

Cancer Prevention & Early Detection

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Figures* 2002



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Preface

This American Cancer Society publication focuses on cancer prevention and early detection and provides the most current data on tobacco use, nutrition, physical activity, obesity, and cancer screening. It complements the annual publication, *Cancer Facts & Figures*, by providing information on modifiable risk factors and screening examinations that affect cancer incidence, mortality, and survival.

The patterns of cancer occurrence we observe today reflect the effects of programs, laws, policies, and behaviors over the last half-century. To be effective, cancer control programs should be monitored to ensure that progress is being made in cancer prevention and early detection, leading to future declines in incidence and mortality rates. This publication compiles relevant data

from multiple sources and provides this information for the nation, the 50 states, the District of Columbia, and selected major cities.

The American Cancer Society is dedicated to eliminating cancer as a major health problem by preventing cancer, saving lives, and diminishing suffering from cancer through research, education, advocacy, and service. To advance this mission, the Society in 1999 set bold challenge goals for the nation that, if met, would significantly lower cancer incidence and mortality rates and improve the quality of life for all cancer survivors by the year 2015 (see below). Nationwide objectives were also developed to set the framework for achieving the 2015 challenge goals (see below). These objectives can only be achieved by improved collaboration between government agencies, private companies, other non-profit organizations, health care providers, policymakers, insurers, and the American public.

American Cancer Society Goals and Objectives

2015 challenge goals

- A 50% reduction in age-adjusted cancer mortality rates.
- A 25% reduction in age-adjusted cancer incidence rates.
- A measurable improvement in the quality of life (physical, psychological, social, and spiritual) from the time of diagnosis and for the balance of life, of all cancer survivors.

2015 nationwide objectives

Adult Tobacco Use: Reduce to 12% the proportion of adults (18 and older) who use tobacco products.

Youth Tobacco Use: Reduce to 10% the proportion of young people (under 18) who use tobacco products.

Nutrition: Increase to 75% the proportion of persons who follow American Cancer Society guidelines with respect to consumption of fruits and vegetables as published in the *American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Prevention*.

Physical Activity: Increase to 90% the proportion of youth (high school students) and to 60% the proportion of adults who follow American Cancer Society guidelines with respect to the appropriate level of physical activity as published in the *American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Prevention*.

Comprehensive School Health Education: Increase to 50% the proportion of school districts that provide a comprehensive or coordinated school health education program.

Sun Protection: Increase to 75% the proportion of people of all ages who use at least two or more of the following protective measures which may reduce the risk of skin cancer: avoid the sun between 10 a.m. and 4 p.m.; wear sun-protective clothing when exposed to sunlight; use sunscreen with an SPF 15 or higher; and avoid artificial sources of ultraviolet light (e.g., sun lamps, tanning booths).

Breast Cancer Early Detection: Increase to 90% the proportion of women aged 40 and older who have breast screening consistent with American Cancer Society guidelines (by 2008).

Colorectal Cancer Early Detection: Increase to 75% the proportion of people aged 50 and older who have colorectal screening consistent with American Cancer Society guidelines.

Prostate Cancer Early Detection: Increase to 90% the proportion of men aged 50 and older who follow American Cancer Society detection guidelines for prostate cancer.

Tobacco Use

Tobacco use is a major preventable cause of disease and premature death in the United States. It accounted for an estimated 430,700 premature deaths each year from 1990 to 1994 and more than \$53 billion in direct medical costs in 1993.^{1,2} Tobacco use causes increased risk for cancer of the lung, mouth, larynx, pharynx, esophagus, pancreas, kidney, bladder, and uterine cervix. Thirty percent of all cancer deaths and 87% of lung cancer deaths can be attributed to tobacco.^{3,4} The American Cancer Society estimates that, in 2002, 170,000 cancer deaths will be attributable to tobacco use; 154,900 of these from lung cancer.⁵

Adult Tobacco Use

Tobacco Use on a National Level

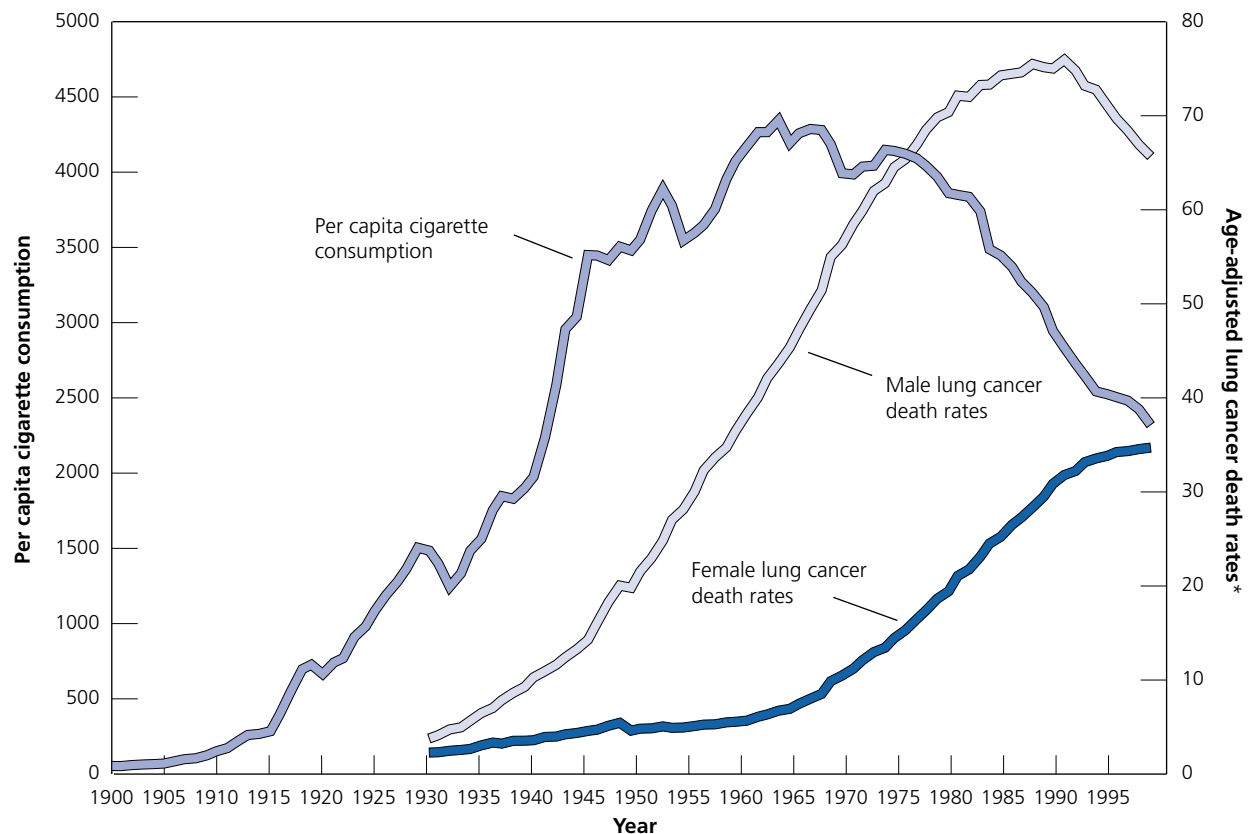
Annual per capita cigarette consumption in the United States increased during the first half of the twentieth

century, peaked in 1963, and has decreased since the first US Surgeon General's Report on Smoking and Health in 1964 (Figure 1A).⁶⁻⁹ The lung cancer death rate among men peaked approximately 25 years after the year of highest cigarette consumption and has decreased since 1990. The lung cancer death rate among women, who began regular cigarette smoking about 20 years after United States men, has not yet peaked although the age-adjusted rate has been leveling off since the mid-1990s (Figure 1A).

Cigarette smoking varies by gender, age, racial and ethnic group, education, and income status. The 1999 National Health Interview Survey (NHIS) estimated 46.5 million adults were current cigarette smokers, either daily (19.2%) or on some days (4.3%).¹⁰ Additionally, NHIS highlighted the disparities by gender, age, education, and race and ethnicity (Table 1A):¹⁰

- Men (25.7%) were more likely to smoke than women (21.5%) and the difference between the genders has

Figure 1A. Tobacco Use in the United States, 1900-1998



*Age-adjusted to 1970 US standard population.

Source: Death rates: US mortality public use tapes, 1960-1998, US mortality volumes, 1930-1959, National Center for Health Statistics, Centers for Disease Control and Prevention, 2000. Per capita cigarette consumption: US Department of Agriculture, 1900-1987,⁶ 1988,⁷ 1989-1997,⁸ 1998.⁹

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narrowed over time. Male and female percentages varied by 15 percentage points in 1965, but only differed by 5 percentage points in 1985.¹¹ This differential has remained constant since the mid-1980s.¹²

- Younger adults aged 18 to 24 years (27.9%) or 25 to 44 years (27.3%) were more likely to smoke than those aged 65 years or older (10.6%).
- College graduates (16 years of education) were less likely to smoke (13.0%) than high school dropouts who completed 9 to 11 years of education (37.7%).
- American Indians and Alaska Natives were most likely to smoke (40.8%) among racial and ethnic groups.

The percentage of adults who smoke decreased more rapidly from 1965 (42.4%) to 1990 (25.5%)¹¹ than subsequently, although this percentage decreased significantly from 1993 (25.0%) to 1999 (23.5%).¹⁰ In addition, the decrease in current smoking from 1965 to 1999 has been larger in men (51.9% to 25.7%) than in women (33.9% to 21.5%).¹¹

Tobacco Use on a State Level

According to the Behavioral Risk Factor Surveillance System (BRFSS), the adult smoking percentage in 2000 ranged from 12.9% in Utah to 30.5% in Kentucky. The BRFSS data showed current cigarette smoking did not differ greatly by gender in the majority of the states, but the percentage for men was significantly higher than the percentage for women in one-fourth of the states. Utah had the lowest smoking percentage for men and women (14.5% and 11.4%, respectively) while the highest percentage was in Kentucky (33.4%) for men and in Nevada (29.5%) for women. In addition, BRFSS data showed current cigarette smoking was higher among adults with a high school education or less compared to the overall percentage for a majority of the states. The percentages ranged from 21.5% in California to 36.8% in Alaska.

Men are more likely than women to switch to or continue to use other tobacco products, such as smokeless tobacco, when they stop smoking cigarettes.¹² Of the 18 states that monitor smokeless tobacco use, the percentages for men ranged from 2.8% in Maryland to 18.0% in West Virginia.

State Efforts in Tobacco Control

The voters of California, Massachusetts, Arizona, and Oregon passed initiatives to increase taxes on tobacco products and use portions of the excise tax

Table 1A. Current Cigarette Use*, Adults 18 and Older, United States, 1999

Characteristic	% Men	% Women	% Total
Age group (years)			
18 to 24	29.5	26.3	27.9
25 to 44	29.6	25.1	27.3
45 to 64	25.8	21.0	23.3
65 or older	10.5	10.7	10.6
Race/Ethnicity			
White (non-Hispanic)	25.5	23.1	24.3
Black (non-Hispanic)	28.7	20.8	24.3
Hispanic	24.1	12.3	18.1
American Indian/ Alaskan Native†	40.9	40.8	40.8
Asian/Pacific Islander	24.3	7.1	15.1
Education (years)‡			
8 or fewer	24.7	12.8	18.3
9 to 11	42.4	33.5	37.7
12	30.2	23.2	26.3
13 to 15	27.6	23.3	25.3
16	14.0	11.9	13.0
more than 16	9.1	7.8	8.5
Total	25.7	21.5	23.5

*Persons who reported having smoked at least 100 cigarettes or more during their lifetime and who reported at the time of interview smoking every day or some days. †Estimates should be interpreted with caution because of the small sample sizes. ‡Persons aged 25 years or older.

Source: National Health Interview Survey, 1999, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention.¹⁰

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dollars to fund comprehensive tobacco control programs.¹³ The success of these statewide programs has led to substantial decreases in adult smoking.¹³ The US Surgeon General recommends that states establish comprehensive tobacco control programs which involve multiple strategies, including restrictions on indoor smoking, minor's access and advertising, increases in excise taxes, and counter advertising.¹³ Several funding opportunities have become available in recent years such as settlement agreements with the tobacco industry, excise taxes, and federal and private sources for states to use in their tobacco control efforts. In 2001, states varied in the allocation of money per capita from \$0.10 in Pennsylvania to \$20.82 in Ohio (Table 1B).¹⁴ For more information on economic and legislative data on tobacco by state, visit the Centers for Disease Control and Prevention's Office on Smoking and Health Web site, http://www.cdc.gov/tobacco/statehi/statehi_2001.htm.

Table 1B. Tobacco Use, Adults 18 and Older, by State, 2000, and Funding Levels for Tobacco Control, by State, 2001

	Cigarette Smoking*				Smokeless Tobacco†	Per Capita Tobacco Control Funding (\$)
	% 18 and older	% Men 18 and older	% Women 18 and older	% Low education‡	% Men	
Alabama	25.3	29.0	22.0	27.7	N/A	0.53
Alaska	25.0	26.8	23.1	36.8	9.5	4.31
Arizona	18.6	18.4	18.8	25.7	N/A	7.32
Arkansas	25.2	26.2	24.2	30.7	N/A	0.58
California	17.2	20.1	14.4	21.5	N/A	3.44
Colorado	20.1	19.5	20.6	29.3	8.2	3.10
Connecticut	20.0	20.5	19.5	27.6	N/A	0.30
Delaware	23.0	25.8	20.3	31.6	N/A	4.61
Dist. of Columbia	20.9	22.1	19.9	29.2	N/A	1.67
Florida	23.2	24.5	22.1	28.5	N/A	2.81
Georgia	23.6	26.5	21.0	31.6	N/A	2.19
Hawaii	19.7	22.9	16.5	26.2	N/A	8.75
Idaho	22.4	22.9	21.9	31.7	6.5	1.60
Illinois	22.3	24.9	20.0	26.9	N/A	2.35
Indiana	27.0	28.5	25.5	33.5	N/A	5.99
Iowa	23.3	25.9	20.9	28.0	6.3	3.52
Kansas	21.1	24.2	18.2	27.9	N/A	0.83
Kentucky	30.5	33.4	27.9	34.6	N/A	0.90
Louisiana	24.1	26.7	21.8	27.7	6.6	0.36
Maine	23.8	24.6	23.1	30.4	N/A	15.08
Maryland	20.6	22.0	19.2	30.4	2.8	4.05
Massachusetts	20.0	20.2	19.8	26.7	N/A	10.22
Michigan	24.2	26.0	22.5	31.5	N/A	0.66
Minnesota	19.8	20.7	18.9	25.5	N/A	4.71
Mississippi	23.5	25.3	21.9	25.2	14.1	7.90
Missouri	27.2	30.1	24.6	34.4	N/A	0.43
Montana	18.9	18.0	19.7	25.4	12.6	4.85
Nebraska	21.4	22.1	20.7	24.3	7.9	4.83
Nevada	29.1	28.7	29.5	35.5	5.2	1.93
New Hampshire	25.4	26.9	23.9	34.7	N/A	3.29
New Jersey	21.0	23.5	18.6	24.9	N/A	3.80
New Mexico	23.6	26.2	21.2	28.0	N/A	1.89
New York	21.6	22.5	20.9	25.5	N/A	2.27
North Carolina	26.1	28.4	24.1	31.7	8.9	0.32
North Dakota	23.3	25.9	20.7	28.0	N/A	1.71
Ohio	26.3	26.7	26.0	34.0	6.8	20.82
Oklahoma	23.3	23.7	23.0	28.4	9.2	1.13
Oregon	20.8	22.3	19.3	27.0	N/A	2.71
Pennsylvania	24.3	25.4	23.3	29.2	N/A	0.10
Rhode Island	23.5	23.8	23.2	27.0	N/A	3.03
South Carolina	24.9	28.7	21.5	29.1	N/A	0.78
South Dakota	22.0	22.6	21.4	27.0	N/A	4.09
Tennessee	25.7	27.7	23.8	31.3	N/A	0.24
Texas	22.0	25.3	18.8	26.1	8.3	0.59
Utah	12.9	14.5	11.4	22.9	N/A	0.67
Vermont	21.5	21.8	21.2	27.4	N/A	13.63
Virginia	21.5	24.4	18.8	29.2	6.0	1.98
Washington	20.7	21.7	19.7	31.7	6.3	3.08
West Virginia	26.1	27.8	24.7	31.3	18.0	4.28
Wisconsin	24.1	24.4	23.9	30.1	N/A	4.37
Wyoming	23.8	23.2	24.3	30.7	14.3	3.79
United States§	23.3	24.5	21.2	28.5	8.0	
Range	12.9-30.5	14.5-33.4	11.4-29.5	21.5-36.8	2.8-18.0	0.10-20.82

*Adults 18 years old and older who have ever smoked 100 cigarettes and are current smokers (regular and irregular). †Men 18 years old and older who currently use smokeless tobacco. ‡Adults 20 years old and older with high school education or less. §Median for all participating states (see Statistical Notes, p. 31). N/A= Data not available.

Source: Cigarette Smoking Percentages: Behavioral Risk Factor Surveillance System Public Use Data Tape 2000, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 2001. Per capita tobacco control funding: Investments in Tobacco Control, 2001, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention.¹⁴

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Youth Tobacco Use

Tobacco Use on a National Level

The percentage of US 12th graders who smoked peaked in 1976 (39%), declined to 29% between 1976 and 1981, and remained at this level until 1992. Current cigarette smoking began to increase sharply in 1993, rose by one-third in the mid-1990s, peaked in 1997 (37%) and has shown a marked decline to 31% in 2000. The same study shows that smoking at lower grade levels is declining faster and suggests that the decreasing trend among US 12th graders is likely to continue, especially among girls, students planning on attending a four-year college, and students whose parents had a college degree or higher.¹⁵ Among US high school students in grades 9 to 12, current cigarette smoking increased significantly in male and female students for whites, blacks and

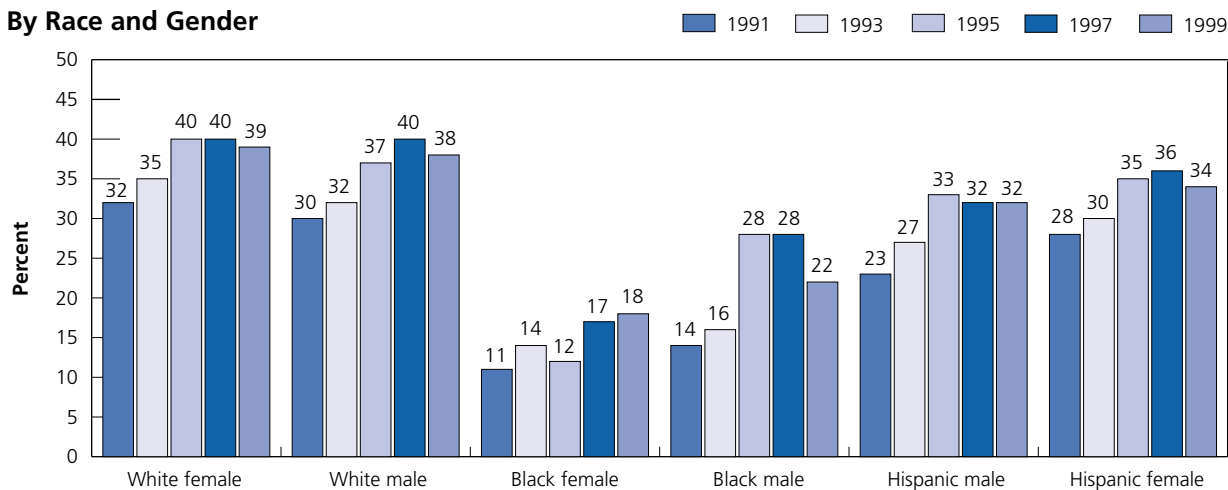
Hispanics and in all grade levels from 1991 to 1999 (Figure 1B).¹⁶ Recent data suggest a leveling or possible decline of smoking in all high school students and in 9th grade students (Figure 1B).¹⁶

Several measures of youth smoking reflect different aspects of initiation, beginning with tobacco product experimentation and progressing to regular smoking and nicotine dependence. According to the Youth Risk Behavior Surveillance System (YRBSS), 40.2% of high school students currently used tobacco products (cigarettes, chewing tobacco or snuff, or cigars) and one-fourth (24.7%) had smoked a whole cigarette before age 13 years in 1999.¹⁷ Additionally, YRBSS showed (Table 1C):¹⁷

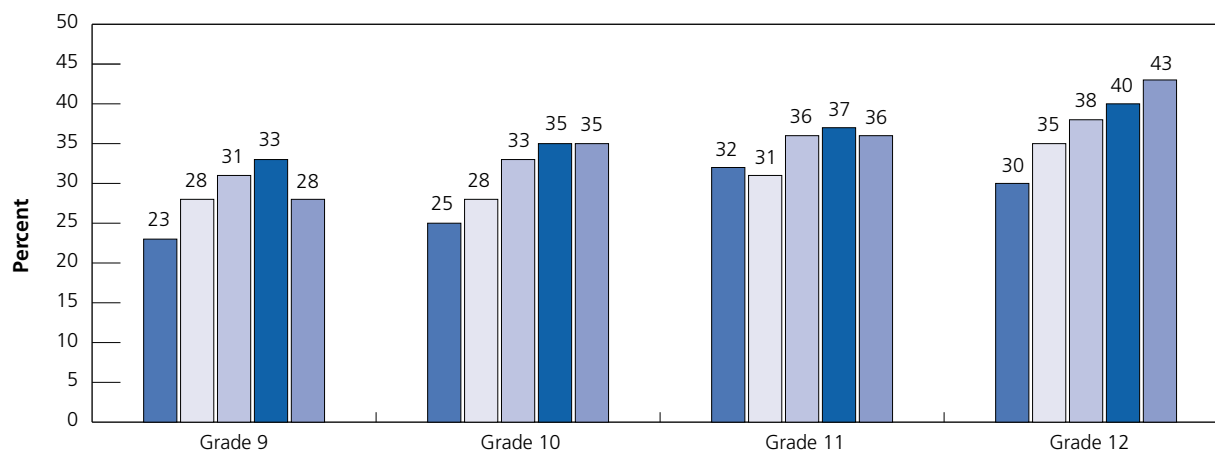
- More than one-third (34.8%) of high school students smoke cigarettes currently.

Figure 1B. Current Cigarette Smoking* Among High School Students, 1991-1999

By Race and Gender



By Grade Level



*Smoked cigarettes on one or more of the 30 days preceding the survey.

Source: Youth Risk Behavior Surveillance System, 1991, 1993, 1995, 1997, 1999, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention.¹⁶ American Cancer Society, Surveillance Research

- Nationwide, 17.9% of male and 15.6% of female high school students smoked cigarettes frequently.
- Regardless of race, male students were more likely to use smokeless tobacco than female students. White male students had the highest percentage of smokeless tobacco use.
- Male students (25.4%) were more likely to smoke cigars, cigarillos, or little cigars than female students (9.9%).

As current cigarette smoking increased during the 1990s, other tobacco products also gained popularity among adolescents. In 1999, cigar smoking was substantially more common than smokeless tobacco use among high school students regardless of gender, race and ethnic group, and grade level (Table 1C). Other products smoked by youth include bidis. These are small, filterless, and flavored cigarettes imported from India.¹⁸ Bidis smokers may inhale more often and deeply due to the low combustibility of the leaf wrapper and breathe in greater quantities of tar and other toxins than cigarette smokers. Like all tobacco products, bidis cause cancer.¹⁹

Tobacco Use on a State Level

According to YRBSS data, the percentage of high school students who smoke cigarettes currently ranged from 11.9% in Utah to 43.6% in South Dakota. Male and female cigarette smoking varied by state with the largest differences shown in Alabama and New Hampshire. The percentage of students who smoke frequently ranged from 5.6% in Utah to 24.0% in West Virginia. The greatest difference among males and females was in Mississippi. Males who currently use smokeless tobacco ranged from 3.8% in Hawaii to 29.8% in Montana (Table 1D).

Smoking Initiation and Cessation Among Youth

Nearly all first use of tobacco occurs before high school graduation.²⁰ Smoking initiation involves a complex array of sociodemographic, environmental, behavioral, and personal factors. Previous studies indicate youth from low socioeconomic families, with friends who currently use tobacco, with lower scholastic achievement, and with lower self-esteem are more likely to use tobacco than their peers.²⁰ Long-term progress in reducing tobacco use and tobacco-related deaths in the United States requires protecting adolescents and young adults from tobacco marketing, thereby

Table 1C. Tobacco Use, High School Students, United States, 1999

Characteristic	Cigarette use		Current smokeless tobacco# %	Current cigar use§ %
	Current* %	Frequent† %		
Gender				
Male	34.7	17.9	14.2	25.4
Female	34.9	15.6	1.3	9.9
Race/Ethnicity				
White, non-Hispanic				
Male	38.6	20.2	10.4	18.8
Female	38.2	20.9	18.8	28.3
Black, non-Hispanic				
Male	39.1	19.4	1.5	8.6
Female	19.7	7.0	1.3	13.7
Hispanic				
Male	21.8	9.1	2.5	16.0
Female	17.7	5.0	0.2	11.6
Grade				
9	32.7	10.4	3.9	16.7
10	34.0	12.5	6.1	21.9
11	36.0	18.7	8.4	18.2
12	42.8	23.1	8.9	22.0
Total	34.8	16.8	7.8	17.7

*Smoked cigarettes on one or more of the 30 days preceding the survey. †Smoked cigarettes on 20 or more of the 30 days preceding the survey. ‡Used chewing tobacco or snuff on one or more of the 30 days preceding the survey. §Smoked cigars on one or more of the 30 days preceding the survey.

Source: Youth Risk Behavior Surveillance System, 1999, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention.¹⁷

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reducing experimentation and nicotine addiction. Statewide, comprehensive tobacco control programs targeting youth, such as those in Mississippi and Florida, have proven to be effective in reducing tobacco use among adolescents.¹³ Measures that have been shown to be particularly effective in preventing initiation are increasing the cost of tobacco products through taxes, reducing youth access to tobacco by requiring and enforcing state laws that prohibit the sale of tobacco products to anyone under age 18 years old and developing counter-marketing campaigns against tobacco use.¹³ Nicotine addiction among youth is similar to that among adults.²⁰ Recruitment and retention of youth in formal tobacco cessation programs is difficult, but necessary to reduce the current tobacco use percentage among youth and subsequently adults.

Table 1D. Tobacco Use, High School Students, by State and City, 1999

	Current cigarette smoking*			Frequent cigarette smoking†			Smokeless tobacco‡
	% Total	% Male	% Female	% Total	% Male	% Female	% Male
State							
Alabama	36.6	40.0	33.0	17.0	18.3	15.6	23.1
Alaska§	33.9	31.1	35.8	18.1	16.6	18.9	20.9
Arkansas	39.6	41.2	37.9	22.5	23.5	21.6	18.9
Connecticut¶	31.2	30.0	32.1	15.2	16.1	13.9	8.4
Delaware	32.2	31.1	33.4	17.7	17.4	18.0	6.8
Florida¶	27.4	26.9	27.6	13.7	13.1	13.9	9.6
Hawaii	27.9	26.7	28.8	13.1	14.9	11.4	3.8
Illinois¶	34.0	32.4	35.4	16.8	15.7	17.8	11.3
Iowa¶	35.8	32.8	38.4	19.1	18.3	19.9	14.7
Kentucky¶	41.5	41.5	41.5	23.5	21.9	24.9	27.8
Louisiana§¶	33.3	34.8	31.8	15.5	16.0	15.2	15.4
Maine¶	31.2	30.7	31.4	15.6	16.4	14.8	9.7
Massachusetts	30.3	29.9	30.7	15.9	15.5	16.1	8.1
Michigan	34.1	34.9	33.3	17.4	19.2	15.6	12.9
Mississippi	31.5	34.4	28.5	14.9	17.2	12.6	15.5
Missouri	32.8	35.6	30.1	16.3	17.6	15.0	13.6
Montana	35.0	35.4	34.6	18.0	18.1	17.7	29.8
Nebraska¶	37.3	37.7	36.7	16.0	17.6	14.6	21.9
Nevada	32.6	32.4	32.5	16.7	17.4	16.1	16.2
New Hampshire¶	34.1	30.8	37.4	19.1	17.3	20.9	8.2
New Jersey¶	33.8	33.0	34.3	15.9	14.9	16.6	9.5
New Mexico¶	36.2	36.0	36.2	16.2	16.3	16.2	18.9
New York	31.8	29.5	34.1	15.3	14.4	16.1	7.5
North Dakota	40.6	40.2	41.0	20.5	19.9	21.1	25.1
Ohio	40.3	40.1	40.5	22.1	22.6	21.7	19.0
South Carolina	36.0	37.7	34.2	17.7	19.5	15.9	13.8
South Dakota	43.6	41.8	45.5	23.6	23.1	24.2	26.0
Tennessee§	37.5	39.2	35.6	19.6	19.3	19.9	24.3
Utah	11.9	11.7	11.8	5.6	5.3	5.5	4.0
Vermont	33.4	33.3	33.6	N/A	N/A	N/A	13.1
West Virginia	42.2	40.6	43.7	24.0	22.9	24.9	28.6
Wisconsin	38.1	38.2	37.8	21.7	21.7	21.5	21.3
Wyoming	35.2	34.6	35.9	19.3	18.2	20.4	28.8
City							
Boston, MA	17.8	18.0	17.4	6.7	6.0	7.3	2.3
Chicago, IL	29.0	31.4	26.6	9.3	11.3	7.4	4.3
Dallas, TX	25.0	29.4	20.9	6.1	7.0	5.3	2.0
Detroit, MI	17.7	20.0	15.7	6.5	8.1	5.2	5.3
Dist. of Columbia	19.9	21.0	19.0	6.3	8.6	4.3	2.1
Ft. Lauderdale, FL	21.9	20.2	23.5	8.8	7.5	9.9	3.9
Houston, TX	25.4	28.6	21.7	5.5	6.9	3.9	3.1
Miami, FL	20.9	23.3	18.2	7.6	9.4	5.5	4.0
New Orleans, LA	17.0	19.0	15.1	6.0	8.5	3.9	5.0
New York City, NY	24.1	22.6	25.7	8.8	8.7	8.8	1.9
Palm Beach, FL	26.1	28.1	24.0	11.3	12.6	9.8	8.8
Philadelphia, PA	23.0	22.4	23.2	10.3	9.8	10.8	2.6
San Bernardino, CA¶	19.9	21.5	18.4	5.0	7.0	3.4	6.7
San Diego, CA	23.1	24.9	21.5	5.7	6.8	4.7	3.5
San Francisco, CA¶	18.7	19.0	18.1	5.8	6.2	5.3	3.3
Seattle, WA	25.9	24.3	27.3	12.5	12.7	12.0	N/A

*Smoked cigarettes on one or more of the 30 days preceding the survey. †Smoked cigarettes on 20 or more of the 30 days preceding the survey. ‡Used chewing tobacco or snuff on one or more of the 30 days preceding the survey. §Survey did not include students from one of the state's largest school districts. ¶Unweighted data (see Statistical Notes, p. 31). N/A = Data not available.

Source: Youth Risk Behavior Surveillance System, 1999, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention.¹⁷

American Cancer Society, Surveillance Research

Nutrition and Physical Activity

Nutrition, Physical Activity, and Obesity Among Adults

Nutrition

For the majority of Americans who do not use tobacco products, dietary choices and physical activity are the most important modifiable determinants of cancer risk.²¹ Nutritional factors account for about one-third of US cancer deaths.^{3,22} To provide the public with current cancer prevention information, the American Cancer Society periodically reviews, updates, and publishes guidelines on nutrition and physical activity. The most recent guidelines, completed in 2001, recommend dietary and physical activity patterns to maintain a healthy body weight and to reduce cancer risk. The guidelines also recommend community action to facilitate healthy dietary and physical activity behaviors.²³ This chapter provides recent data on the interrelated factors of diet, physical activity and weight among adults and youth, respectively.

Education about the importance of diet and physical activity for health can stimulate worksites and other community organizations to consider these factors in health promotion planning. While knowledge about nutrition and health is improving, Americans have been slow to adopt more healthful diets.²⁴ According to the National Cancer Institute's 5 A Day campaign, the percentage of persons who were aware of the need to eat five or more fruits and vegetables a day increased more than three-fold from 1991 to 1997 (8% to 39%, respectively).²⁵ Results from the most recent Continuing Survey of Food Intakes by Individuals (CSFII 1994-1996) indicated that two-thirds of US adults believed a diet full of fruits and vegetables was very important, less than one-third thought a diet with plenty of grains was very

American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Prevention

1. Eat a variety of healthful foods, with an emphasis on plant sources.

- Eat five or more servings of vegetables and fruit each day.
- Choose whole grains in preference to processed (refined) grains and sugars.
- Limit consumption of red meats, especially high-fat and processed meats.
- Choose foods that help maintain a healthful weight.

2. Adopt a physically active lifestyle.

- Adults: engage in at least moderate activity for 30 minutes or more on 5 or more days of the week; 45 minutes or more of moderate to vigorous activity on 5 or more days per week may further enhance reductions in the risk of breast and colon cancer.
- Children and adolescents: engage in at least 60 minutes per day of moderate to vigorous physical activity at least 5 days per week.

3. Maintain a healthful weight throughout life.

- Balance caloric intake with physical activity.
- Lose weight if currently overweight or obese.

4. If you drink alcoholic beverages, limit consumption.

Recommendation for Community Action

Public, private, and community organizations should work to create social and physical environments that support the adoption and maintenance of healthful nutrition and physical activity behaviors.

- Increase access to healthful foods in schools, worksites, and communities.
- Provide safe, enjoyable, and accessible environments for physical activity in schools and for transportation and recreation in communities.

important, and only one-half believed they eat too much fat.²⁶

However, knowledge about healthy nutritional patterns may not always align with behavioral practices.²⁴ Since the 1970s, fruit and vegetable consumption has increased slightly, grain consumption has increased by more than 40%, and two-thirds of adults consumed more than the recommended 30% of calories from fat.²⁶ In addition, American diets have changed in the past three decades toward a pattern which includes more meals away from home, food choices that are mainly meat, poultry or fish (such as hamburgers, stews, and chicken sandwiches), and more carbonated soft drinks.^{24,27} The recent shift toward consuming meals outside the home and greater consumption of processed foods, fast foods, and snack foods makes it difficult for many Americans to meet the recommendations for healthy eating.

In 2000, state-level data showed that fewer than one in four adults reported eating five or more servings of fruits and vegetables in more than half of the states. The percentages ranged from 15.7% in Louisiana to 36.7% in Arizona (Table 2A).

Physical Activity

Transportation systems based entirely on automobiles, reduced leisure time, and sedentary activities—television, video games, and computers—have contributed to physical inactivity.²³ Community efforts to increase opportunities for safe and convenient physical activity are important. Scientific evidence for the health benefits of regular physical activity has accumulated as the population has become more sedentary. During the 1970s, federal recommendations first emphasized the benefits of vigorous physical activity²⁸ (activities that cause an increase in heart rate, breathing depth and frequency, and sweating). As subsequent research demonstrated the benefits of even moderate physical activity for weight control and cardiovascular health, the recommendations were modified to include moderate physical activity²⁸—effort equivalent to a brisk walk (see sidebar, page 12).

Table 2A. Percent Eating Five or More Fruits and Vegetables a Day, Adults 18 and Older, by State, 2000

State	%
Alabama	22.7
Alaska	23.7
Arizona	36.7
Arkansas	22.5
California	26.7
Colorado	23.4
Connecticut	29.3
Delaware	22.4
Dist. of Columbia	31.8
Florida	23.2
Georgia	22.2
Hawaii	22.3
Idaho	21.1
Illinois	23.3
Indiana	20.1
Iowa	18.1
Kansas	23.4
Kentucky	22.6
Louisiana	15.7
Maine	24.6
Maryland	27.4
Massachusetts	29.9
Michigan	23.0
Minnesota	24.3
Mississippi	18.5
Missouri	20.6
Montana	22.7
Nebraska	20.2
Nevada	21.3
New Hampshire	26.2
New Jersey	27.3
New Mexico	20.5
New York	27.5
North Carolina	22.1
North Dakota	23.2
Ohio	21.4
Oklahoma	18.2
Oregon	26.8
Pennsylvania	23.2
Rhode Island	29.2
South Carolina	24.5
South Dakota	19.9
Tennessee	34.0
Texas	23.4
Utah	20.5
Vermont	28.6
Virginia	25.5
Washington	24.7
West Virginia	21.3
Wisconsin	21.6
Wyoming	20.3
United States*	23.2
Range	15.7-36.7

*Median for all reporting states (see Statistical Notes, p. 31).

Source: Behavioral Risk Factor Surveillance System Public Use Data Tape 2000, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 2001.

American Cancer Society, Surveillance Research

Moderate Physical Activity Examples*

Washing and waxing a car for 45-60 minutes

Washing windows or floors for 45-60 minutes

Playing volleyball for 45 minutes

Playing touch football for 30-45 minutes

Gardening for 30-45 minutes

Wheeling self in wheelchair for 30-40 minutes

Walking 1¾ miles in 35 minutes (20 minutes per mile)

Basketball (shooting baskets) for 30 minutes

Bicycling for 5 miles in 30 minutes

Dancing fast (social) for 30 minutes

Pushing a stroller 1½ miles in 30 minutes

Raking leaves for 30 minutes

Walking 2 miles in 30 minutes (15 minutes per mile)

Water aerobics for 30 minutes

Swimming laps for 20 minutes

Wheelchair basketball for 20 minutes

Basketball (playing a game) for 15-20 minutes

Bicycling 4 miles in 15 minutes

Jumping rope for 15 minutes

Running 1½ miles in 15 minutes (10 minutes per mile)

Shoveling snow for 15 minutes

Stairwalking for 15 minutes

Less Vigorous,
More Time

More Vigorous,
Less Time

*The amount of physical activity is influenced by its duration, intensity, and frequency. The same amount of activity can be obtained in longer sessions of moderately intense activities (such as brisk walking) as in shorter sessions of more strenuous activities (such as running).

Adapted from: Chronic Disease Notes & Reports, a publication of the Centers for Disease Control and Prevention.²⁹

To achieve the American Cancer Society physical activity guidelines, adults may choose to do a variety of activities. Some examples from the table above include:

- Bicycle 5 miles in 30 minutes
- Walk 2 miles in 30 minutes and run 1½ miles in 15 minutes
- Garden for 30 minutes
- Play volleyball for 45 minutes

Recent evidence shows that physical activity is strongly associated with reduced risk of developing colon and breast cancer.³⁰ More limited evidence suggest that physical activity may also decrease the risk for cancer of the pancreas, prostate, lung, endometrium, ovary, and testicles.³⁰ The American Cancer Society recommendations on physical activity are based on both the role of regular physical activity in maintaining a healthy body weight and on other cancer prevention effects.

Recent national data indicate that 40% of US adults did not participate in any leisure-time physical activity and less than one-fourth participated in vigorous activities.³¹ The level of participation varied by age, gender, race, and education level (Table 2B):

- More women (43%) than men (37%) reported that they had not participated in leisure time physical activity.
- Older adults (75 years or older) were less likely to participate in leisure-time physical activity than younger adults (18 to 24 years). When adults did participate in leisure-time physical activity, younger adults participated in more vigorous activity, while older adults participated in moderate activity.
- The percentage of adults with no leisure-time physical activity ranged from 36% among white, non-Hispanics to 55% among Hispanics.
- Almost three-fourths (72%) of adults with less than a 9th grade education did not participate in leisure-time physical activity compared to one-fourth (24%) of college graduates (completed 16 or more years of education).

Across the states, the percentage of adults with no leisure-time physical activity ranged from 15.5% in Utah to 41.1% in Kentucky, based on 2000 BRFSS data. More adults participated in regular and sustained physical activity (median percentage: 21.9%) than regular and vigorous activity (median percentage: 14.1%). The percentage reporting regular and sustained physical activity ranged from 14.3% in Kentucky to 29.3% in the District of Columbia. The corresponding range for regular and vigorous physical activity was from 8.9% in Louisiana to 18.3% in Montana (Table 2C). (Note: BRFSS physical activity questions are not comparable to NHIS physical activity questions. Therefore, direct comparisons between national and state-level physical activity percentages should not be made.)

Table 2B. Physical Activity,* Adults 18 and Older, United States, 1998

Characteristic	% No Leisure-Time Physical Activity	% Moderate† Physical Activity	% Vigorous‡ Physical Activity
Gender			
Male	37	15	26
Female	43	12	18
Age group (years)			
18 to 24	33	15	31
25 to 44	36	13	25
45 to 64	41	14	19
65 to 74	49	15	12
75 or older	63	10	5
Race/Ethnicity			
White (non-Hispanic)	36	15	23
Black (non-Hispanic)	52	10	16
Hispanic	55	10	15
American Indian/Alaskan Native	48	18	20
Asian/Pacific Islander	40	10	18
Education (years)§			
8 or fewer	72	7	6
9 to 11	60	10	11
12	47	12	15
13 to 15	35	15	21
16 or more	24	16	32
Total	40	13	21

*Prevalences are age-adjusted to 2000 U.S. standard population. †Regular physical activity for at least 30 minutes a day, 5 or more days per week.

‡Physical activity that promotes the development and maintenance of cardiorespiratory fitness 3 or more days for 20 or more minutes per occasion for 3 or more days per week. §Persons aged 25 years or older.

Source: National Health Interview Survey, 1998, National Center for Health Statistics, Centers for Disease Control and Prevention.³¹

American Cancer Society, Surveillance Research

Overweight and Obesity

Obesity has been recognized as a potentially modifiable risk factor for heart disease since the 1950s.³² In 1985, a National Institutes of Health (NIH) conference highlighted obesity as an important cause of cancer as well as diabetes and coronary heart disease.³³ By 1996, obesity was known to increase the risk of developing cancers of the breast (among post-menopausal women), cervix, endometrium, ovary, and gallbladder among women and cancer of the colon and prostate among men.²² More recent studies also implicate obesity in cancers of the pancreas and esophagus.³⁴⁻³⁵

Recent national data show that obesity has reached epidemic proportions in the United States. The Third National Health and Nutrition Examination Survey (NHANES III, 1988-1994) indicated that the percentage of obese adults rose dramatically from 12.8% in 1960 to

22.5% in 1994, with the largest increases occurring in the 1990s. Additionally, the percentage of overweight adults increased from 30.5% in 1960 to 32.0% in 1994.^{33,36} The BRFSS data show that the number of states in which half or more of the adults are overweight or obese (BMI greater than or equal to 25.0 kg/m²) increased from 12 states in 1992 to 49 states, including the District of Columbia, in 2000 (Figure 2A).

The percentage of adults in 2000 classified as overweight ranged from 31.7% in the District of Columbia to 40.0% in North Dakota, based on BRFSS data. The percentage classified as obese ranged from 14.2% in Colorado to 25.0% in Mississippi. Whereas men were more likely than women to be classified as overweight, men and women were equally likely to be classified as obese (Table 2D).

Table 2C. Physical Activity, Adults 18 and Older, by State, 2000

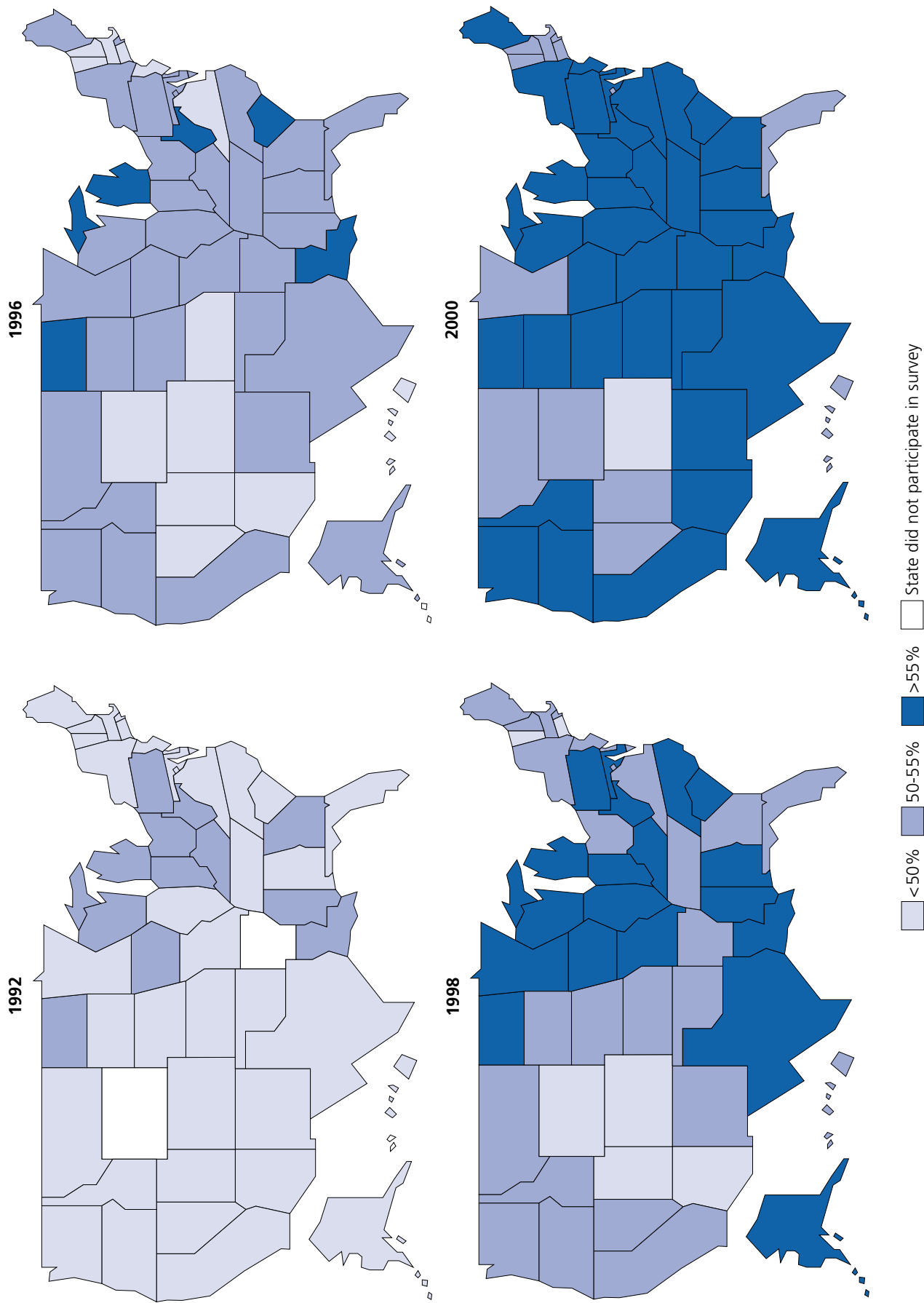
	% No Leisure Time Physical Activity	% Regular & Sustained Physical Activity*	% Regular & Vigorous Physical Activity†
Alabama	31.6	22.1	10.5
Alaska	20.0	26.4	18.3
Arizona	34.1	21.5	15.5
Arkansas	28.0	21.4	11.6
California	26.5	24.0	16.4
Colorado	19.8	24.7	16.2
Connecticut	25.3	23.8	16.9
Delaware	28.0	20.8	13.0
Dist. of Columbia	20.8	29.3	16.1
Florida	28.8	22.2	15.6
Georgia	29.0	20.6	12.1
Hawaii	23.2	28.8	17.8
Idaho	19.8	25.2	14.2
Illinois	30.9	20.7	12.5
Indiana	25.2	21.8	12.9
Iowa	27.3	19.9	12.3
Kansas	30.4	17.8	11.9
Kentucky	41.1	14.3	9.5
Louisiana	36.2	14.6	8.9
Maine	27.1	20.8	14.1
Maryland	24.2	22.3	16.8
Massachusetts	24.7	23.6	17.2
Michigan	22.9	24.8	14.9
Minnesota	24.8	20.5	15.6
Mississippi	33.4	18.6	9.4
Missouri	28.9	20.2	12.6
Montana	23.3	23.9	18.3
Nebraska	29.3	19.8	13.8
Nevada	24.9	24.5	14.4
New Hampshire	26.6	21.9	16.4
New Jersey	28.7	21.4	14.3
New Mexico	24.4	23.7	14.7
New York	29.3	20.5	13.9
North Carolina	30.5	18.3	12.5
North Dakota	24.3	22.2	13.4
Ohio	31.4	18.1	13.1
Oklahoma	34.4	18.3	12.5
Oregon	20.0	27.0	17.1
Pennsylvania	23.0	22.8	14.0
Rhode Island	27.5	24.5	17.6
South Carolina	28.0	20.8	12.8
South Dakota	26.6	21.4	12.7
Tennessee	32.7	14.6	10.6
Texas	28.5	20.8	12.6
Utah	15.5	26.0	15.1
Vermont	23.2	24.8	17.6
Virginia	24.9	22.8	15.8
Washington	16.9	27.0	16.6
West Virginia	33.6	18.1	11.0
Wisconsin	22.1	23.1	14.6
Wyoming	22.6	26.5	13.8
United States‡	26.6	21.9	14.1
Range	15.5-41.1	14.3-29.3	8.9-18.3

*At least 5 times per week, 30 minutes or more per session, regardless of intensity. †At least 3 times a week, 20 minutes or more per session, 50% or more of capacity. ‡Median for all reporting states (see Statistical Notes, p. 31).

Source: Behavioral Risk Factor Surveillance System Public Use Data Tape 2000, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 2001.

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Figure 2A. Overweight* Adults in the United States, by State, 1992-2000



*Body mass index of 25.0 kg/m² or greater.

Source: Behavioral Risk Factor Surveillance System, CD-ROM 1984-1995, 1996, 1998, and public use data tape 2000, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 1997, 1999, 2000, 2001.

Table 2D. Overweight and Obesity, Adults 18 and Older, by State, 2000

	Overweight*			Obese†		
	% Total	% Men	% Women	% Total	% Men	% Women
Alabama	36.8	45.0	29.3	24.0	23.2	24.6
Alaska	38.2	46.9	28.3	21.1	20.8	21.5
Arizona	36.9	45.8	28.0	19.4	20.9	17.9
Arkansas	36.6	42.9	30.6	23.2	23.9	22.7
California	37.4	46.1	28.5	19.9	20.6	19.3
Colorado	34.0	42.7	25.1	14.2	13.9	14.6
Connecticut	36.3	44.4	28.3	17.5	18.3	16.7
Delaware	39.2	46.4	32.2	16.6	16.5	16.7
Dist. of Columbia	31.7	38.5	25.7	21.6	16.2	26.3
Florida	35.2	43.6	27.3	18.7	19.5	17.9
Georgia	37.9	46.3	29.9	21.5	20.8	22.1
Hawaii	34.5	43.3	25.4	15.8	17.3	14.2
Idaho	36.8	44.4	29.0	19.0	18.7	19.2
Illinois	37.2	42.8	31.8	21.7	22.8	20.7
Indiana	36.6	44.9	28.6	21.9	22.2	21.6
Iowa	38.5	45.7	31.4	21.5	22.4	20.7
Kansas	37.9	46.3	29.4	20.8	21.7	19.9
Kentucky	38.0	44.8	31.4	23.0	24.1	22.0
Louisiana	36.5	43.9	29.4	23.7	22.4	24.8
Maine	36.4	44.9	28.0	20.0	19.3	20.7
Maryland	36.5	44.7	28.5	20.3	19.3	21.2
Massachusetts	36.1	46.4	26.3	16.8	18.0	15.6
Michigan	38.7	48.7	29.0	22.4	22.6	22.1
Minnesota	37.6	46.7	28.5	17.4	18.0	16.8
Mississippi	36.8	44.4	29.5	25.0	25.9	24.2
Missouri	34.4	42.5	26.7	22.1	23.8	20.5
Montana	37.1	46.2	28.0	15.9	16.4	15.4
Nebraska	37.2	45.4	29.1	21.2	24.3	18.0
Nevada	35.3	42.5	27.5	17.9	20.3	15.3
New Hampshire	36.5	46.9	26.1	18.1	19.5	16.8
New Jersey	38.2	48.4	28.4	18.5	18.5	18.6
New Mexico	36.2	43.3	29.2	19.3	20.1	18.5
New York	39.3	48.8	30.1	17.8	16.3	19.2
North Carolina	37.4	46.1	29.0	21.8	21.2	22.5
North Dakota	40.0	49.1	30.4	20.5	21.5	19.5
Ohio	35.7	43.8	27.9	21.6	21.2	21.9
Oklahoma	36.6	47.4	26.0	19.6	19.0	20.3
Oregon	36.1	43.9	28.3	21.5	21.6	21.5
Pennsylvania	36.4	45.3	28.0	21.3	22.2	20.3
Rhode Island	36.7	44.9	28.8	17.2	18.5	15.9
South Carolina	36.8	45.4	28.5	22.1	20.6	23.6
South Dakota	38.9	46.6	31.2	19.9	19.9	19.8
Tennessee	36.5	44.9	28.5	23.0	23.1	22.8
Texas	36.8	45.5	28.0	23.2	24.0	22.3
Utah	35.0	41.3	28.6	19.2	20.9	17.4
Vermont	34.6	42.2	27.1	18.2	19.2	17.3
Virginia	37.9	46.0	29.7	18.2	19.1	17.2
Washington	36.3	44.3	28.1	18.8	20.0	17.6
West Virginia	36.5	45.4	28.0	23.2	23.6	22.9
Wisconsin	37.8	46.0	29.8	20.0	21.9	18.1
Wyoming	37.1	45.1	28.9	17.9	19.6	16.2
United States‡	36.8	45.1	28.5	20.0	20.6	19.8
Range	31.7-40.0	38.5-49.1	25.1-32.2	14.2-25.0	13.9-25.9	14.2-26.3

*Body mass index of 25.0-29.9 kg/m². †Body mass index greater than or equal to 30.0 kg/m². ‡Median for all reporting states (see Statistical Notes, p. 31).

Source: Behavioral Risk Factor Surveillance System Public Use Data Tape 2000, National Center for Chronic Disease and Prevention and Health Promotion, Centers for Disease Control and Prevention, 2001.

American Cancer Society, Surveillance Research

Body Mass Index for Adults

Different measures are used to determine whether a person is considered normal weight, overweight, or obese, taking into account height. A common scale is the body mass index (BMI), or ratio of weight (in kilograms) to height (in meters, squared). For adults aged 20 years and older, overweight is defined as a BMI of 25.0 to 29.9 kg/m²; obesity is defined as a BMI of 30.0 kg/m² or greater.

The table below relates BMI to pounds and inches rather than kilograms and meters. BMI corresponds to an individual's height (in the left column) and weight category (in pounds). An adult aged 20 or older is considered overweight or obese if his or her weight falls within the corresponding area of the table. For example, a 5'4" woman is considered overweight if she weighs between 145 to 173 pounds. She is considered obese if she weighs 174 pounds or more. A 5'10" man is considered overweight if he weighs between 174 and 206 pounds and obese if he weighs 207 pounds or more.

Height (feet, inches)	Body weight (pounds)	
	Overweight*	Obese†
6'4"	205	246
6'3"	200	240
6'2"	194	233
6'1"	189	227
6'0"	184	221
5'11"	179	215
5'10"	174	207
5'9"	169	203
5'8"	164	197
5'7"	159	191
5'6"	155	186
5'5"	150	180
5'4"	145	174
5'3"	141	169
5'2"	136	164
5'1"	132	158
5'0"	128	153
4'11"	124	148
4'10"	119	143

*Overweight defined as BMI of 25 to 29.9 kg/m².

†Obesity defined as BMI of 30 kg/m² or greater.

Nutrition, Physical Activity, and Overweight and Obesity Among Youth

Nutrition

Healthy eating behaviors established early in childhood often influence adult dietary patterns. Eating behaviors are influenced by family members at home and primary caregivers outside of the home, such as daycare providers and teachers. Often, dietary patterns deteriorate in childhood and adolescence,³⁷ but may improve in adulthood. Balanced diets are more difficult to maintain when snack foods and sodas high in sugar or fat are abundantly available.³⁸ Data from CSFII (1994-1996, 1998) indicate that consumption of snack foods has doubled in the last twenty years. Soft drink consumption has also increased 21% among 2-to-5-year-olds and 37% among 6-to-9 year olds over the last two decades. Rather than a diet high in snack food and sodas, a nutritious diet high in fruits and vegetables is important for growth and development. The YRBSS showed in 1999 less than one-fourth (23.9%) of US high school students ate five or more fruits and vegetables per day (Table 2E).

The state-level YRBSS data showed the percentage of high school students in 1999 who ate five fruits and vegetables a day ranged from 14.1% in Alabama to 28.4% in New Jersey. For the majority of states, more male

students ate the recommended number of fruits and vegetables compared to female students. The largest differences by gender were observed in Florida and New Mexico (Table 2F).

Physical Activity

Physical activity in childhood, whether at a physical education class or at a community park, can help maintain a healthy weight and promote active, adult lifestyles. Children and young adults who engage in physical activity regularly improve their muscular strength and aerobic endurance.³⁹ Improvements have been observed since the first national survey in 1992 indicated only one-half of US youth aged 12 to 21 years regularly participated in vigorous physical activity.²⁸ According to the YRBSS, almost two-thirds (64.7%) of US high school students participated in vigorous physical activity and approximately one-fourth (26.7%) were moderately active in 1999 (Table 2G).¹⁷ In addition, male students were more likely to participate in vigorous or moderate physical activity than female students, regardless of race and ethnicity.¹⁷

The 1999 state-level YRBSS data showed moderate physical activity ranged from 20.3% in Hawaii to 32.7% in Maine and vigorous physical activity ranged from 55.2% in South Carolina to 77.0% in Utah. Similar to national trends, males participated in more moderate

Table 2E. Percent Eating 5 or More Fruits and Vegetables a Day*, High School Students, United States, 1999

Characteristic	%
Gender	
Male	24.4
Female	23.4
Race/Ethnicity	
White, non-Hispanic	22.5
Male	23.5
Female	21.5
Black, non-Hispanic	27.8
Male	25.2
Female	30.2
Hispanic	24.0
Male	27.2
Female	21.0
Grade	
9	25.6
10	23.1
11	23.1
12	23.5
Total	23.9

*Had eaten five or more servings of 100% fruit juice, fruit, green salad, potatoes (excluding french fries, fried potatoes, or potato chips), carrots or other vegetables during the seven days preceding the survey.

Source: Youth Risk Behavior Surveillance System, 1999, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention.¹⁷

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and vigorous physical activity. The largest differences by gender were in Wyoming and New Mexico for moderate physical activity and Mississippi and Tennessee for vigorous physical activity (Table 2H).

Overweight and Obesity

Research has shown that overweight children or adolescents are at greater risk of becoming overweight in adulthood.⁴⁰ Recent national data show that obesity in youth aged 6 to 17 years has increased since the 1960s across all subgroups of age, gender, and race and ethnicity.⁴¹ According to NHANES III, approximately 11% of children and adolescents were classified as overweight and the largest increase has occurred since the mid-1970s. The same survey showed approximately 14% of youth were at risk for becoming overweight.⁴¹ Similar increasing patterns were observed among public and private high school students. The YRBSS data showed in 1999 that 9.9% of high school students were considered overweight and 16.0% were at risk for becoming overweight. The YRBSS data indicated male students were

Table 2F. Percent Eating 5 or More Fruits and Vegetables a Day*, High School Students, by State and City, 1999

	% Total	% Male	% Female
State			
Alabama	14.1	16.0	12.2
Alaska†	25.6	26.2	24.8
Arkansas	18.8	20.2	17.3
Connecticut§	N/A	N/A	N/A
Delaware	24.5	25.9	22.7
Florida§	26.3	29.8	22.5
Hawaii	21.1	21.9	20.6
Illinois§	22.1	23.7	20.5
Iowa§	16.9	19.8	14.3
Kentucky§	23.1	24.8	21.6
Louisiana†§	17.1	20.0	14.4
Maine§	26.7	24.6	28.5
Massachusetts	N/A	N/A	N/A
Michigan	19.0	20.1	17.9
Mississippi	19.8	20.8	18.8
Missouri	18.3	18.5	18.1
Montana	19.5	19.9	18.9
Nebraska§	19.6	19.3	19.7
Nevada	22.1	21.3	22.9
New Hampshire§	24.6	25.0	24.1
New Jersey§	28.4	30.1	26.5
New Mexico§	22.5	25.8	19.7
New York	26.1	27.1	25.0
North Dakota	N/A	N/A	N/A
Ohio	18.7	20.6	16.7
South Carolina	17.6	18.3	17.0
South Dakota	19.1	20.4	17.7
Tennessee†	18.3	19.5	16.8
Utah	25.8	27.2	24.1
Vermont	N/A	N/A	N/A
West Virginia	20.4	21.5	19.4
Wisconsin	N/A	N/A	N/A
Wyoming	21.6	23.8	19.3
City			
Boston, MA	N/A	N/A	N/A
Chicago, IL	27.9	30.1	25.3
Dallas, TX	20.3	22.1	18.6
Detroit, MI	20.2	21.8	18.7
Dist. of Columbia	28.6	32.9	24.6
Ft. Lauderdale, FL	23.4	27.1	19.8
Houston, TX	22.4	23.9	20.6
Miami, FL	24.9	27.8	22.0
New Orleans, LA	25.2	27.4	23.1
New York City, NY	25.2	25.6	24.8
Palm Beach, FL	26.2	30.8	21.4
Philadelphia, PA	21.1	21.7	20.5
San Bernardino, CA§	19.9	23.9	16.7
San Diego, CA	24.5	26.1	23.3
San Francisco, CA§	N/A	N/A	N/A
Seattle, WA	N/A	N/A	N/A

*Had eaten five or more servings of 100% fruit juice, fruit, green salad, potatoes (excluding french fries, fried potatoes, or potato chips), carrots or other vegetables during the seven days preceding the survey.

†Survey did not include students from one of the state's largest school districts. §Unweighted data (see Statistical Notes, p. 31). N/A = Data not available.

Source: Youth Risk Behavior Surveillance System, 1999, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention.¹⁷

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Table 2G. Physical Activity, High School Students, United States, 1999

Characteristic	Physical Activity	
	% Moderate*	% Vigorous†
Gender		
Male	29.0	72.3
Female	24.4	57.1
Race/Ethnicity		
White, non-Hispanic	28.8	67.4
Male	31.7	74.6
Female	24.8	59.7
Black, non-Hispanic	20.9	55.6
Male	24.3	64.6
Female	17.8	47.2
Hispanic	21.4	60.5
Male	26.1	71.6
Female	16.7	49.5
Grade		
9	28.3	72.5
10	26.3	64.7
11	24.9	58.2
12	26.9	61.4
Total	26.7	64.7

*Activities that did not cause sweating or hard breathing for 30 minutes or more on 5 or more of the 7 days preceding the survey.

†Activities that caused sweating or hard breathing for 20 minutes or more on 3 or more of the 7 days preceding the survey.

Source: Youth Risk Behavior Surveillance System, 1999, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention.¹⁷

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more likely to be overweight or at risk for becoming overweight than female students.¹⁷

According to YRBSS state-level data, the percentage of youth at risk for becoming overweight ranged from 10.2% in Utah to 18.0% in Louisiana. Males and females who were at risk for becoming overweight varied by state with the largest differences in Maine, Hawaii, Louisiana, and South Dakota. Youth who were overweight in 1999 ranged from 4.9% in Utah to 13.1% in Mississippi. Males who were overweight had higher percentages than females, with the largest differences observed in Alabama and West Virginia (Table 2I).

Working Toward Community Change

The US Surgeon General and numerous health organizations have identified the high prevalence of obesity and physical inactivity as serious challenges for the prevention of cancer and other chronic diseases. An estimated 97 million US adults are overweight or obese.³³ Overweight and obesity rank as the second

Body Mass Index for Youth and Adolescents

Since children grow and their body composition changes dramatically through adolescence, the overweight and obesity definitions for youth differ from the definitions for adults. Caution is necessary when using body mass index (BMI) as a measure of body composition in youth.⁴¹ Growth charts show the entire distribution of a measurement (height and weight) or measurement ratio (BMI) across a range of ages and present multiple percentiles. The growth charts were revised in 2000⁴² and are available at Centers for Disease Control and Prevention's National Center for Health statistics Web site at <http://www.cdc.gov/growthcharts>. In this report the following definitions are used:

- Overweight: 95th or higher percentile for BMI
- At risk of becoming overweight: 85th to 94th percentile for BMI

leading cause of preventable premature death in the United States, accounting for an estimated \$70 billion in direct medical costs in 1995.^{33,43} Current trends toward increasing consumption of high-calorie convenience foods, meals prepared outside the home, reliance on automobiles for transportation, and reduced leisure time all present obstacles to healthy dietary and physical activity behaviors.²³

Social, economic, and cultural factors strongly influence individual choices about diet and physical activity. Community actions, such as program planning and policies for a healthy environment, that facilitate healthy dietary choices and regular physical activity are essential if the current progress on cancer and cardiovascular disease mortality is to be sustained. There is a critical need to develop and identify effective community-level strategies. Programs focusing on nutrition and physical activity in the workplace, in schools, and at home must be developed and evaluated for effectiveness. Multiple and comprehensive approaches including education, communication, intervention and environmental and policy change at the local, state, and national level are needed in order to facilitate environmental community change.⁴⁴ Public, private, and community organizations should work to create social and physical environments that support the adoption and maintenance of healthful dietary and physical activity behavior.

Table 2H. Physical Activity, High School Students, by State and City, 1999

	Participated in moderate physical activity*			Participated in vigorous physical activity†		
	% Total	% Male	% Female	% Total	% Male	% Female
State						
Alabama	23.3	26.3	20.2	58.5	68.4	48.6
Alaska‡	28.7	29.7	27.1	71.8	77.4	65.2
Arkansas	24.2	28.2	20.2	63.1	71.1	54.8
Connecticut§	24.3	26.8	22.0	62.3	68.0	56.9
Delaware	24.9	27.2	22.3	65.6	74.0	56.6
Florida§	22.3	27.1	17.5	57.1	66.1	48.0
Hawaii	20.3	22.7	18.3	64.0	74.8	54.8
Illinois§	29.3	30.2	28.5	74.8	80.6	69.3
Iowa§	27.1	30.7	23.6	67.4	74.0	61.2
Kentucky§	24.3	27.6	21.4	62.6	70.5	55.4
Louisiana‡§	21.0	22.6	19.0	59.5	66.7	52.2
Maine§	32.7	35.3	30.6	70.6	72.9	68.8
Massachusetts	26.8	30.4	23.2	62.5	68.9	55.9
Michigan	26.8	27.8	25.8	63.5	69.7	57.3
Mississippi	20.4	24.1	16.8	55.3	67.1	44.7
Missouri	22.5	25.7	19.1	64.3	72.3	56.1
Montana	29.9	33.3	26.6	69.5	75.8	63.1
Nebraska§	27.8	30.6	25.3	68.8	77.2	61.2
Nevada	31.7	34.4	28.5	69.3	74.7	63.4
New Hampshire§	26.9	29.4	24.4	65.5	72.0	59.4
New Jersey§	29.1	28.3	29.7	69.2	76.9	62.3
New Mexico§	28.1	34.0	22.8	62.5	72.1	54.0
New York	25.1	27.7	22.5	71.1	78.1	64.1
North Dakota	25.2	25.8	24.5	65.1	67.3	62.9
Ohio	27.8	31.9	23.7	62.5	72.3	52.7
South Carolina	22.1	25.1	19.3	55.2	61.4	49.1
South Dakota	25.4	26.3	24.4	63.0	68.2	57.7
Tennessee‡	22.6	26.9	18.4	63.4	73.8	53.1
Utah	31.4	33.9	28.8	77.0	81.3	72.7
Vermont	27.5	30.2	24.6	62.4	67.1	57.5
West Virginia	25.4	27.3	23.5	62.4	70.0	54.2
Wisconsin	25.5	25.9	25.4	60.2	64.6	55.9
Wyoming	30.2	35.3	24.5	70.7	76.4	64.6
City						
Boston, MA	18.8	21.7	16.2	48.9	60.5	38.2
Chicago, IL	24.5	27.3	22.1	57.1	66.1	48.7
Dallas, TX	19.8	20.9	18.9	58.1	67.7	49.0
Detroit, MI	23.2	27.8	19.0	52.4	60.4	45.2
Dist. of Columbia	17.8	19.1	16.7	51.7	62.5	42.0
Ft. Lauderdale, FL	19.4	22.4	16.5	58.6	69.8	47.4
Houston, TX	17.0	16.9	17.1	56.2	63.3	48.6
Miami, FL	20.8	24.1	17.6	57.9	69.4	47.0
New Orleans, LA	18.8	19.7	18.2	49.4	59.2	40.7
New York City, NY	24.7	25.3	24.2	66.5	72.2	60.7
Palm Beach, FL	22.3	25.8	18.7	61.7	72.1	51.3
Philadelphia, PA	20.8	22.3	19.3	53.3	61.0	45.5
San Bernardino, CA§	26.4	31.0	22.8	62.4	70.8	55.6
San Diego, CA	29.2	32.1	26.3	67.2	74.4	60.2
San Francisco, CA§	21.9	24.1	20.2	52.4	64.7	42.4
Seattle, WA	N/A	N/A	N/A	64.1	71.1	57.6

*Activities that did not cause sweating or hard breathing (such as fast walking or slow bicycling) for 30 minutes or more on five or more of the seven days preceding the survey. †Activities that caused sweating and hard breathing (such as basketball or running) for 20 minutes or more on three or more of the seven days preceding the survey. ‡Survey did not include students from one of the state's largest school districts. §Unweighted data (see Statistical Notes, p. 31). N/A = Data not available.

Source: Youth Risk Behavior Surveillance System, 1999, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention.¹⁷

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Table 2I. At Risk for Becoming Overweight or Were Overweight, High School Students, by State and City, 1999

	At risk for becoming overweight*			Overweight†		
	% Total	% Male	% Female	% Total	% Male	% Female
State						
Alabama	17.3	18.1	16.4	11.1	14.6	7.4
Alaska‡	15.6	17.2	13.8	7.3	8.3	6.2
Arkansas	15.2	14.4	15.9	10.9	12.8	8.8
Connecticut§	15.4	16.9	13.8	9.1	11.3	6.8
Delaware	16.4	18.2	14.4	9.1	11.1	7.0
Florida§	15.2	17.7	12.4	8.6	10.3	6.8
Hawaii	16.3	20.4	12.6	9.0	11.1	7.0
Illinois§	14.9	16.2	13.4	8.3	10.4	6.1
Iowa§	12.9	13.4	12.5	8.1	9.6	6.7
Kentucky§	16.7	19.5	14.1	12.0	15.4	8.9
Louisiana‡§	18.0	21.9	14.2	12.0	12.9	11.0
Maine§	14.2	18.3	10.3	8.6	11.1	6.1
Massachusetts	14.9	18.0	11.5	7.3	9.0	5.5
Michigan	14.7	16.5	12.9	9.9	12.2	7.6
Mississippi	17.2	18.6	16.0	13.1	16.6	9.9
Missouri	15.6	16.7	14.5	7.8	9.9	5.6
Montana	11.7	14.3	8.9	5.5	7.1	3.7
Nebraska§	12.0	14.6	9.7	6.4	8.4	4.6
Nevada	13.1	16.1	10.0	6.4	8.5	4.1
New Hampshire§	14.5	17.8	11.3	9.1	12.3	6.0
New Jersey§	12.8	15.5	10.4	7.4	9.2	5.6
New Mexico§	14.7	16.5	13.0	6.6	7.1	6.1
New York	15.3	17.7	12.8	7.6	9.7	5.4
North Dakota	13.0	16.2	9.5	6.7	9.2	3.9
Ohio	13.6	16.1	11.0	9.6	11.2	7.9
South Carolina	14.6	16.4	12.8	10.7	12.3	9.1
South Dakota	12.7	16.4	8.8	6.4	7.9	4.8
Tennessee‡	17.5	20.9	13.8	11.9	14.6	9.2
Utah	10.2	11.0	9.3	4.9	6.5	3.2
Vermont	N/A	N/A	N/A	N/A	N/A	N/A
West Virginia	15.9	16.5	15.4	12.2	15.8	8.3
Wisconsin	14.3	17.1	11.4	8.9	9.8	7.9
Wyoming	11.9	13.8	9.8	5.5	8.8	2.1
City						
Boston, MA	16.5	16.0	17.0	11.1	12.3	9.9
Chicago, IL	19.2	18.1	20.2	11.8	13.6	9.9
Dallas, TX	20.6	22.4	18.8	13.1	16.6	9.7
Detroit, MI	21.0	19.0	22.9	14.3	14.9	13.7
Dist. of Columbia	18.2	16.0	20.2	12.3	12.7	11.8
Ft. Lauderdale, FL	14.1	16.8	11.3	7.8	9.3	6.2
Houston, TX	18.3	18.1	18.5	12.2	12.3	12.1
Miami, FL	17.5	19.9	15.1	9.3	11.0	7.6
New Orleans, LA	17.7	16.7	18.6	13.1	13.3	12.8
New York City, NY	16.0	18.7	13.4	8.1	10.7	5.6
Palm Beach, FL	14.2	17.5	10.7	7.2	7.4	7.0
Philadelphia, PA	17.0	18.0	16.0	9.4	8.5	10.4
San Bernardino, CA§	14.9	15.5	14.4	12.4	12.6	12.1
San Diego, CA	13.6	15.9	11.1	6.5	8.2	4.8
San Francisco, CA§	12.0	14.7	9.6	7.1	8.7	5.8
Seattle, WA	12.0	13.6	10.3	6.6	7.9	5.3

*Students who were at or above the 85th percentile but below the 95th percentile for body mass index by age and sex based on reference data from the National Health and Nutrition Examination Survey I. †Students who were at or above the 95th percentile for body mass index by age and sex based on reference data from the National Health and Nutrition Examination Survey I. ‡Survey did not include students from one of the state's largest school districts. §Unweighted data (see Statistical Notes, p. 31). N/A = Data not available.

Source: Youth Risk Behavior Surveillance System, 1999, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention.¹⁷

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Sun Exposure

The vast majority of skin cancers are due to unprotected and excessive ultraviolet (UV) radiation exposure. Most exposure to ultraviolet radiation comes from sunlight, but exposure can also come from artificial sources, such as tanning booths. Whereas the short-term results from unprotected UV exposure are sunburn and tanning, long-term exposure can cause prematurely aged skin, wrinkles, and skin cancer. Among white males and females, incidence rates for the most fatal skin cancer—melanoma—increased sharply from 1973 until the mid 1980s. Rates have made slower increases during the 1990s.⁴⁵ While UV exposure is associated with a small percentage of all cancer deaths,²² the American Cancer Society estimates that UV exposure is associated with more than one million new cases of basal and squamous cell cancers and approximately 53,600 new cases of melanoma will be diagnosed in 2002.⁵

Sun Exposure on a National Level

Almost one-half (43%) of the adult US population in 1995 did not know that melanoma was a type of cancer. However, once told melanoma was a type of skin cancer, 82% identified sun exposure as a skin cancer risk factor.⁴⁶ Increased information about sun exposure and protection during the late 1980s and early 1990s may have influenced the responses related to risk factors for skin cancer. From 1986 to 1996, the percentage of adults who recognized the sun's harmful effects increased, but there was a concomitant decrease in the percentage that was able to identify skin cancer as fatal.⁴⁷ Widespread knowledge regarding sun exposure dangers was apparent in 1996, but the skin cancer emphasis was missing.⁴⁷ In the same study, the sunscreen use increased more than 50% from 35% in 1986 to 54% in 1996. However, the percentage of adults who had one or more sunburns or used a tanning booth increased over the 10 years.⁴⁷

A history of sunburn during childhood and intense intermittent sun exposure have been shown to increase the risk of melanoma and other skin cancers.^{48,49,50} Solar exposure is the chief modifiable risk factor for skin cancer, including melanoma, and sun protection behaviors can lead to significant reduction in sun exposure. Since a majority of lifetime sunlight exposure occurs during childhood or adolescence, sun protection behaviors should be implemented at a young age. Three-fourths of parents had their children, aged 12 or younger, use one or more sun protective behaviors, with sunscreen use as the most frequently reported behavior. In

the same study, sunscreen application did not change with a child's age, but the proportion of children using one or more protective behaviors decreased with age.⁵¹ As a child ages, the parental influences may not be as strong as in younger ages. An American Cancer Society survey among youth aged 11 to 18 showed less than one-third practiced sun protection behaviors. While more than one-half (58%) reported using a SPF-15 or greater sunscreen lotion at the beach or pool, less than one-third (31%) used it if they were out in the sun for more than one hour.⁵² In addition, the same survey showed almost three-quarters of youth reported getting sunburned. Of those with sunburns, more than one-third reported using a SPF-15 or higher sunscreen lotion when they got burned.⁵³

Sun Exposure on a State Level

Despite the importance of sun protective behaviors, little state-level data is available. According to BRFSS data, the percentage of adults who were sunburned during the past 12 months in 1999 ranged from 19.6% in

Risk factors and prevention measures for melanoma and other skin cancers

Risk factors for melanoma⁴⁶

- Light skin color
- Family history of melanoma
- Personal history of melanoma
- Presence of moles and freckles
- History of severe sunburn occurring early in life

Risk factors for basal and squamous cell cancers⁴⁶

- Chronic exposure to the sun
- Family history of skin cancer
- Personal history of skin cancer
- Light skin color

Measures to prevent skin cancer

- Avoid direct exposure to the sun between the hours of 10 a.m. to 4 p.m., when ultraviolet rays are the most intense.
- Wear hats with a brim wide enough to shade face, ears, and neck, as well as clothing that covers as much as possible of the arms, legs, and torso.
- Cover exposed skin with a sunscreen lotion with a sun protection factor (SPF) of 15 or higher.
- Avoid tanning beds and sun lamps, which provide an additional source of UV radiation.

Arizona to 47.8% in Wisconsin and Wyoming (Table 3A). In addition, sunburns during the past 12 months differed significantly by gender for 45 of the states with men more likely than women to report sunburns.

Changing Attitudes Toward Tanning: Key to Reducing UV Exposure

Knowledge regarding a particular health topic may influence one's attitude and behavior. Widespread knowledge about the dangers of unprotected sun exposure has slowly influenced some adult and youth attitudes. In 1996, 68% of adults reported that persons looked better with a tan. In particular, men and whites were more likely to think that a tan was more appealing.⁴⁷ In the same study, the attitude that a tan appeared

healthy decreased from 1986 to 1996, but whites and adults with higher incomes were more likely to have this attitude.⁴⁷ Among youth aged 11 to 18, more than one-half agreed or strongly agreed that they looked better with a tan, with more youth ages 17 to 18 having this attitude compared to those youth from ages 11 to 13.⁵² Boys were more likely to agree or strongly agree that they felt healthy when they had a tan compared to girls.⁵² A shift in attitudes toward sun protection—from perceiving a tan as healthy to unhealthy or from thinking a person looks better with a tan as opposed to without a tan—and an increased effort on effective sun protection would be key components in decreasing skin cancer incidence rates.

Table 3A. Sunburn, Adults 18 and Older, by State, 1999

Sunburn* within Past 12 Months							
	% Total	% Male	% Female		% Total	% Male	% Female
Alabama	30.0	35.4	25.1	Montana	36.2	39.7	33.0
Alaska	26.9	28.6	25.0	Nebraska	40.2	46.8	34.1
Arizona	19.6	21.0	18.3	Nevada	35.2	39.9	30.4
Arkansas	36.0	43.8	28.9	New Hampshire	41.6	46.5	37.0
California	31.6	36.9	26.5	New Jersey	26.1	30.8	21.9
Colorado	44.3	50.0	38.9	New Mexico	34.9	40.4	29.8
Connecticut	28.5	32.0	25.3	New York	24.1	27.0	21.5
Delaware	35.5	39.8	31.6	North Carolina	24.4	29.7	19.5
Dist. of Columbia	22.0	24.6	19.8	North Dakota	37.0	42.5	31.7
Florida	26.6	30.5	23.0	Ohio	34.8	41.4	28.8
Georgia	27.0	31.2	23.2	Oklahoma	27.3	29.9	24.8
Hawaii	33.6	38.9	28.5	Oregon	38.2	44.2	32.5
Idaho	44.0	50.8	37.6	Pennsylvania	31.8	36.6	27.5
Illinois	36.4	43.9	29.1	Rhode Island	31.3	35.9	27.2
Indiana	44.5	50.5	39.0	South Carolina	24.4	28.1	21.0
Iowa	45.7	53.9	38.2	South Dakota	43.3	50.5	36.4
Kansas	30.9	35.6	26.5	Tennessee	22.2	27.5	17.5
Kentucky	28.8	34.5	23.6	Texas	31.2	36.9	25.8
Louisiana	25.7	32.2	19.9	Utah	47.3	53.3	41.6
Maine	35.7	43.4	28.8	Vermont	39.0	43.4	34.9
Maryland	29.3	33.6	25.5	Virginia	34.5	42.2	27.3
Massachusetts	32.1	34.1	30.2	Washington	37.6	43.9	31.5
Michigan	41.3	46.2	36.9	West Virginia	32.1	37.7	27.0
Minnesota	38.8	42.4	35.4	Wisconsin	47.8	56.0	40.1
Mississippi	27.7	32.5	23.4	Wyoming	47.8	52.9	42.7
Missouri	37.9	44.1	32.4	United States†	34.5	39.7	28.8
				Range	19.6-47.8	21.0-56.0	17.5-42.7

*Any part of skin (regardless of size) was red for more than 12 hours. †Median for all reporting states (see Statistical Notes, p. 31).

Source: Behavioral Risk Factor Surveillance System CD-ROM 1999, National Center for Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 2000.

Cancer Screening

The early detection of certain cancers can save lives, reduce treatment, and improve quality of life. Early detection definitely improves survival for cancers of the breast, colon, rectum, cervix, prostate, testes, oral cavity, and

skin. Self-examinations of the female breast and skin also result in earlier tumor detection. The American Cancer Society estimates the 5-year relative survival for the nine screening-accessible cancer sites would increase from 82% to more than 95% if all Americans participated in timely cancer screenings.⁵

American Cancer Society Recommendations for the Early Detection of Cancer in Asymptomatic People

Cancer-related Checkup: A cancer-related check-up is recommended every 3 years for people aged 20 to 39 years and annually for people aged 40 years and older. This exam should include health counseling about tobacco, sun exposure, diet and nutrition, risk factors, sexual practices, and environmental and occupational exposures. Depending on a person's age, it might include examinations for cancers of the thyroid, oral cavity, skin, lymph nodes, testes, ovaries, as well as for some nonmalignant diseases.

Breast: Women 40 years and older should have an annual mammogram, an annual clinical breast exam (CBE) performed by a health care professional, and should perform monthly breast self-examinations (BSE). The CBE should be conducted close to the time of the scheduled mammogram, and preferably before.

Women aged 20 to 39 years should have a clinical breast exam performed by a health care professional every three years and should perform monthly BSE. Women with a strong family history of breast cancer should talk to their doctor about when to start screening.

Colon and Rectum: Beginning at age 50, men and women at average risk should follow one of the examination schedules below:

1) Fecal occult blood test (FOBT) every year, or 2) Flexible sigmoidoscopy every 5 years*, or 3) FOBT every year and flexible sigmoidoscopy every 5 years*, (of these first 3 options, the American Cancer Society recommends option 3, i.e., annual FOBT and flexible sigmoidoscopy every 5 years) compared with either option 1 or option 2 alone, or 4) Double-contrast barium enema every 5 years,* or 5) Colonoscopy every 10 years.*

**A digital rectal exam is not recommended as a stand-alone screening test for colorectal cancer. However, DRE should be performed prior to insertion of a sigmoidoscope or colonoscope. People who are at increased or high risk should talk with a doctor about a different testing schedule. Increased or high risk includes a personal history of colorectal cancer, a strong family history of colorectal cancer or polyps, a personal history of chronic inflammatory bowel disease, or family history of hereditary colorectal cancer syndromes.*

Prostate: Beginning at age 50, the prostate-specific antigen (PSA) test and digital rectal exam should be offered annually to men who have a life expectancy of at least 10 years. Men at higher risk (African-American men and men who have a first-degree relative who was diagnosed with prostate cancer at a young age) should begin testing at age 45. Patients should be given information about the benefits and limitations of testing so they can make an informed decision.

Cervix: All women who are or have been sexually active or who are 18 and older should have an annual Pap test and pelvic examination. After three or more consecutive satisfactory examinations with normal findings, the Pap test may be performed less frequently. Discuss the matter with your physician.

Endometrium: Beginning at age 35, women with or at risk for hereditary non-polyposis colon cancer should be offered endometrial biopsy annually to screen for endometrial cancer. The American Cancer Society also recommends that at the time of menopause, women at average and higher risk should be informed about risks and symptoms of endometrial cancer, and strongly encouraged to report any unexpected bleeding or spotting to their physicians.

Breast Cancer in Women

Breast Cancer Screening on a National Level

Between 1973 and 1998, breast cancer incidence rates increased by more than 40%.⁴⁵ Recent trends (1992 to 1998) have shown an increase in breast cancer incidence confined to early stage breast cancer, which largely reflects a rise in mammography use. According to NHIS data, the percentage of women aged 40 years and older who report having had a mammogram within the past two years increased from 29.0% in 1987 to 67.0% in 1998.¹¹ Despite the overall increase, varying percentages are seen among different racial, ethnic, and educational groups (Table 4A).³¹ Similar increasing patterns were observed from 1989 to 1997 for 38 states participating in the BRFSS aggregated to represent the United States. The same study showed mammography use was more likely among women aged 50 to 69 years and lowest among Hispanic women, women with the lowest level of education, and women without health care insurance.⁵⁴

Table 4A. Mammography*, Women 40 and Older, United States, 1998

Characteristic	%†
Race/Ethnicity	
White (non-Hispanic)	68
Black (non-Hispanic)	66
Hispanic	61
American Indian/Alaska Native	45
Asian/Pacific Islander	61
Education (years)	
11 or fewer	53
12	66
13 or more	73
Total	67

*A mammogram within the past two years.

†Percentages are age-adjusted to the 2000 US standard population.

Source: National Health Interview Survey, 1998, National Center for Health Statistics, Centers for Disease Control and Prevention.³¹

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Breast Cancer Screening on a State Level

The state percentages are presented for mammogram or mammogram and clinical breast exam in the past year in compliance with the American Cancer Society breast cancer screening guidelines (Table 4B). According to the 2000 BRFSS, the percentage of women 40 and older with a recent mammogram ranged from 51.5% in Mississippi to 75.8% in Delaware. In addition, the BRFSS data showed little variability in these proportions by age for a majority of the states, but three states (Alaska, Florida, and Montana) had significantly higher percentages for women aged 65 years and older. For a recent mammogram and clinical breast exam, the percentages in 2000 were 4 to 14 percentage points lower than a recent mammogram alone and ranged from 45.5% in Mississippi to 67.6% in Delaware. Similar to a recent mammogram alone, these percentages did not greatly differ by age.

Cervical Cancer

Cervical Cancer Screening on a National Level

Cervical cancer incidence and mortality rates have decreased markedly in the past several decades.⁵⁵ The reduction has been attributed to the Pap test, which detects cervical cancer and precancerous lesions.⁵⁵ When cervical cancer is detected early, it is one of the most successfully treatable cancers.⁵⁵ The NHIS data showed in 1992 that more than 90% of women aged 18 years and older have ever had a Pap test and approximately two-thirds (61%) had a Pap test within the past three years. Recent cervical cancer screening differed by age, race, ethnicity, education, and poverty level.⁵⁶ The differences in race and education persisted in 1998 (Table 4C). Similar patterns for cervical cancer screening were observed for 1991 to 1997 when 38 states in the BRFSS were aggregated to represent the United States.⁵⁴ The BRFSS data showed more than 90% of women 18 and older have ever had a Pap test during the 1990s.⁵⁴ In addition, more than 75% of women have had a Pap test within the past two years, but variability was observed by age, race and ethnicity, income, education, and

Table 4B. Mammography and Clinical Breast Exam, Women 40 and Older, by State, 2000

	% Recent Mammogram*			% Recent Mammogram and Clinical Breast Exam†		
	40+ years	40-64 years	65+ years	40+ years	40-64 years	65+ years
Alabama	58.5	56.5	62.4	52.1	52.8	50.9
Alaska	61.7	58.6	76.8	57.2	55.2	66.8
Arizona	69.3	67.3	72.9	55.0	55.2	54.5
Arkansas	58.7	59.5	57.4	51.1	52.7	48.1
California‡	63.0	60.5	68.8	52.6	51.5	55.2
Colorado	60.2	57.9	66.0	53.6	52.2	57.2
Connecticut	73.2	72.4	74.8	66.0	67.9	62.5
Delaware	75.8	74.0	79.3	67.6	67.1	68.6
District of Columbia	67.9	68.1	67.4	57.9	57.3	59.4
Florida	66.3	62.5	72.7	56.0	54.2	59.1
Georgia	60.4	59.2	63.6	53.4	53.3	53.7
Hawaii	65.8	65.9	65.6	57.5	58.6	55.0
Idaho	51.7	49.1	57.2	45.6	45.0	47.0
Illinois	63.4	64.1	61.9	55.5	58.1	50.1
Indiana	61.6	63.4	58.0	54.8	57.4	49.4
Iowa	62.8	63.7	61.3	56.8	58.6	53.5
Kansas	61.9	61.2	63.0	54.4	56.3	50.9
Kentucky	63.3	64.4	61.0	57.8	60.1	52.9
Louisiana	64.8	63.8	66.9	57.7	58.5	55.9
Maine	67.3	68.9	64.1	62.9	65.7	57.2
Maryland	69.2	67.5	73.3	62.3	61.7	63.7
Massachusetts	72.2	72.6	71.6	65.3	66.7	62.6
Michigan	69.1	68.1	71.2	61.3	62.8	58.1
Minnesota	61.3	61.2	61.6	54.5	57.3	48.5
Mississippi	51.5	54.6	45.4	45.5	49.6	37.3
Missouri	60.7	61.6	58.9	54.5	56.7	50.5
Montana	61.6	58.4	68.2	57.3	55.8	60.5
Nebraska	61.9	64.5	57.4	57.5	61.9	49.8
Nevada	61.9	58.7	69.7	50.6	52.6	45.9
New Hampshire	68.5	66.9	72.4	63.4	61.0	69.0
New Jersey	66.8	67.3	65.7	58.0	60.5	53.0
New Mexico	60.6	57.2	68.2	53.9	52.7	56.6
New York	68.2	69.0	66.7	60.3	62.3	56.1
North Carolina	64.8	64.2	65.9	59.4	60.7	56.8
North Dakota	62.0	60.1	65.3	55.1	55.2	55.0
Ohio	67.2	66.0	69.3	58.5	59.1	57.2
Oklahoma	55.8	54.6	58.1	50.1	50.0	50.4
Oregon	62.1	60.1	66.3	54.3	55.0	52.9
Pennsylvania	63.7	63.7	63.7	56.2	59.4	50.8
Rhode Island	71.5	71.3	72.0	65.5	66.3	64.2
South Carolina	64.8	62.7	69.3	57.0	56.1	59.1
South Dakota	62.7	61.2	65.2	57.7	58.2	57.0
Tennessee	62.6	63.2	61.5	54.7	56.8	50.4
Texas	57.2	55.0	62.2	48.7	47.4	51.6
Utah	53.0	51.5	56.7	47.1	46.8	47.9
Vermont	62.9	62.8	63.0	57.0	58.2	54.3
Virginia	61.9	58.7	69.3	54.0	53.3	55.6
Washington	58.8	57.8	61.1	51.7	51.9	51.5
West Virginia	61.6	60.3	63.9	55.3	57.3	51.6
Wisconsin	61.3	61.2	61.6	54.9	56.9	50.9
Wyoming	54.4	53.1	57.6	48.6	49.1	47.2
United States§	62.6	62.5	65.3	55.5	56.9	54.3
Range	51.5-75.8	49.1-74.0	45.4-79.3	45.5-67.6	45.0-67.9	37.3-69.0

*A mammogram within the past year. †Both a mammogram and clinical breast exam within the past year. ‡Questions for mammogram and clinical breast exam differed and may not be comparable to other state percentages in this table. §Median for all reporting states (see Statistical Notes, p. 31).

Source: Behavioral Risk Factor Surveillance System Public Use Data Tape 2000, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 2001.

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Table 4C. Pap Test*, Women 18 and Older, United States, 1998

Characteristic	%†
Race/Ethnicity	
White (non-Hispanic)	80
Black (non-Hispanic)	83
Hispanic	74
American Indian/Alaska Native	72
Asian/Pacific Islander	67
Education (years)‡	
11 or fewer	69
12	78
13 or more	85
Total	79

*A Pap test within the past three years. †Percentages are age-adjusted to the 2000 US standard population. ‡Women ages 25 years or older.

Source: National Health Interview Survey, 1998, National Center for Health Statistics, Centers for Disease Control and Prevention.³¹
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access to health insurance.⁵⁴ Women who were 60 years and older, were Hispanic, had an annual household income less than \$10,000, had less than a high school education, or had no health insurance were less likely to receive a Pap test.⁵⁴

Cervical Cancer Screening on a State Level

The state percentages are presented for women who have had a Pap test within the past three years in compliance with the American Cancer Society cervical cancer guidelines (Table 4D). According to the BRFSS, in 2000 the recent Pap test percentages for reproductive-aged women (18-44 years old) ranged from 83.6% in Nevada to 93.0% in Delaware. In addition, the percentages ranged from 75.2% in Wyoming to 90.7% in Delaware for women 45 and older. The percentages for women 45 and older were significantly lower than the percentages for reproductive-aged women for almost half of the states. For women 65 and older, the recent Pap test percentages ranged from 62.7% in New Jersey to 86.7% in Delaware. The BRFSS data showed the percentages for the oldest women were significantly lower than the percentages for reproductive-aged women in three-fourths of the states.

Table 4D. Pap Test, Women 18 and Older, by State, 2000

	% Recent Pap Test*		
	18-44 years	45+ years	65+ years
Alabama	89.8	81.1	72.6
Alaska	91.5	87.3	79.0
Arizona	88.8	86.0	83.9
Arkansas	87.3	78.0	72.4
California†	85.3	84.3	77.6
Colorado	89.8	83.0	70.7
Connecticut	89.3	86.4	77.7
Delaware	93.0	90.7	86.7
Dist. of Columbia	90.9	85.1	73.8
Florida	85.1	83.8	78.5
Georgia	91.5	83.9	73.9
Hawaii	87.9	87.5	82.9
Idaho	85.5	79.0	74.0
Illinois	87.3	80.2	69.0
Indiana	89.0	77.9	64.1
Iowa	88.9	84.1	76.4
Kansas	91.1	83.1	76.7
Kentucky	89.7	81.1	72.3
Louisiana	89.5	83.9	74.5
Maine	92.0	85.1	76.7
Maryland	91.7	87.4	79.8
Massachusetts	91.5	87.1	76.7
Michigan	87.7	85.3	73.4
Minnesota	89.1	81.4	73.2
Mississippi	92.4	78.0	72.8
Missouri	88.7	78.7	67.9
Montana	89.1	88.2	79.1
Nebraska	87.7	83.3	71.6
Nevada	83.6	84.1	74.7
New Hampshire	92.4	86.6	75.5
New Jersey	84.5	78.8	62.7
New Mexico	86.1	83.6	74.4
New York	87.4	83.2	69.6
North Carolina	91.5	85.7	76.0
North Dakota	87.1	79.2	71.9
Ohio	90.4	80.8	75.6
Oklahoma	88.6	80.8	71.5
Oregon	88.7	86.9	81.4
Pennsylvania	89.4	80.5	67.7
Rhode Island	89.0	87.6	80.4
South Carolina	92.1	88.1	84.7
South Dakota	91.0	85.0	77.7
Tennessee	90.0	84.8	72.4
Texas	83.9	79.5	68.9
Utah	84.6	79.9	68.9
Vermont	90.4	84.8	74.5
Virginia	88.1	84.3	77.1
Washington	88.8	84.8	77.7
West Virginia	85.5	77.5	71.3
Wisconsin	91.5	80.5	73.1
Wyoming	85.0	75.2	63.2
United States‡	89.0	83.9	74.4
Range	83.6-93.0	75.2-90.7	62.7-86.7

*A Pap test within the preceding three years for women with intact uteri. †Questions for pap test differed and may not be comparable to other state percentages in this table. ‡Median for all reporting states (see Statistical Notes, p. 31).

Source: Behavioral Risk Factor Surveillance System Public Use Data Tape 2000, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 2001.

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Table 4E. Colorectal Cancer Screening, Adults 50 and Older, United States, 1998

Characteristic	% Fecal Occult Blood Test*‡	Sigmoidoscopy†‡
Gender		
Male	38	43
Female	34	33
Race/Ethnicity		
White (non-Hispanic)	36	39
Black (non-Hispanic)	30	32
Hispanic	23	27
American Indian/ Alaska Native	24	29
Asian/Pacific Islander	31	34
Education (years)‡		
11 or fewer	26	29
12	34	36
13 or more	41	44
Total	35	37

*A fecal occult blood test within the past two years. †Adults who have ever received a sigmoidoscopy. ‡Percentages are age-adjusted to the 2000 US standard population.

Source: National Health Interview Survey, 1998, National Center for Health Statistics, Centers for Disease Control and Prevention.³¹

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Colon and Rectum Cancer

Colon and Rectum Cancer Screening on a National Level

Colon and rectum cancer incidence rates increased until 1985, decreased 1.8% per year through 1995, and stabilized through 1998.⁴⁵ The recent reversal in the downward trend may reflect an increased use of colorectal cancer screening, which initially will increase incidence rates as more cases in asymptomatic individuals are detected, before subsequent decreases in mortality rates.⁴⁵ Colorectal cancer screening allows for the detection and treatment of cancer in its earliest stages, which have a high survival rate, and precancerous polyps, which can be present for years before invasive cancer develops. Despite the availability of different screening methods, colorectal cancer screening is not widely used. In 1992, NHIS data showed almost one-half of adults 50 and older ever had a fecal

occult blood test, but only 17.3% had the test within the past year.⁵⁶ Use of colorectal cancer screening, including sigmoidoscopy, remained low in 1998 and varied by gender, race, and education (Table 4E).³¹ The BRFSS data, which was aggregated to represent the United States, showed little increase in colorectal cancer screening from 1997 to 1999.⁵⁷ In 1999, approximately 20% of adults 50 and older received a fecal occult blood test within the past year and one-third had a sigmoidoscopy or colonoscopy within the past five years.⁵⁷

Colon and Rectum Cancer Screening on a State Level

The state percentages are presented for adults who have had a fecal occult blood test within the past year or sigmoidoscopy or colonoscopy within the past five years in compliance with the American Cancer Society colorectal cancer guidelines (Table 4F). According to the BRFSS, the recent fecal occult blood test percentages in 1999 for adults aged 50 and older ranged from 11.6% in Alabama to 35.8% in the District of Columbia. In addition, the BRFSS data showed a recent fecal occult blood test did not differ by gender for a majority of the states, but 20% of the states had significantly higher percentages for women. The recent sigmoidoscopy or colonoscopy percentages in 1999 for adults 50 and older ranged from 22.6% in Nebraska to 46.2% in Delaware. A recent sigmoidoscopy or colonoscopy did not differ by gender for a majority of the states, but seven of the states had significantly higher percentages for men.

Prostate Cancer

Prostate cancer is the most common type of cancer (other than skin cancer) and the second leading cause of cancer death for US men. National organizations commonly recommend informed decision making about testing for prostate cancer versus a recommendation that all men should be screened. To date, there are no national and only limited state-level data on the prostate-specific antigen (PSA) test and the digital rectal exam. However, national and state-level surveys have recently asked US men about these screening examinations and the data will be available in the next few years.

Table 4F. Colon and Rectum Cancer Screening, Adults 50 and Older, by State, 1999

	% Recent fecal occult blood test*			% Recent sigmoidoscopy or colonoscopy†		
	Total	Men	Women	Total	Men	Women
Alabama	11.6	9.8	13.1	29.9	32.8	27.6
Alaska	12.5	11.0	14.0	35.5	38.1	32.7
Arizona	21.6	17.4	24.9	30.5	32.5	29.0
Arkansas	15.5	14.9	16.0	29.5	31.5	27.9
California	16.5	14.9	17.9	38.3	44.1	33.1
Colorado	21.8	14.9	28.0	31.0	35.5	27.2
Connecticut	28.8	25.4	31.3	39.0	42.2	36.7
Delaware	21.7	17.9	24.6	46.2	51.6	41.9
Dist. of Columbia	35.8	33.9	37.2	42.6	52.1	35.5
Florida	23.0	19.9	25.7	34.8	36.4	33.4
Georgia	16.8	11.8	21.0	35.6	40.0	32.0
Hawaii	19.8	19.2	20.3	35.4	37.4	33.6
Idaho	15.6	10.7	19.9	29.7	31.9	27.8
Illinois	20.5	12.2	27.4	34.1	33.5	34.7
Indiana	16.5	18.0	15.4	31.6	36.5	27.6
Iowa	23.9	19.0	27.7	31.2	31.0	31.3
Kansas	19.1	14.8	22.5	29.0	30.4	27.8
Kentucky	17.5	16.6	18.1	25.7	25.7	25.6
Louisiana	18.2	17.1	19.1	28.9	33.5	25.4
Maine	26.7	21.3	31.0	31.0	31.2	30.9
Maryland	28.7	29.4	28.1	40.7	45.1	37.0
Massachusetts	29.2	26.1	31.7	35.0	38.2	32.5
Michigan	24.2	25.6	23.1	39.9	49.0	32.8
Minnesota	18.3	16.3	19.9	36.5	37.8	35.3
Mississippi	13.5	11.9	14.7	28.4	28.7	28.1
Missouri	17.5	16.2	18.6	26.6	26.2	26.9
Montana	18.6	15.4	21.4	30.4	32.5	28.6
Nebraska	20.0	18.5	21.3	22.6	24.5	21.1
Nevada	13.7	14.0	13.4	28.0	30.2	26.1
New Hampshire	33.0	35.6	30.9	37.6	46.5	30.4
New Jersey	26.1	25.5	26.6	35.3	42.0	30.1
New Mexico	18.1	17.7	18.4	32.4	35.5	30.0
New York	23.6	23.3	23.9	34.9	38.9	31.7
North Carolina	29.9	27.0	32.3	31.0	32.6	29.7
North Dakota	17.4	14.0	20.1	30.4	32.5	28.7
Ohio	22.9	20.6	24.5	32.6	34.2	31.4
Oklahoma	15.5	17.0	14.2	28.2	30.7	26.3
Oregon	21.4	14.8	26.8	33.3	31.9	34.4
Pennsylvania	24.2	24.5	23.9	30.6	34.1	27.9
Rhode Island	25.0	22.1	27.3	39.4	43.5	36.3
South Carolina	20.0	17.1	22.3	32.1	34.3	30.3
South Dakota	19.0	18.4	19.6	32.3	33.4	31.4
Tennessee	17.5	15.7	18.8	29.8	31.3	28.6
Texas	17.3	15.6	18.6	32.6	37.5	28.5
Utah	15.1	14.5	15.7	31.4	33.1	29.9
Vermont	29.8	23.6	35.1	32.1	34.0	30.5
Virginia	18.1	14.3	21.3	34.4	38.4	30.9
Washington	26.2	23.7	28.3	37.0	41.8	33.0
West Virginia	13.5	13.4	13.5	26.2	28.8	24.2
Wisconsin	14.8	13.7	15.6	36.2	42.2	31.2
Wyoming	13.8	13.2	14.2	34.0	42.0	26.7
United States‡	19.1	17.1	21.3	32.3	34.2	30.3
Range	11.6-35.8	9.8-35.6	13.1-37.2	22.6-46.2	24.5-52.1	21.1-41.9

*A fecal occult blood test within the last year. †A sigmoidoscopy or colonoscopy within the preceding five years. ‡Median of all reporting states (see Statistical Notes, p. 31).

Source: Behavioral Risk Factor Surveillance System CD-ROM 1999, National Center for Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 2000.

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Barriers to Cancer Screening

Personal beliefs and practices, lack of physician recommendation, and access to medical care are barriers to cancer screening. A study focusing on female breast and cervical cancer screening found that positive perceptions about surviving cancer were associated with higher cancer screening levels.⁵⁸ In the same study, knowledge of one or more risk factors increased the likelihood of screening.⁵⁸ Low cancer screening prevalence is found among adults who have little or no access to health care,⁵⁸ who have a low income,⁵⁸ who have a lower educational attainment,⁵⁸ who live in rural areas,⁵⁸ who have language barriers,⁶⁰ who are ethnic minorities,⁶⁰ or who lack a physician recommendation or referral.⁶¹ Failure to comply with cancer screening examinations may be influenced by other lifestyle practices and willingness to obtain preventive health

care. For example, women who smoke were less likely to obtain a mammogram for screening purposes.⁶² The same study showed women who did have a screening mammogram were more likely to have had a Pap test, had a cholesterol screening, and worn a seatbelt.⁶² Similar patterns were observed for colorectal cancer screening. Adults who had other screening examinations or had a healthy lifestyle—wore seatbelts, ate fruits and vegetables, were physically active, or were former or never smokers—were more likely to have been screened for colorectal cancer.⁶³ Increasing knowledge, improving physician recommendations, and creating access to affordable cancer screening tests are important factors to lower the barriers to cancer screening. Strategies like computerized office reminder systems have been shown to be effective in improving cancer screening within medical settings.⁶⁴

Statistical Notes

Sample Surveys

In measuring the **prevalence** of certain behaviors in a **population**, it is usually impossible to survey every person. Hence, most **population-based surveys** are conducted by choosing a representative **sample** of people to estimate the true prevalence in a population. All of the adult statistics and most of the youth statistics presented in this publication have been **weighted** and are estimates of the true prevalence in the population. Some of the youth statistics presented in this publication are estimates of the students who participated in the survey and remain **unweighted**. The population-based survey methodology introduces sampling error to the estimated prevalence since a true prevalence is not calculated. In addition, a **standard error** is associated with the estimated prevalence and can be used to calculate the margin that contains the prevalence.

Prevalence: The percentage of people exhibiting the behavior out of the total number at risk for the behavior. For example, 66.3% of Floridian women aged 40 years and older had a mammogram within the past year in 2000. The percentage of people exhibiting the behavior is 66.3% and the population at risk for the behavior is women aged 40 years and older living in Florida in 2000. Throughout this publication, the prevalence is called a percentage.

Population: A group of people defined by the survey. For example, the BRFSS data targets adults aged 18 and older and the YRBSS data targets students in grade 9 to 12 at public and private high schools.

Population-based surveys: A survey conducted to estimate the prevalence of a given disease or risk factor in an entire population in a city, state, or nation. For example, the BRFSS is designed to represent all residents in a given state and the YRBSS is designed to represent all high school students in the nation, a state, or a city.

Sample: A smaller group of people chosen from the population defined by the survey. The sample is chosen based on the age, race, ethnic, and gender demographics of the city, state, or nation. At times, population-based surveys will oversample a particular age, race, ethnic, or

gender group. This oversampling is done to provide enough responses to make valid estimates for a particular population of interest.

Weighted data: Data that are representative of an entire city, state, or nation. Once the sample of the population has completed the survey, statistical analyses are conducted to extrapolate the surveyed group's responses to the entire population (city, state, or nation). For example, BRFSS data in this publication is representative of all non-institutionalized, civilian adults with telephones. Most YRBSS data in this publication is representative of all public and private high school students in grades 9 to 12.

Unweighted data: Data that are only representative of the sample (surveyed group). The surveyed group's responses cannot be extrapolated to the entire population because the data are not reliable due to low response rates or other factors affecting survey quality. Some criteria to determine if data are reliable include the percentage of people who respond to the survey or the completeness of the survey questions. For example, YRBSS data are considered unweighted if less than 60% of the questionnaires in a state or city return the survey. The collected data are still valid for the students that participated in the survey, but not for the entire intended population.

Standard Error: An estimated prevalence is subject to deviations from the true prevalence and this error is associated with the survey methods and statistical adjustments in estimating the prevalence.

Other Statistical Terms

Median: The middle value (50th percentile) when the state prevalence estimates are ordered from smallest to largest. A median differs from a mean or average since a median is not influenced by extremely low or high prevalence estimates. For the BRFSS data, the median for all 50 states and the District of Columbia is listed to estimate the United States prevalence. A more accurate method of estimating the United States prevalence would be to sample from the national population, but since BRFSS is a state-based survey, the median is listed as the United States prevalence.

Range: The lowest and highest values of a group of prevalence estimates.

Confidence Interval: A range of possible values for the estimated prevalence. A 90% confidence interval is one that will contain the true value 90 out of 100 samples surveyed. Similarly, a 95% confidence interval will contain the true value 95 out of 100 samples surveyed. A 95% confidence interval is commonly reported and the following table reports the confidence interval ranges for the survey data.

Example

The confidence interval range for current cigarette smoking among adults is between 1.1% and 3.1%. The widest confidence interval is around the percentage for Arizona (18.6% ±3.1%), and the percentage for Massachusetts has the narrowest range of possible values (20.0% ±1.1%).

Confidence Interval (CI) Ranges for Percentages Listed in Tables, by State

Table	Description	95% CI Range
1B	Current cigarette smoking, adults	± 1.1% to 3.1%
	Current cigarette smoking, men	± 1.7% to 4.4%
	Current cigarette smoking, women	± 1.4% to 4.6%
2A	Five or more fruits and vegetables a day, adults	± 1.1% to 3.1%
2C	No leisure time physical activity, adults	± 1.1% to 3.4%
	Regular and sustained physical activity, adults	± 1.1% to 2.8%
	Regular and vigorous physical activity, adults	± 1.0% to 2.5%
2D	Overweight, adults	± 1.3% to 3.3%
	Obese, adults	± 1.0% to 3.0%
2H	Moderate physical activity, high school students, total*	± 0.7% to 3.3%
	Vigorous physical activity, high school students, total*	± 1.9% to 5.9%
3A	Sunburn within the past 12 months, adults	± 1.4% to 3.4%
4B	Recent mammogram, women 40 and older	± 1.9% to 5.6%
	Recent mammogram, women 65 and older	± 3.4% to 9.5%
	Recent mammogram and clinical breast exam, women 40 and older	± 2.1% to 6.1%
	Recent mammogram and clinical breast exam, women 65 and older	± 3.7% to 11.6%
4D	Recent Pap test, women of reproductive age	± 1.5% to 5.1%
	Recent Pap test, women 45 and older	± 1.9% to 5.9%
4F	Recent fecal occult blood test, adults	± 1.8% to 4.9%
	Recent sigmoidoscopy or colonoscopy, adults	± 2.1% to 6.1%

*For states with weighted data only.

Survey Sources

The statistics reported in this publication are compiled by several different, publicly available surveys designed to provide prevalence estimates of health-related behaviors and practices for a city, state, or nation. The survey design varies; some surveys provide prevalence estimates on a national level, whereas some surveys provide estimates on a state level. A brief description of the surveys follows:

Behavioral Risk Factor Surveillance System (BRFSS). The BRFSS is a survey of the Centers for Disease Control and Prevention (CDC), National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP) and the US states and territories. The survey is designed to provide state prevalence estimates on behavioral risk factors such as cigarette smoking, physical activity and cancer screening. Data are gathered through monthly, computer-assisted telephone interviews on adults aged 18 years or older living in households in a state or US territory. The BRFSS is an annual survey and all 50 states, the District of Columbia, and Puerto Rico have participated since 1996. The methods are generally comparable from state to state and from year to year, which allows states to monitor the effects in interventions over time. Prevalence estimates from BRFSS are subject to several limitations. The prevalence estimates are only applicable to adults living in households with a residential telephone line. Although 95% of US households have telephones, the coverage ranges from 87 to 98% in the states and varies by state.

For more information, visit the BRFSS Web site at <http://www.cdc.gov/nccdphp/brfss/>

Continuing Survey of Food Intakes by Individuals (CSFII). The CSFII is a survey conducted by the United States Department of Agriculture's Food Surveys Research Group (FSGR), Agricultural Research Service (ARS) and is referred to as the "What We Eat In America" survey. The survey is designed to provide national prevalence estimates on the food Americans eat as well as knowledge and attitudes about food by age, race, gender, and geographic region. Data are gathered through in-person interviews of non-institutionalized individuals living in households in the 50 states. Questions regarding 1-day dietary recall, food intakes on 2 non-consecutive days and health-related information were asked. The CSFII is not an annual survey; the most recent data cover 1994 to 1996 and 1998. The 1994 to 1996 data represent responses from all age groups whereas the 1998 data represent responses from children at birth to 9 years old. For more information, visit the CSFII Web site at <http://www.barc.usda.gov/bhnrc/foodsurvey/home.htm>

National Health and Nutrition Examination Survey (NHANES). The NHANES is a survey of the Centers of Disease Control and Prevention (CDC), National Center for Health

Statistics (NCHS). The survey is designed to provide national prevalence estimates on the health and nutritional status of US adults and children, such as prevalence on major disease, nutritional disorders, and potential risk factors. Data are gathered through in-person interviews and direct physical exams in mobile examination centers. Questions regarding diet and health are asked in the interview; the physical exam consists of medical and dental exams, physiological measurements, and laboratory tests. Three cycles of NHANES were conducted between 1971 to 1994; the most recent and third cycle (NHANES III) was conducted from 1988 to 1994. Beginning in 1999, NHANES was implemented as a continuous, annual survey. For more information, visit the NHANES Web site at <http://www.cdc.gov/nchs/nhanes.htm>

National Health Interview Survey (NHIS). The NHIS is a survey of the Centers of Disease Control and Prevention (CDC), National Center for Health Statistics (NCHS). The survey is designed to provide national prevalence estimates on personal, socioeconomic, demographic, and health characteristics, such as cigarette smoking and physical activity, of US adults. Data are gathered through a computer-assisted personal interview on adults aged 18 years or older living in households in the United States. The NHIS is an annual survey and has been conducted by NCHS since 1957. For more information, visit the NHIS Web site at <http://www.cdc.gov/nchs/nhis.htm>

Youth Risk Behavior Surveillance System (YRBSS). The YRBSS is a survey of the Centers for Disease Control and Prevention (CDC), National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP). The survey is designed to provide national, state, and local prevalence estimates on health risk behaviors, such as tobacco use, unhealthy dietary behaviors, physical inactivity and others, among youth and young adults who attend public and private high schools. Different statistical methods are used to choose the representative sample for the national, state, and local prevalence estimates (see Statistical Notes, p. 31). Data are gathered through a self-administered questionnaire, which was completed during a required subject or class period. The YRBSS is a biennial survey, which began in 1991. The state and local surveys are of variable data quality and caution should be used in comparing data between them. Data from states and local areas with an overall response rate of 60% and appropriate documentation are considered weighted and are generalized to all public and private high school students in grades 9 to 12 in the respective jurisdiction. However, data from states and local areas without an overall response rate of 60% and inappropriate documentation are considered unweighted and are only applicable to students participating in the survey. (see Statistical Notes, p. 31). For more information, visit the YRBSS Web site at <http://www.cdc.gov/nccdphp/dash/yrebs/index.htm>

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