (22.4%) or non-Hispanic black

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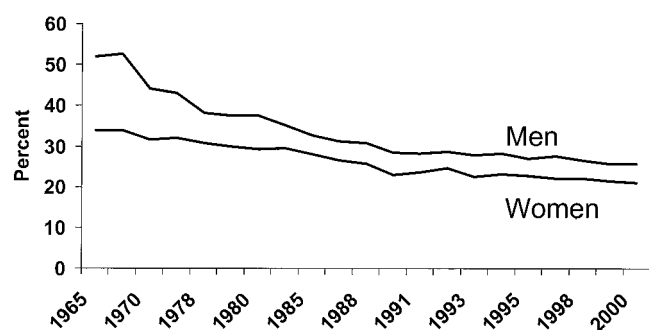


Figure 1. Trends in prevalence of cigarette smoking among adults—United States, 1965–2000. National Health Interviews.

women (20.9%). Native Americans and Native Alaskas experienced the highest prevalence of smoking in 2000 of any racial or ethnic group nationally, and was the only group in which the prevalence of smok-

ing was higher for women (42.5%) than for men (29.1%).

Based on data from the Behavioral Risk Factor Surveillance System, the prevalence of smoking among adults varied widely among the states in 2000, from 12.9% in Utah to 30.5% in Kentucky (Figure 2).⁷ Utah was the only state that achieved the Healthy People 2000 Objective^{8,9} of a prevalence of no more than 15% among persons aged 18 years and older. In 11 states, more than one quarter of adults were current smokers.

Young People.

The Monitoring the Future Project (MTFP), conducted since 1975 by the University of Michigan under contract with the National Institute on Drug Abuse, provides the longest-running trend data on smoking among US high school students.¹⁰ In the MTFP, current smoking was defined as having smoked during the 30 days preceding the survey.

Table 1. Percentage of Persons Aged >18 Years Who Were Current Smokers,^a by Selected Characteristics—National Health Interview Survey, United States, 2000

Characteristic	Men (n = 13,986)		Women (n = 18,388)		Total (n = 32,374)	
	%	95% CI ^b	%	95% CI	%	95% CI
Age						
18–24	28.5	±2.7	25.1	±2.4	26.8	±1.8
25–44	29.7	±1.4	24.5	±1.1	27.0	±0.9
45–64	26.4	±1.5	21.6	±1.3	24.0	±1.0
65+	10.2	±1.3	9.3	±1.0	9.7	±0.8
Education ^c						
0–12 no diploma	33.2	±2.2	23.6	±1.7	28.2	±1.4
GED ^d diploma	50.1	±6.2	44.3	±5.7	47.2	±4.3
12 diploma	31.7	±1.9	23.5	±1.4	27.2	±1.2
Associate degree	21.9	±2.8	20.4	±2.4	21.1	±1.8
Some college	25.8	±2.1	21.6	±1.7	23.5	±1.3
Undergraduate degree	14.2	±1.7	12.4	±1.5	13.2	±1.1
Graduate degree	9.1	±1.8	7.5	±1.6	8.4	±1.2
Race/Ethnicity ^e						
Hispanic	24.0	±2.1	13.3	±1.6	18.6	±1.3
White, non-Hispanic	25.9	±1.0	22.4	±0.8	24.1	±0.7
Black, non-Hispanic	26.1	±2.5	20.9	±1.7	23.2	±1.5
Native American/Alaskan ^f	29.1	±11.0	42.5	±11.0	36.0	±8.0
Asian ^g	21.0	±4.6	7.6	±2.8	14.4	±2.8
Poverty status ^h						
At or above	25.4	±1.0	20.4	±0.9	22.9	±0.7
Below	35.3	±3.2	29.1	±2.3	31.7	±1.9
Unknown	23.6	±1.8	19.5	±1.4	21.4	±1.1
Total	25.7	±0.8	21.0	±0.7	23.3	±0.5

^a Smoked >100 cigarettes during their lifetime and reported smoking every day or some days at the time of interview. Excludes 301 respondents for whom smoking status was unknown.

^b Confidence interval.

^c Persons aged >25 years. Excludes 305 persons with unknown years of education.

^d General Educational Development.

^e Excludes 287 respondents of unknown, multiple, and other racial/ethnic categories.

^f Wide variances among estimates reflect limited sample sizes.

^g Does not include Native Hawaiians and other Pacific Islanders.

^h The 1999 poverty thresholds from the Bureau of the Census were used in these calculations. Adapted from ref. ⁵.

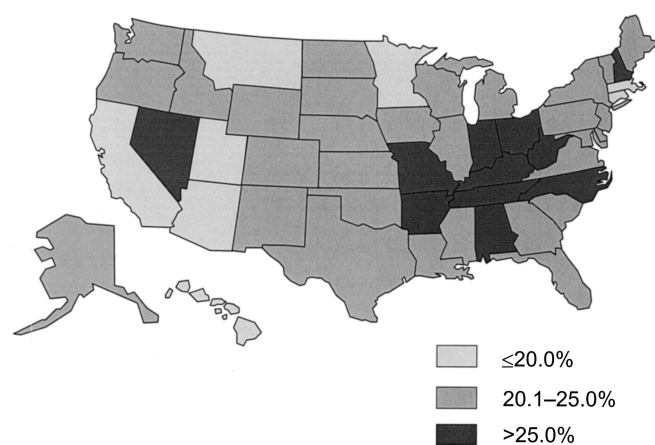


Figure 2. Prevalence of current smoking by adults—United States, 2000. Behavioral Risk Factor Surveillance System.

The prevalence of smoking declined from nearly 40% among high school seniors in the mid-1970s to about 30% in the early 1980s, and then remained relatively constant for the next decade (Figure 3). From 1976 through 1990, smoking was more prevalent among female high school seniors than among male students but has been higher among boys since then. High school seniors experienced a steep increase in smoking from 1991 through 1997, and it seems that the prevalence has been trending downward since 1998. The current prevalence is still high, however, at 29.7% and 28.7% of male and female high school seniors, respectively, in 2001.

Other school-based data on smoking in high schools are collected in the Youth Risk Behavior Survey (YRBS),¹¹ conducted by the Centers for Disease Control and Prevention biennially since 1991. The YRBS consistently reported a higher prevalence

of current smoking than the MTFP for each year, perhaps because of differences in question wording or other aspects of the surveys' methodologies. However, the trends for the 2 surveys are parallel and both surveys suggest that smoking levels among high school students peaked in the late 1990s and are now declining. Based on the 2001 YRBS, 23.9% of high school boys and girls in the ninth grade were current smokers, with a higher prevalence in each successive grade up to 35.2% of seniors (Table 2). Although boys tended to have a higher prevalence of current smoking than girls overall and within most grades, those differences were not statistically significant. Smoking was more common among non-Hispanic white students (31.9%) than among non-Hispanic black (14.7%) or Hispanic students (26.6%).

Factors that may have contributed to a decline in cigarette use among high school students include a 70% increase in the retail price of cigarettes from December 1997 to May 2001,¹² increased school-based efforts to prevent tobacco use,¹³ and increased exposure of youth to both state and national mass media smoking prevention campaigns.¹⁴

Smokeless Tobacco

Smokeless tobacco products, such as moist snuff and chewing tobacco, have been determined to be carcinogenic to humans,^{3,15} carry many risks to oral health,³ and may increase the risk for cardiovascular diseases.¹⁶ These products were heading toward extinction by the late 1960s. However, development of new moist snuff products that promoted experimentation, initiation, and nicotine addiction among young people fueled a rapid increase in their popularity.¹⁷ The epidemiology of snuff use changed from

Table 2. Percentage of High School Students Who Used Tobacco, by Sex, Race/Ethnicity, and Grade—United States, Youth Risk Behavior Survey, 2001

	Current Cigarette Use ^a			Current Smokeless Tobacco Use ^b			Current Cigar Use ^c		
	Female	Male	Total	Female	Male	Total	Female	Male	Total
Race/Ethnicity									
White, non-Hispanic	31.2 ± 2.5 ^d	32.7 ± 3.0	31.9 ± 2.3	2.1 ± 0.6	18.9 ± 3.8	10.3 ± 2.0	7.7 ± 1.5	23.8 ± 1.9	15.6 ± 1.4
Black, non-Hispanic	13.3 ± 3.4	16.3 ± 3.2	14.7 ± 2.8	0.7 ± 0.7	2.9 ± 1.4	1.8 ± 0.8	8.6 ± 2.7	15.8 ± 3.1	12.1 ± 2.6
Hispanic	26.0 ± 3.7	27.2 ± 7.0	26.6 ± 4.3	1.8 ± 0.8	6.4 ± 1.5	4.1 ± 0.7	11.5 ± 2.8	21.4 ± 3.8	16.5 ± 2.5
Grade									
9	23.6 ± 3.8	24.3 ± 3.1	23.9 ± 2.9	1.5 ± 0.7	12.2 ± 3.2	6.6 ± 1.8	8.4 ± 2.6	16.9 ± 2.3	12.5 ± 2.3
10	28.4 ± 3.8	25.4 ± 3.5	26.9 ± 3.2	2.3 ± 0.9	15.2 ± 3.2	8.7 ± 1.7	9.3 ± 2.1	19.6 ± 2.1	14.4 ± 1.9
11	27.3 ± 3.3	32.3 ± 5.0	29.8 ± 3.7	1.7 ± 0.8	16.5 ± 4.0	9.0 ± 2.1	8.3 ± 1.7	25.3 ± 2.9	16.8 ± 2.3
12	33.1 ± 5.3	37.5 ± 4.6	35.2 ± 4.1	1.6 ± 0.9	16.0 ± 3.8	8.7 ± 2.0	7.9 ± 2.4	28.6 ± 3.4	18.0 ± 2.8
Total	27.7 ± 2.1	29.2 ± 2.6	28.5 ± 2.0	1.9 ± 0.5	14.8 ± 2.9	8.2 ± 1.5	8.5 ± 1.3	22.1 ± 1.5	15.2 ± 1.2

^a Smoked cigarettes on ≥1 of the 30 days preceding the survey.

^b Used chewing tobacco, snuff, or dip on ≥1 of the 30 days preceding the survey.

^c Smoked cigars, cigarillos, or little cigars on ≥1 of the 30 days preceding the survey.

^d 95% confidence interval.

Adapted from ref. ¹¹.

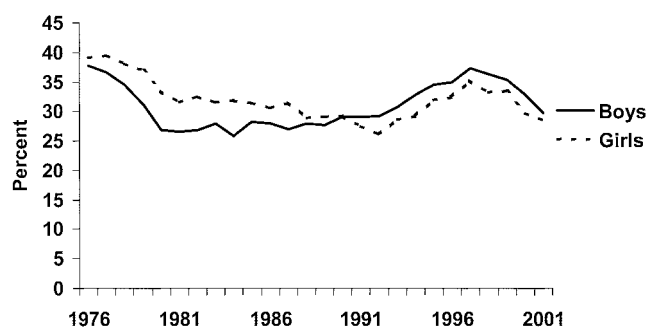


Figure 3. Trends in prevalence of cigarette smoking among high school seniors—United States, 1976–2001. Monitoring the Future Project.

a predominantly older male behavior in 1970 to one practiced mostly by younger men in 2000. Moist snuff is the only tobacco product in the United States that has shown an increase in sales every year since at least the mid-1980s, rising from 36.1 million pounds (\$438 million) in 1986 to 58.4 million pounds (\$1.6 billion) in 1999.¹⁸ Advertising and pro-

motional expenditures paralleled and probably fueled that growth, rising from \$43.3 million in 1986 to \$147.3 million in 1999.¹⁸ Those expenditures increased by more than \$44 million, or 42%, since the 1997 levels that preceded the Master Settlement Agreement in which the major US snuff manufacturer agreed to “voluntarily adopted an array of marketing and advertising restrictions.”¹⁹

Adults. Smokeless tobacco use is a predominantly male behavior in the United States, although there are selected regions and populations in which female use is relatively common.²⁰ In 2000, 4.4% of US men and 0.3% of women were current users of these products (Table 3). Current use was more common among men aged 18 to 24 years (5.0%) or 25 to 44 (5.8%) than men aged 45 years and older (2.8–3.1%). Non-Hispanic white men were more likely to be current users (5.5%) than were men in other racial or ethnic groups (0.8–2.2%), although there was an insufficient sample size to permit meaningful national estimates for some racial and ethnic groups that may have high levels of use, such as Native Americans. The prevalence of smokeless tobacco use

Table 3. Prevalence of Current Smokeless Tobacco Use, by Selected Demographic Characteristics—United States, 2000. National Health Interview Survey

Characteristic	Men		Women		Total	
	%	95% CI ^a	%	95% CI	%	95% CI
Age (years)						
18–24	5.0	±1.5	0.0	±0.0	2.5	±0.8
25–44	5.8	±0.7	0.2	±0.1	2.9	±0.4
45–64	3.1	±0.6	0.4	±0.2	1.7	±0.3
65+	2.8	±0.8	0.7	±0.3	1.6	±0.4
Region ^b						
Northeast	2.2	±0.5	0.1	±0.1	1.1	±0.3
Midwest	4.4	±0.7	0.1	±0.1	2.1	±0.3
South	6.7	±0.8	0.7	±0.2	3.6	±0.4
West	2.6	±0.9	0.1	±0.1	1.3	±0.5
Education						
Less than high school diploma	5.7	±1.2	1.1	±0.4	3.4	±0.6
High school or GED diploma	5.6	±0.8	0.2	±0.1	2.7	±0.4
More than high school diploma	3.4	±0.5	0.1	±0.1	1.7	±0.2
Race/Ethnicity						
Hispanic	0.8	±0.5	0.0	±0.0	0.4	±0.2
White, non-Hispanic	5.5	±0.5	0.2	±0.1	2.7	±0.3
Black, non-Hispanic	1.3	±0.6	1.3	±0.5	1.3	±0.4
Other	2.2	±1.5	0.5	±0.6	1.4	±0.8
Location of residence ^c						
MSA	3.3	±0.4	0.2	±0.1	1.7	±0.2
Non-MSA	9.0	±1.3	0.6	±0.2	4.5	±0.6
Total	4.4	±0.4	0.3	±0.1	2.3	±0.2

^a Confidence interval.

^b Northeast = Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania; Midwest = Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas; South = Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, Texas; West = Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Washington, Oregon, California, Alaska, Hawaii.

^c MSA is metropolitan statistical area. An MSA is a county or group of contiguous counties that contain at least one city with a population of 50,000 or more or includes a Census Bureau-defined urbanized area of at least 50,000 with a metropolitan population of at least 100,000.

was higher among men with a high school education or less (5.6–5.7%) than among those with at least some post-high-school education (3.4%). Prevalence of smokeless tobacco use was higher among men in the South (6.7%) than in other geographic regions (2.2–4.4%) and was much higher among men living outside of metropolitan statistical areas (9.0%) than among urban men (3.3%). Based on unpublished data from the 1999 Current Population Survey Tobacco Use Supplement, the prevalence of smokeless tobacco use was highest among adult men in Montana (15.2%), West Virginia (13.7%), Wyoming (13.3%), Oklahoma (8.5%), and Alabama (8.1%).

Adolescents. Similar to the pattern among adults, boys are the predominant adolescent smokeless tobacco users in the United States. Although the prevalence of smokeless tobacco use among male high school students seems to have been declining since 1993, when 20.4% were current users,²¹ 14.8% of male students were current users in 2001.¹¹ Smokeless tobacco use ranged from 12.2% of ninth-grade boys to 16.0% of male seniors, whereas among high school girls it ranged from 1.5% to 2.3% across grades. The prevalence was substantially higher among non-Hispanic white male students (18.9%) than among male Hispanic (6.4%) or non-Hispanic black students (2.9%).¹¹

Cigars

Cigar smoking has been established as a risk factor for cancers of the oral cavity, pharynx, larynx, esophagus, and lung.² Cigar smokers who inhale increase their risk for chronic obstructive pulmonary disease and coronary heart disease. The US Department of the Treasury defines cigars as “any roll of tobacco wrapped in leaf tobacco or in any substance containing tobacco.”²² This definition allows a loophole in which “little cigars” that look and function like cigarettes are exempt from cigarette excise taxes and marketing restrictions. It also allows manufacturers to imply relative safety by claiming their product is “not a cigarette,” as was stated in magazine advertisements for Swisher Sweets. Thus, television and radio advertising for little cigars began in 1972 after such advertisements were prohibited for cigarettes, which resulted in an increase in consumption from 1.1 billion little cigars in 1971 to more than 4.4 billion in 1973.²² After the ban on television and radio advertising for little cigars in 1973, consumption declined steadily until the mid-1980s.

Large cigars reached their peak consumption in 1964, at 9.1 billion cigars.²³ After the issuance of the first Surgeon General’s Report on Smoking and Health⁴ during that year, the consumption of large cigars began a precipitous drop, reaching a 50-year low of 2.1 billion cigars in 1993. However, similar to the history of smokeless tobacco in this country,

cigar manufacturers resurrected an industry in decline by changing the product’s image. In the early 1990s, cigar manufacturers and their proponents began sponsoring upscale cigar dinners, developed *Cigar Aficionado*—a slick magazine designed to promote cigars as part of the “good life,” gained product placement in movies, and intensified advertising for cigars.²⁴ In response, consumption of large cigars increased by 80% between 1993 and 2001, and now exceeds 3.8 billion cigars annually.²³ Consumption of small cigars increased by 89% during that time period, and now exceeds 2.4 billion cigars per year.

Data from the 2000 National Health Interview Survey provide the most recent national prevalence estimates for adult cigar smoking. Overall, 4.5% of US men and 0.2% of women were current cigar smokers, defined as having smoked at least 50 cigars in one’s lifetime and smoking a cigar every day or on some days at the time of the survey. Cigar smoking was most common among men aged 25–44 years (5.1%), followed by those aged 45 to 64 years (4.8%), 18 to 24 years (3.8%), and 65 years and older (2.6%). Cigar smoking was uncommon among women of all ages.

Adolescent Cigar Smoking Based on the most recent data from the national Youth Risk Behavior Survey, cigar smoking is quite prevalent among US high school students. In 2001, 22.1% of male high school students and 8.5% of female high school students smoked a cigar during the 30 days preceding the survey.¹¹ Although the prevalence of cigar smoking was relatively constant across grades for girls at about 8 to 9%, among high school boys, the prevalence ranged from 16.9% for ninth graders to 28.6% for seniors. Among boys, cigar smoking was most prevalent for non-Hispanic whites (23.8%), followed by Hispanics (21.4%) and African Americans (15.8%); data were not available for other racial or ethnic groups. Among girls, cigar smoking was most common among Hispanics (11.5%), followed by African Americans (8.6%) and non-Hispanic whites (7.7%). It is not known whether some of the cigar smoking reported by high school students may reflect the practice of “blunting,” in which part of the tobacco filler in a cigar is removed and replaced with marijuana.²⁵

Bidis and Kreteks

Bidis are small, brown, hand-rolled cigarettes that are made in India and Southeast Asian countries. They are composed of tobacco wrapped in a tendu leaf, which is taken from a broad-leafed plant native to India.²⁶ Although some young people may perceive bidis as safer than cigarettes,²⁷ bidis may produce substantially higher levels of carbon monoxide, nicotine, and tar than conventional cigarettes²⁸ and carry similar health risks.²⁶

National data on bidi smoking among young peo-

ple are derived from the 2000 National Youth Tobacco Survey, a school-based survey of students in grades 6 to 12 conducted by the American Legacy Foundation and the CDC Foundation. In 2000, 4.1% of high school students (5.4% of boys and 2.8% of girls) and 2.4% of middle school students (3.4% of boys and 1.4% of girls) were current bidi smokers.²⁹ There was no statistically significant difference in bidi smoking among racial or ethnic groups in middle schools of high schools. A 1999 Massachusetts survey of urban youth found that 16% of middle and high school students had smoked a bidi within the preceding 30 days,²⁷ suggesting that they may be very popular among adolescents in some areas. The 1999 National Youth Tobacco Survey found that bidi smoking was relatively common among students who smoked cigarettes; 15.1% of cigarette smokers smoked a bidi within the preceding 30 days, compared with 0.9% of nonsmokers.³⁰

The only source of national data on bidi smoking among adults is unpublished data from the 2000 National Health Interview Survey. In 2000, about 0.2% of adults reported current bidi smoking.

Kreteks (also called clove cigarettes) are flavored cigarettes containing tobacco and clove extract that are manufactured in Indonesia. Kreteks seem to carry tobacco-related health risks similar to conventional cigarettes, plus additional adverse pulmonary effects from volatilized eugenol.³¹

Based on findings from the 2000 National Youth Tobacco Survey, 4.2% of high school students (5.3% of boys and 3.0% of girls) and 2.1% of middle school students (2.7% of boys and 1.5% of girls) smoked a kretek during the 30 days preceding the survey.²⁹ Data from the 1999 National Youth Tobacco Survey suggest that 16.7% of students who were current cigarette smokers also smoked a kretek within the preceding month, compared with just 0.7% of nonsmokers.³⁰ There are no recent national data on the prevalence of kretek smoking among US adults.

Conclusions

Despite recent progress, tobacco use remains prevalent in the United States. Overall, smoking among adults has been declining very slowly for more than a decade, and about 1 in 4 US adults is a smoker. Although smoking seems to be declining among high school students, nearly 1 in 3 high school students smoke. States differ markedly in progress toward achieving the Healthy People objectives on smoking, with significantly better success among states that have invested in comprehensive tobacco control programs.³²

Cigar smoking is surprisingly common among young people, and the long-term consequences of this trend are unknown. Although recent data suggest that the popularity of cigars that began in the

mid-1990s may be starting to wane, cigar consumption remains higher than it was a decade ago.

The prevalence of smokeless tobacco use among young people seems to be declining in recent years but still remains high in specific groups, such as white men, and in certain geographic areas. The impact of emerging marketing strategies by smokeless tobacco manufacturers, such as the introduction of new products designed to appeal to new users and promotion of smokeless tobacco for smoking supplementation and "harm reduction," remains to be seen.

Although the use of "alternative" tobacco products such as bidis and kreteks is fairly low in the United States, it does seem that these products are gaining in popularity and have fairly high use among adolescent cigarette smokers. Unfortunately, the public health community is sometimes caught off guard when use of such tobacco products expands rapidly.

Because of the need to quickly identify emerging trends, target resources to high-risk populations, and monitor the effectiveness of public health interventions, it is imperative to conduct surveillance for tobacco use nationally, statewide, and locally. Surveillance data provide the scientific basis for public health practice and policy-making and are critical in reducing the societal burden of tobacco use. State and local governments need to invest adequate resources in the full range of tobacco control activities, including the conduct of surveillance for tobacco use.

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