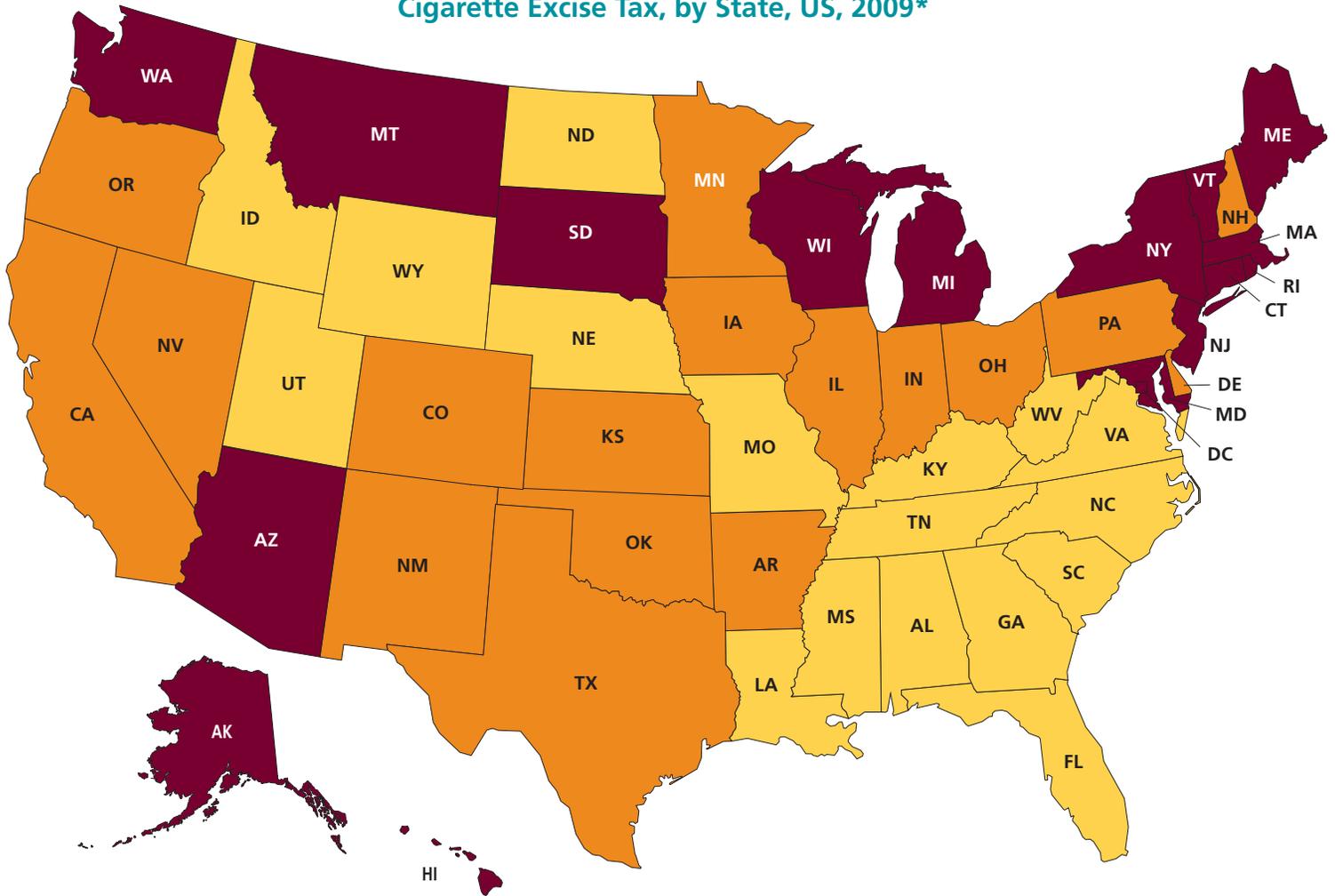


# Cancer Prevention & Early Detection Facts & Figures

# 2009

Cigarette Excise Tax, by State, US, 2009\*



\*Taxes in effect or increases passed, reported as of March 2009. In addition to state excise taxes, the current federal excise tax is \$1.066 per pack of cigarettes.

Source: American Cancer Society Cancer Action Network, April 2009.

- Top third (greater than or equal to \$1.52)
- Middle third (between 74 cents and \$1.52)
- Bottom third (below 74 cents)

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*This publication attempts to summarize current scientific information about cancer. Except when specified, it does not represent the official policy of the American Cancer Society.*

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**For more information, contact:**

Vilma Cokkinides (vilma.cokkinides@cancer.org, 404-329-5731)

Priti Bandi (priti.bandis@cancer.org, 404-329-7912)

Rebecca Siegel (rebecca.siegel@cancer.org, 404-329-7992)

Elizabeth Ward (elizabeth.ward@cancer.org, 404-327-6552)



# Preface

Much of the suffering and death from cancer could be prevented by more systematic efforts to reduce tobacco use, improve diet and physical activity, reduce obesity, and expand the use of established screening tests. The American Cancer Society estimates that in 2009 about 169,000 cancer deaths will be caused by tobacco use alone. In addition, approximately one-third (186,000) of the 562,340 cancer deaths expected to occur in 2009 are attributed to poor nutrition, physical inactivity, overweight, and obesity.<sup>1-3</sup> Regular use of some established screening tests can prevent the development of cancer through identification and removal or treatment of premalignant abnormalities; screening tests

can also improve survival and decrease mortality by detecting cancer at an early stage when treatment is more effective.

The American Cancer Society has published *Cancer Prevention & Early Detection Facts & Figures* (CPED) annually since 1992 as a resource to strengthen cancer prevention and early detection efforts at the local, state, and national levels. CPED complements the Society's flagship publication, *Cancer Facts & Figures*, by disseminating information related to cancer control. Cancer prevention and early detection are central to the American Cancer Society's mission and its 2015 goals. The

## Highlights, CPED 2009

### Tobacco

- Smoking and exposure to secondhand smoke result in an estimated 443,000 premature deaths and \$193 billion in healthcare expenditures and productivity losses annually in the US.
- After remaining essentially unchanged between 2004 and 2006, adult cigarette smoking prevalence declined significantly in 2007 (19.8%). Among high school students, smoking prevalence did not change significantly between 2003 and 2007 (20%).
- Variations in smoking rates reflect social, economic, and cultural factors. For example, the rate of current smoking among males with less than a high school degree is more than five times that of those with more than a college degree.
- In 2009, the federal government increased the excise tax on cigarettes (from a per pack rate of \$0.39 to slightly more than \$1) and other tobacco products.
- Taxing other tobacco products, including smokeless tobacco products and cigars, at a minimum tax rate comparable to that of cigarettes represents a strategy to reduce tobacco use, especially among youth, and increase state revenues.
- Although states allocated \$718 million for tobacco control programs in 2009, the tobacco industry outspent this amount by a ratio of nearly 24-to-1, devoting nearly all of its expenditures to promotions that blunt the impact of tobacco taxes and reduce smokers' motivation to quit.
- The 2008 US Public Health Service clinical practices guidelines recognize tobacco dependence as a chronic disease that should be treated with medications, counseling, or combinations of these therapies. Strategies to help smokers quit should include increasing insurance coverage for cessation treatments, institutionalizing cessation services into health care settings, and promoting statewide telephone cessation services.

### Overweight and Obesity, Physical Activity, and Nutrition

- The *American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Prevention* highlight the importance of individual nutritional and physical activity choices for cancer prevention and community efforts to facilitate such choices.
- Currently, an estimated 17.6% of adolescents and 35.2% of adults are obese.
- In 2007, the prevalence of obesity exceeded 20% in all states except Colorado (19.3%).

### HPV Vaccination for Cervical Cancer Prevention

- To prevent cervical cancer, vaccination against certain types of human papillomavirus (HPV) is recommended for adolescent girls. Currently, 25% of US teens, aged 13 to 17 years, have initiated the HPV vaccination series.

### Cancer Screening

- Mammography usage has not increased since 2000. In 2005, 51.2% of women aged 40 and older reported getting a mammogram in the past year. Women who lack health insurance have the lowest use of mammograms (24.1%).
- In 2005, 79% of adult women had a Pap test in the past three years. However, there is persistent under-use of the Pap test among women who are uninsured, recent immigrants, and those with low education.
- About half (46.8%) of Americans aged 50 and older have had a recent colorectal cancer screening test. To date, 26 states and the District of Columbia have passed legislation ensuring coverage for the full range of colorectal cancer screening tests.
- Among 50- to 64-year-olds, colorectal cancer screening disparities by health insurance have widened between 2000 and 2005.

mission of the Society is to eliminate cancer as a major public health problem by preventing cancer, saving lives, and diminishing suffering from cancer, through research, education, advocacy, and service. In 1999, the American Cancer Society set challenge goals for the US that, if met, would substantially lower cancer incidence and mortality rates and improve the quality of life for all cancer survivors by the year 2015. The Society also has developed nationwide objectives for prevention and early detection that set the framework for achieving the 2015 goals. (See sidebar, below.) These objectives can be achieved by improved collaboration among government agencies, private companies, other nonprofit organizations, health care providers, policy-makers, and the American public.

Social, economic, and legislative factors profoundly influence individual health behaviors. For example, the price and availability of healthy foods, the incentives and opportunities for regular physical activity in schools and communities, the content of advertising aimed at

children, and the availability of insurance coverage for screening tests and treatment for tobacco addiction all influence individual choices. These issues affect not only a person's cancer risk, but also the risk of other major diseases. The Society has joined forces with the American Heart Association and the American Diabetes Association to identify strategies that will improve prevention and early detection efforts for all of the major chronic diseases in the US.

Public policy and legislation at the federal, state, and local levels can increase access to preventive health services, including cancer screening. At both the federal and state levels, the Society has advocated for laws requiring insurers to provide coverage for recommended cancer screening in health care plans, such as coverage for the full range of colorectal cancer screening tests. At the state level, the Society has spearheaded campaigns to protect nonsmokers from tobacco smoke in public places. These and other community, policy, and legislative initiatives are highlighted in this publication.

## American Cancer Society Challenge 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 are current cigarette smokers.
- Reduce to 0.4% the proportion of adults (18 and older) who are current users of smokeless tobacco.

#### Youth Tobacco Use

- Reduce to 10% the proportion of high school students (younger than 18) who are current cigarette smokers.
- Reduce to 1% the proportion of high school students (younger than 18) who are current users of smokeless tobacco.

#### Nutrition & Physical Activity

- The trend of increasing prevalence of overweight and obesity among US adults and youth will have been reversed, and the prevalence of overweight and obesity will be no higher than it was in 2005.
- Increase to 70% the proportion of adults and youth 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*.

- 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*.

#### 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 that 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 of 15 or higher; and avoid artificial sources of ultraviolet light (e.g., sunlamps, tanning booths).

#### Breast Cancer Early Detection

- Increase to 90% the proportion of women aged 40 and older who have breast cancer screening consistent with American Cancer Society guidelines (by 2010).

#### Colorectal Cancer Early Detection

- Increase to 75% the proportion of people aged 50 and older who have colorectal cancer screening consistent with American Cancer Society guidelines.

#### Prostate Cancer Early Detection

- Increase to 90% the proportion of men who follow age-appropriate American Cancer Society detection guidelines for prostate cancer.

# Tobacco Use

Tobacco use remains the single largest preventable cause of disease and premature death in the US. Each year, cigarette smoking results in an estimated 443,000 premature deaths, of which about 49,400 are in non-smokers, as a result of exposure to secondhand smoke. Smoking also accounts for \$193 billion in health care expenditures and productivity losses.<sup>4</sup>

## Youth Tobacco Use

Most smokers become addicted to tobacco before they are legally old enough to buy cigarettes. Addiction develops rapidly in those who experiment with tobacco.<sup>5</sup> Most adolescents who become regular smokers continue to smoke into adulthood.<sup>6</sup> Because the likelihood of developing smoking-related cancers such as lung cancer increases with the duration of smoking, those who start at younger ages and continue to smoke are at highest risk for tobacco-related morbidity and mortality, including a number of cancers.<sup>6</sup>

## Current Patterns and Trends in Cigarette Smoking

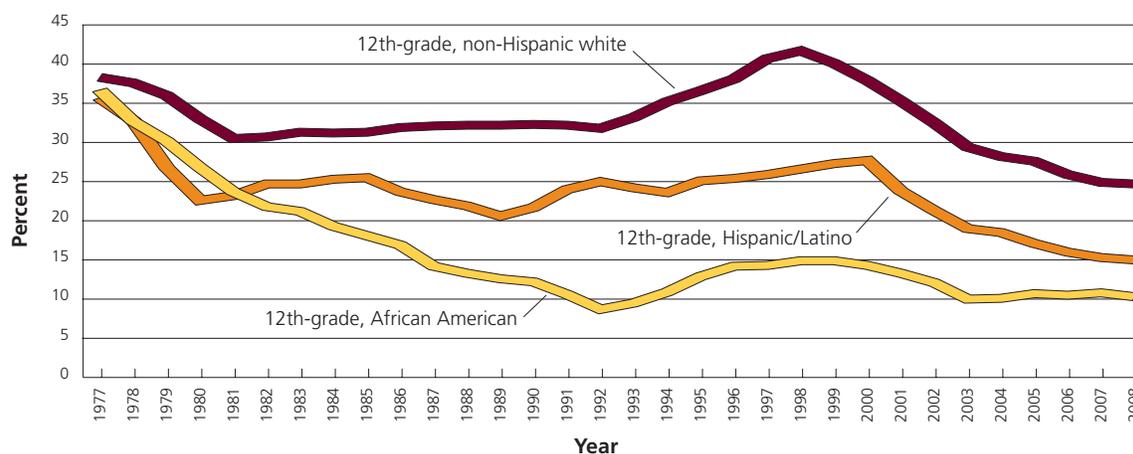
- In 2007, data from the Youth Risk Behavior Survey (YRBS) showed that 20% of high school students reported current cigarette smoking and 8.1% reported frequent smoking (Table 1A).<sup>7</sup>
- Although the percentage of high school students who reported current cigarette smoking decreased from

1997 to 2003, the rate of decrease has slowed because the prevalence did not change significantly between 2003 and 2007.<sup>8</sup> Smoking rates for all gender and racial/ethnic groups did not differ significantly between 2003 and 2007, except for African American females, who have shown a continuous decline since 1999.<sup>7</sup>

- The latest data from the Monitoring the Future (MTF) survey showed significant declines in current smoking among 10th- and 12th-graders between 2007 and 2008.<sup>9</sup> Continued monitoring is required to see whether this trend continues and extends to other sub-groups as well.
- Data from the National Youth Tobacco Survey (NYTS) show that 6.3% of middle school students reported current cigarette smoking in 2006. The NYTS found that smoking declined significantly between 2004 and 2006, after not changing significantly between 2000 and 2004.<sup>10</sup>
- According to the MTF survey, cigarette smoking varies by race/ethnicity among 12th-graders, with prevalence being highest among non-Hispanic whites, followed by among Hispanics/Latinos, and the lowest among African Americans (Figure 1A).



**Figure 1A. Current\* Cigarette Smoking, 12th-graders, by Race/Ethnicity, US, 1977-2008**



\*Used cigarettes in the past 30 days.

Source: Monitoring the Future survey, 1975-2008, University of Michigan.

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**Table 1A. Tobacco Use, High School Students, by State and City, US, 2007**

Location	% Current cigarette smoking*	Rank <sup>†</sup>	% Frequent cigarette smoking <sup>‡</sup>	% Current cigar use <sup>§</sup>	% Current smokeless tobacco use <sup>¶</sup>
<b>United States</b>	20.0		8.1	13.6	7.9
<b>State</b>					
Alaska	17.8	10	7.4	10.1	10.4
Arizona (Including Charter Schools)	22.2	30	6.9	N/A	N/A
Arkansas	20.7	24	8.7	17.4	11.2
Connecticut	21.1	26	8.9	N/A	N/A
Delaware	20.2	21	8.5	12.5	5.2
Florida	15.9	7	6.8	12.0	6.1
Georgia	18.6	14	6.9	16.1	8.4
Hawaii	12.8	2	4.5	N/A	N/A
Idaho	20.0	19	8.2	14.5	11.8
Illinois	19.9	18	9.3	13.3	4.9
Indiana	22.5	31	10.8	17.7	10.7
Iowa	18.9	15	8.1	11.7	8.1
Kansas	20.6	23	9.4	14.4	9.4
Kentucky	26.0	38	13.4	15.5	15.8
Maine	14.0	5	5.9	13.8	6.2
Maryland	16.8	8	7.4	11.0	4.2
Massachusetts	17.7	9	8.1	14.6	6.7
Michigan	18.0	12	8.1	14.7	8.9
Mississippi	19.2	17	7.3	14.9	7.8
Missouri	23.8	34	11.5	15.0	9.1
Montana	20.0	20	8.1	15.5	12.9
Nevada	13.6	3	5.0	N/A	4.5
New Hampshire	19.0	16	8.9	17.2	7.2
New Mexico	24.2	35	6.7	18.9	11.8
New York	13.8	4	6.0	9.0	5.1
North Carolina	22.5	32	9.3	N/A	N/A
North Dakota	21.1	27	9.9	11.4	11.7
Ohio	21.6	29	10.3	N/A	9.8
Oklahoma	23.2	33	9.4	15.0	13.7
Rhode Island	15.1	6	6.2	12.9	6.5
South Carolina	17.8	11	8.1	12.7	7.9
South Dakota	24.7	36	11.8	N/A	11.2
Tennessee	25.5	37	12.1	16.4	12.9
Texas	21.1	28	7.1	15.2	7.9
Utah	7.9	1	2.5	7.0	4.9
Vermont	18.2	13	7.9	N/A	8.6
West Virginia	27.6	39	14.4	14.5	14.8
Wisconsin	20.5	22	9.4	15.8	7.7
Wyoming	20.8	25	9.9	N/A	14.7
<b>City</b>					
Baltimore, MD	9.2	7	3.9	8.6	1.4
Boston, MA	7.5	2	2.1	8.2	3.9
Broward County, FL	14.0	19	5.3	10.9	3.5
Charlotte-Mecklenburg, NC	15.3	22	5.8	N/A	N/A
Chicago, IL	13.2	17	3.2	11.9	3.0
Dallas, TX	15.0	21	2.8	16.9	4.2
DeKalb County, GA	8.5	4	2.8	11.4	2.3
Detroit, MI	6.2	1	1.8	9.1	2.9
District of Columbia	10.6	8	3.1	10.1	5.6
Hillsborough County, FL	13.8	18	5.6	13.8	7.2
Houston, TX	11.7	12	2.4	13.2	4.0
Los Angeles, CA	12.8	15	2.8	9.8	3.4
Memphis, TN	8.8	6	2.9	12.5	1.0
Miami-Dade County, FL	11.2	11	3.1	8.0	3.1
Milwaukee, WI	12.3	14	5.3	13.2	2.2
New York City, NY	8.5	5	2.7	4.5	2.2
Orange County, FL	13.1	16	4.2	10.8	4.0
Palm Beach County, FL	14.4	20	4.4	10.2	4.7
Philadelphia, PA	10.7	9	3.9	6.8	3.0
San Bernardino, CA	11.7	13	2.5	7.2	2.0
San Diego, CA	11.0	10	3.6	9.9	3.3
San Francisco, CA	8.0	3	1.9	N/A	N/A

\*Smoked cigarettes on one or more of the 30 days preceding the survey. †Rank is based on % current cigarette smoking. ‡Smoked cigarettes on 20 or more of the 30 days preceding the survey. §Smoked cigars, cigarillos, or little cigars on one 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. N/A = Data not available. **Note:** Data are not available for all states since participation in the Youth Risk Behavior Surveillance System is a voluntary collaboration between a state's departments of health and education.

**Source:** Youth Risk Behavior Surveillance System, 2007, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention. *MMWR Morb Mortal Wkly Rep.* 2008;57(SS-4)

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The decrease in smoking among high school students between 1997 and 2003 has been attributed – at least in part – to increased cigarette excise taxes, restrictions on smoking in public places, and counter-advertising campaigns. The recent stall in the rate of decline may be related to increases in tobacco industry expenditures on marketing and promotions, declines in funding for comprehensive tobacco control programs, and a lack of substantial increases in retail cigarette price, due to extensive industry price discounting.<sup>8</sup>

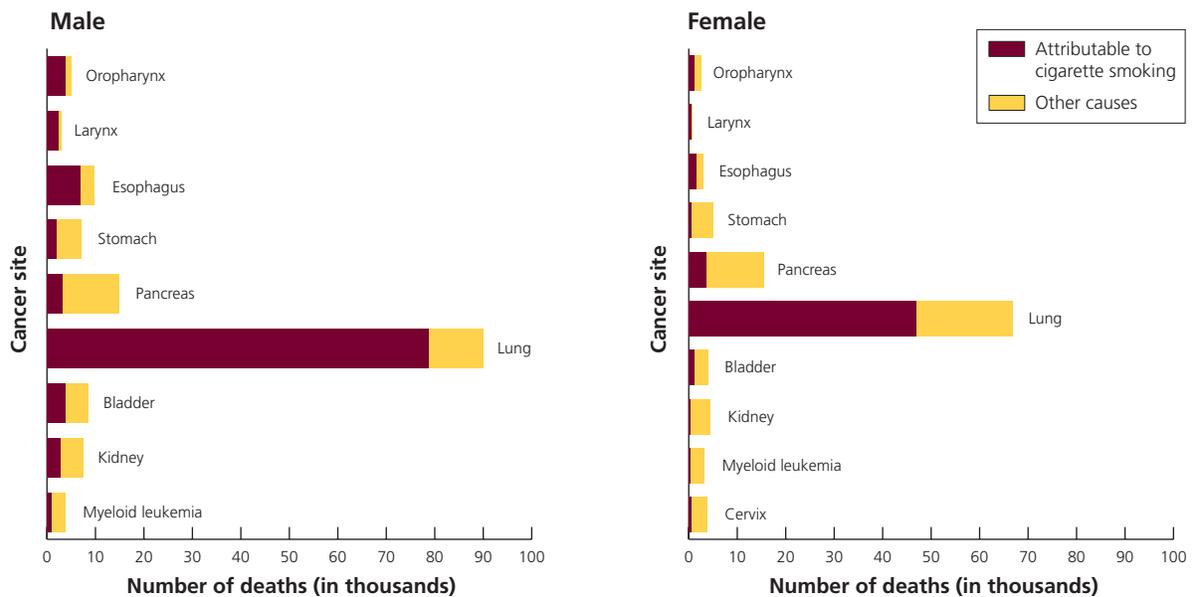
### Other Tobacco Products

While cigarettes remain the primary tobacco product used by youth, cigars, smokeless tobacco products, and hookahs (tobacco waterpipes) have grown in popularity. Table 1A provides data on current cigar and smokeless tobacco use among high school students in states and cities for which these data were available for 2007.

- According to the YRBS, in 2007, 25.7% of high school students reported current use of any tobacco product.<sup>11</sup> Of these products, cigarettes (20%) were most commonly used, followed by cigars (13.6%) and smokeless tobacco products (7.9%).<sup>12</sup>

- Male and female students were equally likely to smoke cigarettes. By comparison, males were six times more likely to use smokeless tobacco products and three times more likely to smoke cigars than females.<sup>12</sup>
- Non-Hispanic white and Hispanic/Latino students predominantly smoke cigarettes, while non-Hispanic African Americans are equally likely to smoke cigarettes and cigars.<sup>12</sup>
- While the use of smokeless tobacco among high school boys declined significantly from 19.2% in 1993 to 11% in 2003, this decline seems to have stalled (2007: 13.4%). Use among high school girls remains low and has changed little in this time period (1.3% to 2.3%).<sup>12</sup>
- According to the NYTS, in 2006, 1.7% of middle school and 2.9% of high school students were current users of bidis (small brown cigarettes from India made of tobacco wrapped in a leaf and tied with a thread) and 1.4% of middle school and 2.8% of high school students were current users of kreteks (flavored cigarettes containing tobacco and clove extract).<sup>12</sup>

**Figure 1B. Annual Number of Cancer Deaths Attributable to Smoking, Males and Females, by Site, US, 2000-2004**



**Source:** Centers for Disease Control and Prevention. Smoking-attributable mortality, years of potential life lost, and productivity losses – United States, 2000-2004. *MMWR Morb Mortal Wkly Rep.* 2008;57(45):1226-1228.

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- An emerging trend among adolescent and young adult smokers is the use of tobacco waterpipes or hookahs. Lifetime use estimates of this product appear to be comparable to lifetime use estimates of cigarettes, and current use estimates range from 10% to 20% among college students and 11% to 17% among adolescents.<sup>13,14</sup> Younger smokers are more likely to be susceptible to its use because of the marketing and promotion of hookah bars and cafes targeting these groups and the misperceptions about the harms of tobacco use from hookahs.<sup>15</sup>

Use of any tobacco in any form may induce nicotine dependence and harm health. Prevention and cessation programs should address other tobacco products in addition to cigarettes.

## Adult Tobacco Use

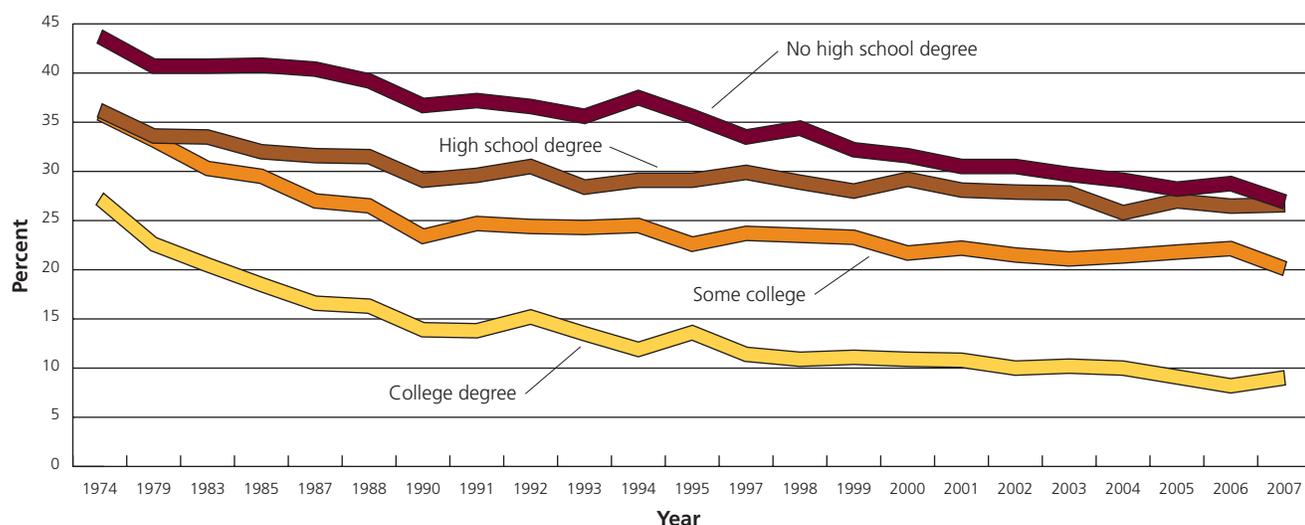
Tobacco use increases the risk of cancer of the lung, mouth, nasal cavities, larynx, pharynx, esophagus, stomach, liver, pancreas, kidney, bladder, uterine cervix, and myeloid leukemia.<sup>16</sup> Exposure to secondhand smoke increases the risk of lung cancer.<sup>17,18</sup> Thirty percent of cancer deaths, including 87% of lung cancer deaths, can be attributed to tobacco.<sup>2,16,18</sup> (Figure 1B)

## Current Patterns and Trends in Cigarette Smoking

Current cigarette use estimates represent a dramatic decline in both consumption and the prevalence of smoking in the US since the release of the first US Surgeon General's Report on Smoking and Health in 1964.

- According to the National Health Interview Survey (NHIS), between 1997 and 2004, the percentage of adults who smoke decreased from 27.6% to 23.4% in men and from 22.1% to 18.5% in women. After remaining essentially unchanged between 2004 and 2006, smoking rates in 2007 declined among all adults (19.8%), African Americans (19.8%) and adults 65 years and older (8.3%) (Table 1B). Currently, an estimated 77.8% of smokers smoke cigarettes daily.<sup>19</sup>
- The largest disparities in smoking prevalence are by socioeconomic status, race/ethnicity, and state of residence.
- Adults without a high school degree are almost three times as likely to be current smokers than those with a college degree (Figure 1C, Table 1B).
- The prevalence of smoking among American Indian/Alaska Native adults is the highest among all racial/ethnic groups and is almost four times that of Asian American adults (Table 1B).

**Figure 1C. Current\* Cigarette Smoking, Adults 25 and Older, by Education†, US, 1974-2007**



\*Adults 25 and older who have ever smoked 100 cigarettes in their lifetime and who are current smokers (everyday or someday). †Estimates are age-adjusted to the 2000 US standard population using four age groups: 25-34 years, 35-44 years, 45-64 years, and 65 years and older.

Source: 1974-2006: National Center for Health Statistics, Health, United States, 2006, 2007. With Chartbook on Trends in the Health of Americans. Hyattsville, Maryland, 2006, 2007. 2007: National Health Interview Survey Public Use Data File, 2007. National Center for Health Statistics, Centers for Disease Control and Prevention, 2008.

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- Among adults who have ever smoked, those with health insurance are up to 2 times more likely to have quit smoking than those without health insurance at every level of education (Figure 1D).
- According to the 2007 Behavioral Risk Factor Surveillance System (BRFSS), the state with the highest smoking prevalence (Kentucky, 28.3%) has a rate that is more than two times that of the state with the lowest prevalence (Utah, 11.7%) (Table 1C).
- The Centers for Disease Control and Prevention (CDC) estimates that states varied substantially in smoking trends between 1998 and 2007; all except six states showed some decline in smoking prevalence during this time period.

## Other Tobacco Products

Despite evidence that cigars and smokeless tobacco products have substantial health risks, the use of some of these products has continued to increase. A recent study found that while cigarette sales decreased by 18% between 2000 and 2007, sales of other tobacco products (in cigarette pack equivalents), including small cigars, roll-your-own tobacco and moist snuff, increased by 115%, 91%, and 33% respectively in the same time period.<sup>20</sup> This increase in other tobacco product sales offset declines in cigarette sales by approximately 30%.<sup>20</sup>

### Cigar Smoking

Cigar smoking increases the risk of cancers of the lung, oral cavity, larynx, esophagus, and probably pancreas. Cigar smokers are 4 to 10 times more likely to die from laryngeal, oral, or esophageal cancers than nonsmokers.<sup>21</sup>

- According to the National Survey on Drug Use and Health (NSDUH), in 2007, 5.5% of adults, 9.5% of men, and 1.8% of women, aged 18 years and older had smoked cigars in the past month.<sup>22</sup>
- As a percent of the cigar market, sales of little cigars and cigarillos increased from 62% to 79% between 1993 and 2006, while contemporaneous sales of large cigars fell from 37% to 22%.<sup>23</sup>

### Smokeless Tobacco

Smokeless tobacco products, including chewing tobacco and snuff, are not safe substitutes for smoking cigarettes or cigars. These products increase the risk of oral, pancreatic, and esophageal cancer, and noncancerous oral conditions and are a major source of carcinogenic nitrosamines.<sup>24</sup> Compared to quitting completely, switching to any smokeless product as a substitute for smoking has also been shown to be harmful.<sup>25</sup>

**Table 1B. Current Cigarette Smoking\*, Adults 18 and Older, US, 2007**

Characteristic	% Men	% Women	% Total
<b>Age group (years)</b>			
18 to 24	25.4	19.1	22.2
25 to 44	26.0	19.6	22.8
45 to 64	22.6	19.5	21.0
65 or older	9.3	7.6	8.3
<b>Race/ethnicity</b>			
White (non-Hispanic)	23.1	19.8	21.4
African American (non-Hispanic)	24.8	15.8	19.8
Hispanic/Latino	18.0	8.3	13.3
American Indian/Alaska Native (non-Hispanic) <sup>†</sup>	36.7	36.0	36.4
Asian (non-Hispanic) <sup>‡</sup>	15.9	4.0	9.6
<b>Education (years)<sup>§</sup></b>			
8 or fewer	20.4	10.0	15.4
9 to 11	36.9	30.0	33.3
12 (no diploma)	33.1	14.8	22.7
GED diploma <sup>¶</sup>	49.6	38.9	44.0
12	27.4	20.4	23.7
13 to 15 (includes Associate degree)	22.5	19.5	20.9
16	13.4	9.4	11.4
More than 16	6.4	6.0	6.2
<b>Total</b>	<b>22.3</b>	<b>17.4</b>	<b>19.8</b>

\*Persons who reported having smoked at least 100 cigarettes or more and who reported now smoking every day or some days. †Estimates should be interpreted with caution because of the small sample sizes. ‡Does not include Native Hawaiians and other Pacific Islanders. §Persons aged 25 years or older. ¶General Educational Development.

**Source:** National Health Interview Survey, 2007, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention. Cigarette smoking among adults – United States, 2007. *MMWR Morb Mortal Wkly Rep.* 2008;57(45):1221-1226.

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- In 2007, according to data from the NSDUH, American Indian/Alaska Natives (7%) and whites (4.3%) were more likely to use smokeless tobacco than Hispanic/Latinos (1.3%), African Americans (0.7%), or Asians (0.6%).<sup>26</sup>

The tobacco industry continues to market new and existing products as supplemental sources of nicotine in smoke-free settings or misleadingly as a low-risk option for smokers who are unable to quit.<sup>27-29</sup> Among the new products being test-marketed by the tobacco industry in the US is a smokeless product called snus, a “spitless,” low-nitrosamine moist powder tobacco pouch placed between the user’s cheek and gum.<sup>30</sup> Although such products are marketed as having lower risk, they may actually provide a gateway to smoking among nonsmokers, especially children, and increase overall tobacco use by encouraging dual use of cigarettes and snus.<sup>31,32</sup> They also may discourage use of evidence-based cessation therapies among those who want to quit. Given any of

**Table 1C. Current Cigarette Smoking\* and Quit Attempts among Current Smokers, Adults 18 and Older, by State, US, 2007**

	% 18 and older	State rank <sup>†</sup>	% Men 18 and older	% Women 18 and older	% Low education <sup>‡</sup>	Quit Attempts <sup>§</sup> (%)
Alabama	22.5	41	25.7	19.7	32.8	59.4
Alaska	22.2	39	24.6	19.7	42.2	62.3
Arizona	19.8	27	23.4	16.3	28.3	60.1
Arkansas	22.4	40	24.8	20.2	35.6	57.1
California	14.3	2	18.1	10.6	16.2	58.1
Colorado	18.7	16	19.7	17.7	32.1	56.7
Connecticut	15.5	3	16.6	14.5	28.8	58.5
Delaware	19.0	18	17.6	20.3	30.7	53.4
Dist. of Columbia	17.3	12	19.1	15.7	25.9	62.4
Florida	19.3	20	21.3	17.5	26.8	53.2
Georgia	29.3	21	21.2	17.5	35.0	57.4
Hawaii	17.0	9	19.8	14.3	24.7	61.9
Idaho	19.2	19	20.9	17.4	37.4	57.4
Illinois	20.2	31	22.1	18.4	24.1	58.7
Indiana	24.1	46	25.9	22.4	37.5	54.4
Iowa	19.8	28	21.4	18.3	30.4	55.7
Kansas	17.9	14	18.7	17.1	25.6	54.9
Kentucky	28.3	51	28.8	27.8	39.2	49.5
Louisiana	22.6	42	26.4	19.1	33.5	54.8
Maine	20.1	30	21.0	19.3	35.6	57.9
Maryland	17.1	10	18.4	16.0	27.2	62.3
Massachusetts	16.4	4	17.4	15.5	31.3	59.7
Michigan	21.2	35	23.5	19.0	34.8	61.1
Minnesota	16.5	5	18.3	14.7	29.1	58.1
Mississippi	24.0	45	27.8	20.5	33.4	56.8
Missouri	24.6	48	26.0	23.3	42.5	55.2
Montana	19.5	24	19.8	19.3	33.9	60.5
Nebraska	19.9	29	23.2	16.8	30.1	50.1
Nevada	21.5	36	23.4	19.6	28.3	56.3
New Hampshire	19.4	22	20.2	18.6	41.5	59.1
New Jersey	17.2	11	19.4	15.2	25.6	64.2
New Mexico	20.8	32	23.6	18.1	27.1	57.4
New York	18.9	17	21.6	16.5	30.8	63.1
North Carolina	22.9	43	25.3	20.7	31.2	56.9
North Dakota	21.0	34	22.2	19.8	23.9	52.8
Ohio	23.1	44	24.2	22.1	39.5	55.9
Oklahoma	25.8	49	28.0	23.8	38.9	57.4
Oregon	16.9	7	18.9	14.9	28.7	58.4
Pennsylvania	20.9	33	20.7	21.1	31.7	57.5
Rhode Island	17.0	8	17.8	16.3	23.9	57.9
South Carolina	21.9	37	25.3	18.8	33.2	58.9
South Dakota	19.8	26	20.1	19.5	27.7	57.4
Tennessee	24.3	47	25.7	22.9	39.9	56.9
Texas	19.4	23	22.0	16.9	26.1	58.0
Utah	11.7	1	15.5	8.0	33.6	62.3
Vermont	17.6	13	19.5	15.9	33.7	57.3
Virginia	18.6	15	20.3	16.9	35.5	55.4
Washington	16.8	6	18.0	15.7	28.1	58.0
West Virginia	27.0	50	28.6	25.5	37.7	55.5
Wisconsin	19.6	25	19.6	19.5	37.4	57.6
Wyoming	22.1	38	22.8	21.4	38.7	56.6
United States <sup>§</sup>	19.5		21.6	17.5	28.1	57.7
Range	11.7-28.3		15.5-28.8	8.0-27.8	16.2-42.5	49.5-64.2

\*Adults 18 and older who have smoked 100 cigarettes in their entire lifetime and are current smokers (someday or every day). †Rank is based on % 18 and older.

‡Adults 25 and older with less than a high school education. §Current smokers 18 and older who reported having stopped smoking for one day or longer because they were trying to quit smoking.

Source: Behavioral Risk Factor Surveillance System Public Use Data Tape 2007, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 2008.

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the above scenarios, the use of smokeless tobacco products may increase the risk of individual and population harm.<sup>27</sup> Therefore, it is important to advocate for regulation of the marketing of smokeless tobacco products and to counteract claims of their potential benefits as a safer alternative to smoking.

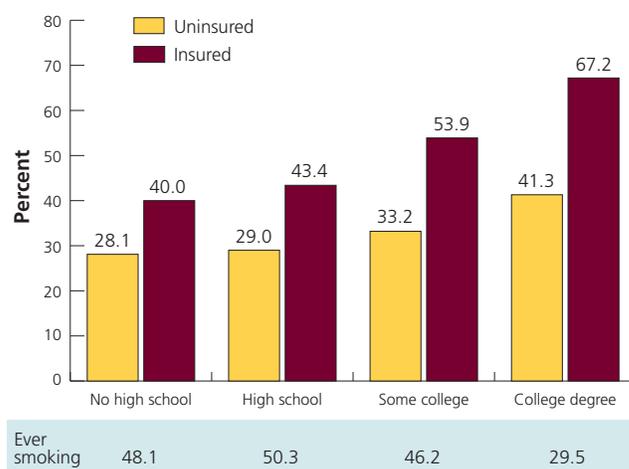
## Comprehensive Tobacco Control Programs

Comprehensive tobacco control programs aim to reduce tobacco use and disease, disability, and death associated with tobacco use by applying an optimal mix of evidence-based economic, policy, regulatory, educational, social, and clinical strategies.<sup>33,34</sup> Interventions that effectively reduce tobacco use include increases in excise taxes, restrictions on smoking in public places, prevention and cessation programs, and effective anti-tobacco media campaigns.<sup>34</sup>

In 2007, the CDC updated its recommendations on *Best Practices for Comprehensive Tobacco Control Programs*.<sup>33</sup> According to these guidelines, effective state-based comprehensive tobacco control programs must include the following components:

- State and community interventions (e.g., support of tobacco prevention and control coalitions, implementation of evidence-based policy interventions to reduce overall tobacco use, funding of community-based organizations, and development of community coalitions to strengthen partnerships between local agencies, grassroots and voluntary and civic organizations)
- Health communication interventions (e.g., audience research to develop high-impact campaigns, market research to motivate behavior change, and marketing surveillance to counter tobacco messaging)
- Cessation interventions (e.g., increase of services available through population-based cessation programs, public and private insurance coverage of evidence-based tobacco treatments, and elimination of cost barriers for underserved populations, including the uninsured)
- Surveillance and evaluation (e.g., regular monitoring of tobacco-related attitudes, behaviors, and health outcomes; measurement of short-term and intermediate indicators of program effectiveness, including policy changes and changes in social norms, and counter-marketing surveillance)

**Figure 1D. Former Cigarette Smoking among Ever Smokers\*, Adults 25-64 Years, by Education† and Insurance Status‡, US, 2007**



\*Ever smokers are respondents who said they had smoked at least 100 cigarettes in their lifetime. Former smokers are ever smokers who said they did not smoke now at all. †Respondents with a high school degree included those with a general educational development diploma. Some college included those with an associate's degree. ‡The uninsured are those who did not report having health insurance at the time of the interview under private health insurance, Medicare, Medicaid, State Children's Health Insurance Program, a state-sponsored health plan, other government programs, or military health plan.

**Source:** National Health Interview Survey Public Use Data File, 2007, National Center for Health Statistics, Centers for Disease Control and Prevention, 2008.

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- Administration and management (e.g., strategic planning to guide program efforts, and award and monitor program contracts)

Evidence for these recommendations stems in part from states that have documented the benefits of implementing comprehensive tobacco control programs.<sup>34-38</sup>

The latest evidence for comprehensive tobacco control programs comes from Washington, Maine, and New York, which have experienced declines in smoking rates of 15%-25% among adults and 40%-65% among youth after implementing such programs.<sup>39-43</sup> As a result of its

According to the US Surgeon General, the goals of comprehensive tobacco control include:<sup>34</sup>

- Prevent the initiation of tobacco use among young people.
- Promote quitting among young people and adults.
- Eliminate nonsmokers' exposure to secondhand smoke.
- Identify and eliminate the disparities in tobacco use and its effects among different population groups.

long-standing comprehensive tobacco control program and increased excise taxes, California has experienced greater reductions in cigarette consumption (among daily smokers 35 years or older) and higher cessation rates (among adult smokers 35 years or younger) than have other states with high cigarette prices but no comprehensive tobacco control programs or low cigarette prices and no comprehensive tobacco control programs.<sup>44,45</sup> These reductions in smoking have in turn led to reductions in tobacco-related cancers. Lung cancer incidence in California has declined more rapidly after the implementation of its comprehensive tobacco control program than would have been predicted from prior trends in the state.<sup>46</sup> Additionally, the California program's estimated impact in reducing personal health care expenditures was \$86 billion.<sup>47</sup>

In 2007, the Institute of Medicine recommended two over-arching strategies to end the tobacco problem in the US.<sup>48</sup> The first was increased implementation of evidence-based tobacco control strategies, including comprehensive state tobacco control programs, tobacco excise taxes, smoking restrictions, youth smoking prevention, cessation support, and community action. The second recommended strategy was a stronger federal presence in tobacco control activities, including federal regulation of tobacco products and industry activities. Federal legislation referred to as the "Family Smoking Prevention and Tobacco Control Act," which would give the Food and Drug Administration (FDA) authority to regulate tobacco products and tobacco industry marketing, passed the US House of Representatives in April and now awaits passage in the US Senate. The proposed legislation would give authority to the FDA to ban the marketing and sales of tobacco products to minors as well as grant states the authority to apply further restrictions on tobacco advertising and promotions. Moreover, this legislation would require the disclosure of ingredients of tobacco products and the FDA would also have the authority to require changes to tobacco products, such as the removal of harmful ingredients or the reduction of nicotine levels to make them less harmful and less addictive. In addition, tobacco products would be required to have larger, more informative health warnings and the tobacco industry would be prohibited from making any unsubstantiated and false health claims. The American Cancer Society, American Cancer Society Cancer Action Network<sup>SM</sup> (ACS CAN, the Society's nonprofit, nonpartisan advocacy affiliate), and almost 700 additional health, public health, and faith-based organizations strongly support this legislation.

## Tobacco Excise Taxes

The price of cigarettes is inversely and predictably related to consumption: A 10% increase in price reduces overall cigarette consumption by 3%-5%.<sup>34</sup> Young people who smoke are up to three times more responsive to price increases than adults.<sup>49</sup> Raising cigarette prices by increasing excise taxes reduces tobacco consumption, especially among children. It also prevents tobacco use among adolescents and young adults and increases cessation among adults.<sup>31</sup> Additionally, increased excise taxes also raise governmental revenue that can be used for tobacco control.<sup>34, 48</sup> Furthermore, in most states, taxes on cigarettes and other tobacco products are not equivalent, with small cigars and roll-your-own tobacco, which are taxed at 5% to 10% the rate of cigarettes.<sup>20</sup> Taxing other tobacco products, at a minimum tax rate comparable to that of cigarettes, including smokeless tobacco products and cigars, represents an additional strategy to reduce tobacco use, especially among youth, and increase state revenues.<sup>50, 51</sup>

### Federal Tobacco Taxes Increase in 2009

In 2009, a new federal law expanded the State Children's Health Insurance Program funded by an increase in the federal tobacco tax rates. The law increased the federal excise tax on cigarettes from a rate of \$0.39 per pack to slightly more than \$1 per pack. Taxes on cigars, snuff, and chewing, pipe, and roll-your-own tobacco are now also significantly higher as a result of this new law. Experts estimate that these tax increases will prevent more than 900,000 smoking-related deaths, deter nearly 1.9 million children from smoking, and encourage 1.4 million adults to quit, while improving access to quality health care for millions of uninsured children. The Society and ACS CAN strongly supported this critical legislation.

- Cigarette taxes can be levied at the federal, state, and local levels. Currently, the federal excise tax is \$1.066 per pack. (See sidebar.) There is wide variation in state cigarette excise taxes, ranging from 7 cents per pack in South Carolina to \$3.46 per pack in Rhode Island (Table 1D).
- Currently, 24 states have a state excise tax of less than \$1 per pack of cigarettes. These low-taxing states are mostly concentrated in the Southeast and central US, and include several tobacco-growing states. (See cover, Table 1D.)

**Table 1D. Comprehensive Tobacco Control Measures, by State, US, 2009**

	Cigarette tax per pack(\$)*	100% smoke-free laws in workplaces and/or restaurants and/or bars†	Fiscal year per capita tobacco control funding (\$)	Tobacco control funding as a % of tobacco revenue‡
Alabama	0.425		0.52	0.9
Alaska	2.00†		14.67	8.9
Arizona	2.00†	W, R, B	4.15	4.2
Arkansas	1.15†		6.32	8.4
California	0.87	R, B	2.31	4.3
Colorado	0.84	R, B	6.39	8.6
Connecticut	2.00†	R, B	2.44	1.9
Delaware	1.15	W, R, B	14.42	7.2
District of Columbia	2.00	W, R, B	6.99	5.1
Florida	0.339	W, R	3.77	7.3
Georgia	0.37		0.39	0.8
Hawaii	2.00†	W, R, B	9.33	7.1
Idaho	0.57	R	2.01	3.2
Illinois	0.98	W, R, B	0.76	1.0
Indiana	0.995†		2.63	2.4
Iowa	1.36	W, R, B	3.83	3.6
Kansas	0.79†		0.74	1.1
Kentucky	0.60†		0.92	1.3
Louisiana	0.36†	W, R	1.90	2.8
Maine	2.00†	R, B	9.18	5.7
Maryland	2.00†	W, R, B	3.89	3.5
Massachusetts	2.51	W, R, B	2.13	1.6
Michigan	2.00†		0.51	0.4
Minnesota	1.504	W, R, B	4.37	3.6
Mississippi	0.18		3.76	5.9
Missouri	0.17		0.48	1.0
Montana	1.70†	W, R, B	10.31	7.4
Nebraska	0.64	W, R, B	2.34	3.4
Nevada	0.80	W, R	2.05	2.3
New Hampshire	1.33†	R, B	0.89	0.5
New Jersey	2.575†	W, R, B	1.21	1.0
New Mexico	0.91	R, B	5.77	9.7
New York	2.75†	W, R, B	4.32	3.9
North Carolina	0.35†		2.30	4.7
North Dakota	0.44	W	6.38	7.1
Ohio	1.25	W, R, B	0.63	0.6
Oklahoma	1.03		5.54	4.4
Oregon	1.18	W, R, B	2.66	2.7
Pennsylvania	1.35†	W	2.70	2.4
Rhode Island	3.46†	W, R, B	1.81	1.1
South Carolina	0.07		0.25	0.9
South Dakota	1.53†	R, B	7.68	6.6
Tennessee	0.62†		1.07	1.5
Texas	1.41		0.60	0.6
Utah	0.695	W, R, B	3.67	7.8
Vermont	1.99†	R, B	10.02	6.0
Virginia	0.30†		1.92	4.4
Washington	2.025†	W, R, B	4.82	4.8
West Virginia	0.55		3.71	3.7
Wisconsin	1.77†		3.04	2.3
Wyoming	0.60		13.97	14.7
United States¶	1.23		4.09	2.9
Range	0.07-3.46		0.25-14.67	0.4-14.7

\*Taxes in effect or increases passed, reported as of April 2009.†States that passed tax increases more than once or instituted multi-year increases in a law passed at the same time since 2000. ‡Smoke-free laws passed or implemented, reported as of April 20, 2009. Note: W-workplaces, R-restaurants, B-bars. Note: At the time of publication of this report, smoke-free laws in Montana (B), Nebraska (W, R, B), and South Dakota (R, B) as reported here, were not in effect. §Tobacco revenue is the projected collections from tobacco taxes and payments to states from the Master Settlement agreement with the tobacco companies. ¶See Statistical Notes for definition of prevalence measures; average value (including District of Columbia) for taxes and per capita funding.

**Source:** Cigarette Taxes: American Cancer Society Cancer Action Network, April 2009. Campaign for Tobacco-Free Kids, et al. Cigarette tax increases by state per year, 2000-2008. National Center for Tobacco-Free Kids, 2008. 100% Smoke-free laws: American Nonsmokers' Rights Foundation. Overview List-How Many Smokefree Laws? 2009. Tobacco control Funding & Tobacco control funding as a % of tobacco revenue: A Decade of Broken Promises: the 1998 Master Settlement Agreement Ten Years Later. National Center for Tobacco-Free Kids, 2008. Per capita funding is calculated by dividing state prevention funding by 2000 US Census state population counts (<http://www.census.gov>).

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- Although 44 states and the District of Columbia have increased their cigarette taxes since 2000, only 24 states have laws requiring that a portion of their excise taxes be dedicated to health, cancer control, or tobacco control programs.<sup>52, 53</sup>
- All states, except for Pennsylvania, tax non-cigarette tobacco products to some extent. Florida and New Hampshire do not tax cigars, but tax other tobacco products.<sup>54</sup>
- Non-cigarette tobacco products are taxed either as a percent of wholesale or retail price (recommended method) or based on weight and states differ in their method of taxation. The national average among states that tax as a percentage of price is 33%, with the highest tax rates in Massachusetts (90%), Rhode Island (80%), Maine (78%), Washington (75%), and Arkansas (75%) and the lowest rates in South Carolina (5%), Tennessee (6.6%), and West Virginia (7%).<sup>54</sup>

Even though state excise taxes have risen in the past few decades, tobacco companies currently devote approximately 94% of their marketing expenditures (\$12.7 billion in 2006 dollars) on cigarette price discounts, promotional allowances to retailers or wholesalers, coupons and retail-value added and other strategies to buffer price-sensitive smokers from the shock of price increases.<sup>55, 56</sup> Further increases in excise taxes and increased regulation of the tobacco industry are needed to counter these strategies. In parallel, policies should be developed to counter bootlegging and illegal sales of single cigarettes in disadvantaged communities that negate the benefits of increased tobacco taxes.<sup>57, 58</sup> Also, it is important to advocate for higher excise taxes on other tobacco products that are commensurate with increases in cigarette excise taxes because such discrepancies in price may lead to young smokers' substituting or taking up new tobacco products in lieu of cigarettes.<sup>50, 51</sup>

### Smoke-free Initiatives to Reduce Exposure to Secondhand Smoke

Smoke-free initiatives (also referred to as clean indoor air laws or ordinances), implemented at the state or local level, are another important component of comprehensive tobacco control. Comprehensive smoking bans reduce exposure to secondhand smoke (SHS). Nationally, exposure to SHS among nonsmokers, as measured by detectable levels of cotinine (a metabolite of nicotine) declined from 84% in 1988-1994 to 46% in 1999-2004, a likely reflection of widespread implementation of

smoke-free laws and reductions in smoking prevalence.<sup>59</sup> A comprehensive statewide smoking ban in workplaces, restaurants, and bars in 2003 in New York resulted in a 47% reduction in exposure to secondhand smoke among nonsmokers.<sup>60</sup> Comprehensive smoking bans are also effective at the local level. A recent study showed that the more comprehensive the smoke-free law, the greater the percentage of the population protected from exposure to secondhand smoke: 12.5% of adults in counties with extensive smoke-free coverage laws were exposed to secondhand smoke, compared to 35.1% in counties with limited smoke-free coverage and 45.9% in counties with no law.<sup>61</sup>

Several studies have documented a positive health effect of smoke-free ordinances, including associated reductions in heart attacks and respiratory symptoms.<sup>17, 62</sup> Smoking bans also change social norms about smoking and motivate smokers to reduce their consumption or quit completely.<sup>17, 62</sup> Recent research also indicates that local restaurant smoking bans reduced progression from experimentation to established smoking among adolescents.<sup>63</sup>

Although opponents of smoke-free laws cite concerns about harms to businesses, particularly in the hospitality industry, numerous studies on the economic impact of smoke-free legislation on restaurants, bars, and other components of the hospitality industry have shown either no adverse effect or a positive effect on business.<sup>64</sup> The gaming industry, including most tribally owned casinos and bars, has recently emerged as a strong opponent of smoke-free laws. The industry actively works to include gaming facility exemptions in state and local laws designed to decrease health risks for hospitality workers. However, a study in Delaware found that its comprehensive statewide smoke-free law had no effect on revenue from the gaming industry.<sup>65</sup>

Comprehensive smoke-free legislation has been most effective at the state and local levels:<sup>34</sup>

- Reflecting the current success of smoke-free legislation, 70.2% of the US population is covered by a 100% smoke-free provision in workplaces, and/or restaurants, and/or bars.<sup>66</sup>
- More than 3,010 municipalities have passed some form of local smoke-free legislation.<sup>66</sup> Currently, 340 municipalities in the country have passed local laws to establish 100% smoke-free workplaces, restaurants, and bars.<sup>66</sup>

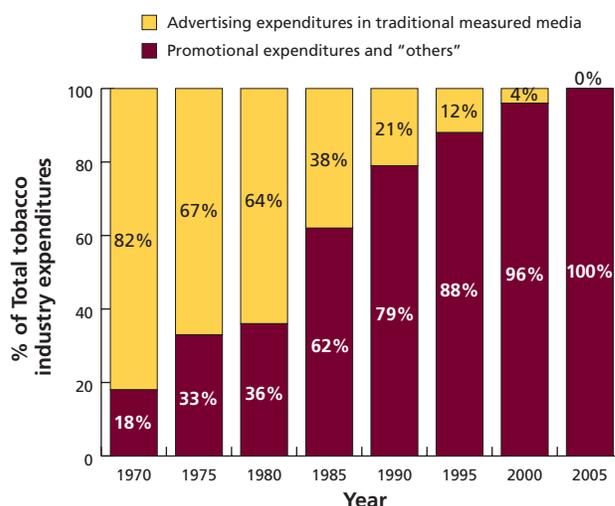
- Thirty-one states, the District of Columbia, and Puerto Rico have either implemented or enacted statewide smoking bans that prohibit smoking in workplaces, and/or restaurants, and/or bars.<sup>66</sup> Twenty of these states/territories, including the District of Columbia and Puerto Rico, provide comprehensive smoke-free protection, meaning that all workplaces, restaurants, and bars are 100% smoke-free (Table 1D).<sup>66</sup> Several other states have had success enacting limited forms of smoke-free legislation.
- However, 13 state legislatures have enacted either partial or complete preemption laws that prohibit local governments from enacting smoke-free air laws.<sup>67</sup>

Despite tremendous progress in reducing population exposure to secondhand smoke, disparities exist. Declines in exposure to secondhand smoke since the late 1980s have been twice as large among non-Hispanic whites, compared to non-Hispanic African Americans.<sup>59</sup> In 2003, more than 85% of white-collar employees reported working under a smoke-free policy, compared to 75% of service workers, 63% of blue-collar workers, and 72% of food-service workers.<sup>68, 69</sup> These disparities underscore the need for comprehensive smoke-free legislation that covers all segments of society.

### Countering Tobacco Industry Marketing

Exposure to tobacco industry marketing, including advertising and promotions, significantly increases the likelihood that adolescents initiate and continue tobacco use and increases per capita cigarette consumption in the general population.<sup>56</sup> In 2005, the tobacco industry spent \$13.1 billion (in 2006 dollars) on cigarette marketing.<sup>55</sup> With direct and indirect tobacco marketing to children prohibited by the 1998 Master Settlement Agreement (MSA), the industry is increasingly moving away from traditional advertising venues, such as newspapers, magazines, outdoor, and transit, and redirecting the majority of its marketing expenditures toward promotional activities that circumvent tobacco tax increases, including price discounts, promotional allowances, coupons, and retail-value added-bonus cigarettes.<sup>56</sup> Between 1970 and 2005, while tobacco industry marketing expenditures on traditional advertising venues decreased from 82% to 0%, promotional expenditures increased from 18% to 100% (Figure 1E).<sup>56</sup> In addition, in 2005, the industry spent \$259 million (in 2006 dollars) on smokeless tobacco advertising and promotion, the majority toward price discounts.<sup>56</sup> Hence, to counter the tobacco industry's tactics, there is a need for both further increases in excise taxes and

**Figure 1E. Cigarette Advertising\* vs. Promotional Expenditures† as a Percent of Total Tobacco Industry Expenditures‡, US, 1970-2005**



\*Advertising expenditures in traditional measured media include newspapers, magazines, outdoor, and transit. †Promotional expenditures and "others" include point of sale, promotional allowances, sampling distribution, specialty item distribution, public entertainment, direct mail, endorsements/testimonials, Internet, coupons, retail value added, and all others. ‡Adjusted to 2006 dollars, using the consumer price index.

**Source:** The Role of the Media in Promoting and Reducing Tobacco Use. Tobacco Control Monograph No. 19. Bethesda, MD: U.S. Department of Health and Human Services, National Institutes of Health, National Cancer Institute; June 2008. Original data: Federal Trade Commission, Federal Trade Commission Cigarette Report for 2004 & 2005, Washington, DC, 2007.

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comprehensive bans on all tobacco advertising, promotion, and sponsorship.

Also, such marketing tactics of the tobacco industry can be countered with sustained implementation of effective mass media campaigns that highlight the negative consequences of tobacco use and expose the industry's deceptive marketing and promotional tactics.<sup>56, 70, 71</sup> The Florida "truth" antismoking campaign and the nationwide "truth" campaign developed messages that countered the perception of smoking as cool and rebellious by highlighting the tobacco industry's misleading and duplicitous practices.<sup>56</sup> In California, the statewide media campaign messages (e.g., "the tobacco industry lies," "secondhand smoke kills," and "nicotine is addictive") foster a social and legal climate in which tobacco use is recognized as undesirable and non-normative.<sup>72</sup>

Antismoking media campaigns can reduce tobacco use by reducing smoking initiation among youth and promoting adult cessation.<sup>56</sup> States that have combined mass media campaigns with other anti-tobacco

activities have seen rapid declines in youth and adult smoking prevalence.<sup>56,73</sup> After experiencing a stall after four years of significant declines in smoking rates as a result of a comprehensive tobacco control program, New York City implemented an extensive antismoking media campaign in 2005 that resulted in a further decline in smoking rates among males and Hispanics.<sup>74</sup>

Tobacco companies, on the other hand, have blocked the creation of several media campaigns, subverted effective media messages, and even initiated lawsuits against the California campaign and the “truth” campaign.<sup>56,75,76</sup> In addition, they have launched their own media campaigns that purport to discourage youth smoking and help adult smokers quit. Recent research has shown, however, that the industry advertisements are not effective in deterring youth smoking and those that target parents may actually encourage youth smoking.<sup>77</sup>

## Tobacco Cessation

### Youth Tobacco Cessation

Encouragement and support in quitting smoking is important for adolescent smokers for several reasons. The opportunity to prevent diseases caused by smoking is greatest when smokers quit early.<sup>78</sup> Adolescents often underestimate the strength and rapidity of tobacco dependence and generally overestimate their ability to quit smoking.<sup>5,79</sup> Most young smokers want to quit smoking and have tried to quit. In 2007, 49.7% of high school smokers reported having made an attempt to quit in the preceding 12 months. However, the prevalence of relapse among these smokers is high.<sup>80</sup>

The US Public Health Service (USPHS) updated its clinical practices guidelines for tobacco dependence in 2008 and found that counseling increases tobacco cessation among adolescent smokers.<sup>81</sup> Although nicotine replacement medications appear to be safe in adolescents, there is little evidence that these medications are effective in promoting long-term abstinence among adolescent smokers and as a result they are not recommended as a component of pediatric tobacco use intervention.<sup>81</sup> There is a need to conduct research on the effectiveness of tobacco dependence treatments among young smokers. More youth cessation resources can be found at <http://youthtobaccocessation.org/index.html> or at [http://cdc.gov/tobacco/quit\\_smoking/cessation/youth\\_tobacco\\_cessation](http://cdc.gov/tobacco/quit_smoking/cessation/youth_tobacco_cessation).

### Adult Tobacco Cessation

Much of the risk of premature death from smoking could be prevented by smoking cessation. Smokers who quit can expect to live as many as 10 years longer than those who continue to smoke.<sup>16,82</sup> One study showed that those who quit smoking at age 60, 50, 40, or 30 gained about three, six, nine, or 10 years of life expectancy, respectively.<sup>82</sup>

- According to the 2007 BRFSS, in 43 states the majority of adults (50% or more) who ever smoked have now quit smoking.<sup>83</sup>
- According to the 2007 NHIS, of the 43.4 million Americans who smoke, 39.8% reported having attempted to quit for at least one day in the past year.<sup>19</sup> The prevalence of past year quit attempts declined significantly between 1993 and 2007 among all adults, those aged 25 to 44 years, and those 65 years and older.
- Reports of quit attempts in the past year among current smokers were highest in New Jersey (64.2%) and lowest in Kentucky (49.5%), according to the 2007 BRFSS. (Table 1C).

Tobacco dependence is a chronic disease and should be treated with effective treatments that may double or triple smokers’ chances of long-term abstinence.<sup>81</sup> These treatments, according to the latest USPHS guidelines, include nicotine replacement treatment (NRT) products, prescription medications, or combinations of these medications and counseling (individual, group, or telephone).<sup>81</sup> The combined use of counseling and medication can be more effective than the individual use of any treatments.

Due to the addictive properties of nicotine in tobacco, for many smokers quitting can be difficult. Successful quitting is more likely when smokers utilize professional counseling and pharmaceutical aids.<sup>81</sup> However, even with such interventions, multiple attempts may be necessary before long-term quitting is achieved. Thus, it is critical for health care providers to continue to discuss tobacco cessation with these patients even if they have tried to quit and failed. Health care providers can be especially effective in delivering cessation services. The USPHS recommends that clinicians follow the “5 A” model in treating smokers who are willing to quit: *Ask* a patient about their smoking status; *advise* to quit; *assess* for willingness to quit; *assist* in quitting; and *arrange* for a follow-up visit. Even among smokers unwilling to

quit, the USPHS recommends brief motivational interventions that can increase attempts to quit.<sup>81</sup> Other strategies that institutionalize cessation services may promote the use of treatment by patients in health care systems; these may include training health care providers to deliver effective treatments and integrating cessation outcomes into overall health quality standards and ratings.<sup>81</sup>

Insurance coverage of tobacco-dependence treatments increases smokers' likelihood of receiving treatment, making a quit attempt, and being abstinent from smoking. Among adults who ever smoked, those who currently have health insurance are much more likely to have quit smoking, regardless of level of education (Figure 1D). This association is likely because of insured smokers' greater access to and use of effective tobacco dependence treatments. Nationally, the use of evidence-based treatments in quit attempts remains low, with only 22% of smokers trying to quit using treatments. This proportion was even lower among uninsured smokers (13%).<sup>84</sup> One major barrier is cost.<sup>85</sup> Even insured smokers may bear a significant portion of the cost of pharmacotherapy because of deductibles and co-payments, or in some cases because of non-coverage.<sup>85, 86</sup> In some cases, coverage is extended only to certain groups of smokers; e.g., Medicare covers smoking cessation counseling and pharmacotherapy (excluding over-the-counter treatment) only for seniors with illnesses caused or complicated by tobacco use and some state Medicaid programs cover treatments only for pregnant women.<sup>87, 88</sup>

- Among national surveys to assess health insurance coverage of any tobacco-dependence treatments, estimates range from 88% among health maintenance plans to 20% among employer-provided plans.<sup>89, 90</sup> State-specific estimates may be higher; in California, employer-sponsored coverage of any treatment increased from 44% in 2000 to 57% in 2005, while coverage for all forms of treatment increased from 11% to 22% in this time period.<sup>91</sup>
- In 2006, Medicaid programs in 38 states and the District of Columbia covered one or more treatments for tobacco dependence (medication or counseling) for all recipients.<sup>88</sup> Only Oregon offered full coverage of all USPHS-recommended medication and counseling treatments. Seven other states offered coverage for all recommended medications and at least one form of counseling.

- In 2003, 17 states (out of 45 states surveyed) ensured that state employees had access to health insurance coverage for pharmacotherapy and counseling, while 29 states reported coverage of any treatment.<sup>92</sup>

Another strategy to facilitate cessation is to integrate population-wide cessation services into comprehensive tobacco control programs. New York City's experience with incorporating a cessation services component into its program, which included physician outreach and education, quit smoking clinics, and population-wide free NRT distribution, was associated with greater utilization of cessation services, greater quit rates, and reductions in young adult women smoking prevalence.<sup>93, 94</sup> Part of this strategy also includes the implementation of statewide cessation telephone counseling. These toll-free services, which have a broad reach, can deliver effective behavioral counseling to diverse groups of tobacco users, including low-income, rural, elderly, uninsured, and racial/ethnic subpopulations of smokers.<sup>81</sup> Recent studies show that integrating standard nicotine replacement treatments into state quitlines can improve quit rates and are cost-effective.<sup>95, 96</sup> In addition to a national service (1-800-QUITNOW), as of 2007, all 50 states, the District of Columbia, and five territories offered some degree of telephone cessation counseling.<sup>33, 97</sup>

The American Cancer Society Quitline® program (1-877-YES-QUIT, 1-877-937-7848) has offered free telephone-based cessation services since 2000 and has become the top provider of services with contracts in 13 states. In addition, the American Cancer Society Quitline services are available to more than 100 employers and health plans nationwide. For three decades, the Society has designated the third Thursday in November as the Great American Smokeout®, a day for smokers nationwide to give up their cigarettes for at least a day in the hope they might stop smoking. (For more information, refer to [http://cancer.org/docroot/PED/PED\\_10\\_4\\_Great\\_American\\_Smokeout.asp](http://cancer.org/docroot/PED/PED_10_4_Great_American_Smokeout.asp) or call 1-800-227-2345) In addition, a US Department of Health and Human Services Web site (<http://smokefree.gov>) offers online advice and downloadable information on quitting.

## Funding for Tobacco Control

Since the Master Settlement Agreement with the states, tobacco companies have increased their cigarette advertising and promotional expenditures by 95%, from \$6.7 billion in 1998 to \$13.1 billion in 2005, and even higher

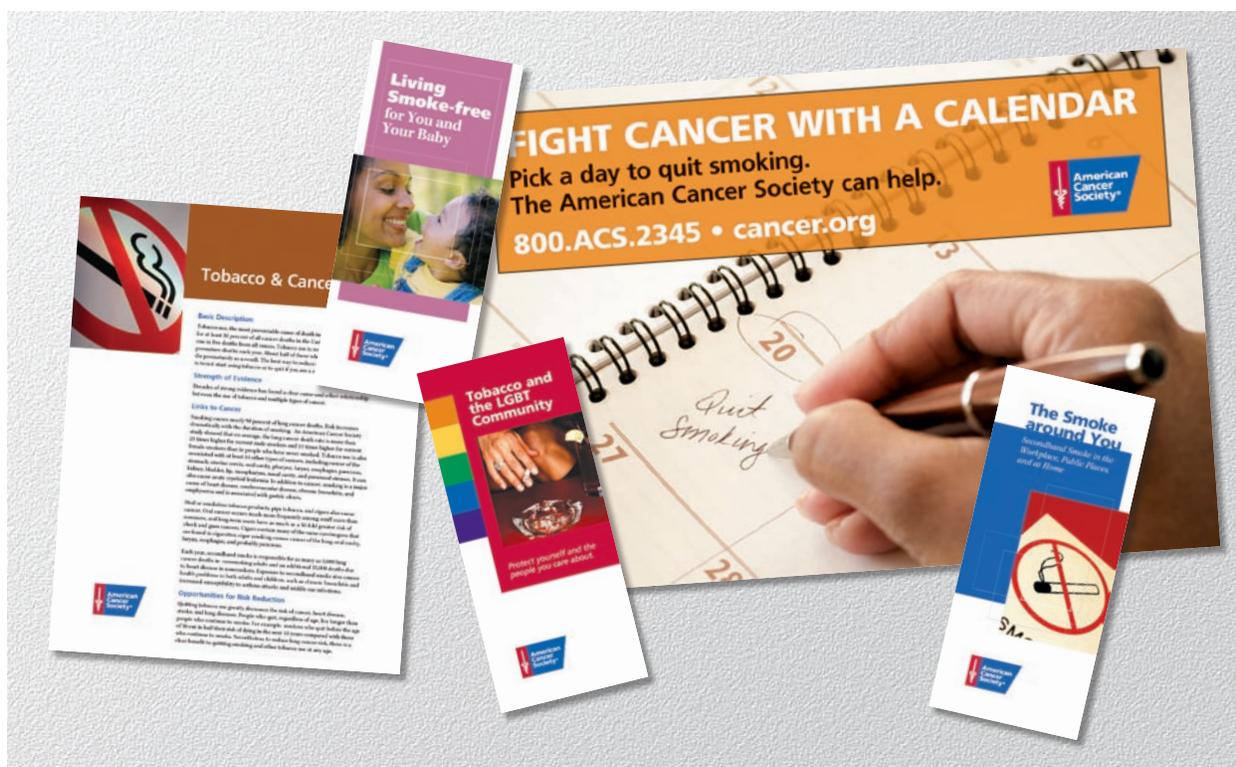


- In 2009, states allocated a total of \$718.1 million for tobacco control programs.<sup>104</sup>
- The total amount allocated in 2009 constitutes just 19.4% of the CDC recommendation for the minimum level of tobacco control funding. No state met or exceeded its minimum recommended funding levels. Only nine states fund tobacco control programs at at least half their minimum recommended levels while the remaining 41 states and the District of Columbia fund at less than half their minimum recommended amount (Figure 1F).<sup>104</sup>
- In 2009, states' revenue from tobacco taxes and the MSA with the tobacco companies is projected to be \$24.6 billion.<sup>104</sup> However, only 2.9% of this amount has been allocated for tobacco control funding. Among states' allocation of revenue to tobacco control, Michigan ranked the lowest (0.4%) and Wyoming ranked the highest (14.7%) (Table 1D).

## Other Youth Tobacco Control Strategies

School-based tobacco prevention programs that focus on the short-term as well as the long-term consequences of smoking can be effective as part of comprehensive tobacco control programs.<sup>34, 105, 106</sup> The US Surgeon General recommends that tobacco prevention programs begin by sixth grade.<sup>34, 105, 106</sup> Additionally, parental guidance is important in maintaining smoke-free households, setting nonsmoking expectations early, monitoring adolescents for signs of smoking, limiting exposure to movies in which smoking is depicted, and countering the influence of glamorous or grown-up depictions of smoking in movies and other media.<sup>107</sup>

There is now strong evidence of a causal association between exposure to smoking in movies and adolescent smoking initiation.<sup>56</sup> In 2004, almost 75% of youth-rated movies and 90% of R-rated movies depicted smoking.<sup>108</sup> Movie rating systems that take into account smoking depictions must be standardized and then enforced in order to counter the impact of smoking in movies on youth.



# Overweight and Obesity, Physical Activity, and Nutrition

Obesity, physical inactivity, and poor nutrition are major risk factors for cancer, second only to tobacco use.<sup>109</sup> Approximately one-third of the more than 500,000 cancer deaths in the US this year can be attributed to poor diet and physical inactivity, while another third is caused by use of tobacco products. Although genetic inheritance plays a role in the risk of some individuals developing cancer, non-inherited factors have a larger impact on cancer risk for the population as a whole. Avoiding the use of tobacco products and exposure to secondhand smoke, maintaining a healthy weight, staying physically active throughout life, and consuming a healthy diet can substantially reduce a person's lifetime risk of developing cancer (as well as cardiovascular disease).<sup>110</sup>

Based upon a comprehensive review of current evidence, the American Cancer Society has published guidelines on nutrition and physical activity for cancer prevention. These guidelines contain recommendations regarding individual choices related to weight control, physical activity, diet and community action to create a physical and social environment that promote healthy behaviors.

## Individual Choices

The American Cancer Society guidelines include four recommendations for individual choices that may reduce cancer risk: 1) maintaining a healthy weight throughout life, 2) adopting a physically active lifestyle, 3) consuming a healthy diet, and 4) limiting consumption of alcoholic beverages. (See sidebar, page 19.)

### 1. Maintain a Healthy Weight throughout Life

- Balance caloric intake with physical activity.
- Avoid excessive weight gain throughout life cycle.
- Achieve and maintain a healthy weight if currently overweight or obese.

### Body Weight and Cancer Risk

In the US, overweight and obesity contribute to 14% to 20% of all cancer-related deaths. (For definitions of overweight, obesity, and extreme obesity see sidebar, page 20.) Overweight and obesity are clearly associated with increased risk for developing many cancers, including cancer of the breast, colon, endometrium, esophagus,



and kidney. It is also believed that obesity increases the risk for cancers of the pancreas, gallbladder, thyroid, ovary, and cervix, and for multiple myeloma, Hodgkin's lymphoma, and aggressive prostate cancer. The link between body weight and cancer risk is believed to stem from multiple effects on fat and sugar metabolism, immune function, level of hormones (including insulin and estradiol), and cell growth. Recent studies suggest that losing weight may reduce the risk of breast cancer. In addition, surgery to treat morbid obesity has been shown to improve insulin sensitivity and hormone metabolism and reduce mortality from diabetes, heart disease, and cancer.<sup>111, 112</sup> Although knowledge about the relationship between weight loss and cancer risk is still limited, individuals who are overweight or obese should be encouraged and supported in their efforts to reduce weight.

## Obesity Trends

- More than two-thirds of Americans are overweight or obese.<sup>113</sup>
- Between 1976-1980 and 2003-2006, the prevalence of obesity among adolescents aged 12 to 19 years more than tripled, from 5% to 17.6%. Increases occurred across race, ethnicity, and gender; non-Hispanic African American girls have the highest rates of overweight (Figure 2A). More recently, no changes in the prevalence of obesity were observed between 2003-2004 and 2005-2006.<sup>114</sup>

This section provides a summary of the 2006 American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Prevention along with the most recent population statistics. The complete guidelines article has been published in the *CA Cancer J Clin* 2006;56(5):254-281 and can be downloaded for free from this link: <http://caonline.amcancersoc.org/cgi/content/full/56/5/254>.

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

### INDIVIDUAL CHOICES

#### Maintain a healthy weight throughout life.

- Balance caloric intake with physical activity.
- Avoid excessive weight gain throughout life cycle.
- Achieve and maintain a healthy weight if currently overweight or obese.

#### Adopt a physically active lifestyle.

- **Adults:** Engage in at least 30 minutes of moderate to vigorous physical activity, above usual activities, on 5 or more days of the week; 45 to 60 minutes of intentional physical activity are preferable.
- **Children and adolescents:** Engage in at least 60 minutes per day of moderate to vigorous physical activity at least 5 days per week.

#### Consume a healthy diet, with an emphasis on plant sources.

- Choose foods and beverages in amounts that help achieve and maintain a healthy weight.
- Eat 5 or more servings of a variety of vegetables and fruits each day.
- Choose whole grains in preference to processed (refined) grains.
- Limit consumption of processed and red meats.

#### If you drink alcoholic beverages, limit consumption

- Drink no more than 1 drink per day for women or 2 per day for men.

### 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.

- The percentage of US adolescents who were obese in 2007 varied widely across states. Utah had the lowest proportion of obese adolescents (8.7%) whereas in Mississippi 17.9% of adolescents were obese (Table 2A provides additional overweight measures in certain cities).<sup>12</sup>
  - The percent of obese adults aged 20 to 74 years varied little from 1960-1962 to 1976-1980; in contrast, obesity rates more than doubled between 1976-1980 and 2003-2004 from 15.1% to 33.0%. For the most recent period, 2005-2006, obesity prevalence did not significantly increase in either men (34.0%) or women (36.4%) from 2003-2004.
  - The increase in the rate of adults classified as extremely obese has significantly contributed to the increase in obesity rates in the past 25 years. Rates of extreme obesity among adults aged 20-74 years increased from 1.4% in 1976-1980 to 6.2% in 2005-2006.
  - In 2007, the prevalence of obesity exceeded more than 20 percent in all states except Colorado (19.3%); the state with the highest obesity prevalence is Mississippi (32.6%) (Table 2B).
- For most people, weight gain results from a combination of excessive caloric intake and inadequate physical activity. While science continues to investigate the specific relationship between these aspects and cancer, there is no debate that overweight and obesity represent a serious and growing health problem in the US.

#### Achieving and Maintaining a Healthy Weight

A healthy weight depends on a person's height. Weight recommendations are often determined by a measure known as body mass index (BMI). (See sidebar, page 20.) Cutoffs established by the World Health Organization define the healthy range of BMI to be 18.5 to 25.0 kg/m<sup>2</sup>, the range of 25.0 to 29.9 to be overweight, and a BMI of 30.0 or higher as obese.

## Defining Body Mass Index

For adults, this sidebar relates body mass index (BMI) to pounds and inches. For example, a 5-foot-4-inch woman is considered overweight if she weighs between 145 and 173 pounds. She is considered obese if she weighs 174 pounds or more. A 5-foot-10-inch 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†	Extremely Obese‡
6'4"	205	246	328
6'3"	200	240	319
6'2"	194	233	311
6'1"	189	227	302
6'0"	184	221	294
5'11"	179	215	286
5'10"	174	209	278
5'9"	169	203	270
5'8"	164	197	262
5'7"	159	191	255
5'6"	155	186	247
5'5"	150	180	240
5'4"	145	174	232
5'3"	141	169	225
5'2"	136	164	218
5'1"	132	158	211
5'0"	128	153	204
4'11"	124	148	198
4'10"	119	143	191

\*Overweight is defined as BMI of 25-29.9 kg/m<sup>2</sup>.

†Obesity is defined as BMI of 30 kg/m<sup>2</sup> or greater.

‡Extreme obesity is defined as BMI of 40 kg/m<sup>2</sup> or greater.

For children two years and older, BMI values are used as a screening tool for determining overweight and obesity for children and to identify possible weight problems. After a BMI value is calculated for a child based on his weight and height, the BMI number is plotted on the Centers for Disease Control and Prevention (CDC) BMI for age- and gender-specific growth charts to obtain a percentile ranking.<sup>67</sup> The percentile indicates the relative position of the child's BMI number among children of the same sex and age. According to the CDC definitions, obesity in children is defined as a BMI at or above the sex- and age-specific 95th percentile BMI cutoff points and overweight is defined as between 85th to less than the 95th percentile.<sup>67</sup>

The best way to achieve and maintain a healthy body weight is to balance caloric intake with physical activity.<sup>109, 115</sup> For individuals who are overweight, limiting consumption of foods and beverages high in calories, fat and added sugars, as well as alcohol, can help reduce caloric intake. Eating smaller portion sizes will also

help. High-calorie and low-nutrient foods should be replaced with vegetables and fruits, whole grains, beans, and lower-calorie beverages.

Healthy behavioral patterns are often established early in childhood. About half of youngsters who are overweight as children will remain overweight in adulthood; 70% of those who are overweight by adolescence will remain overweight as adults.<sup>116</sup> Unhealthy dietary patterns, physical inactivity, and excessive weight gain that begin during childhood often continue into adulthood and increase the risk of developing cancer, cardiovascular disease, diabetes, hypertension, and osteoporosis later in life.

## 2. Adopt a Physically Active Lifestyle

- **Adults:** Engage in at least 30 minutes of moderate to vigorous physical activity, above usual activities, on 5 or more days of the week; 45 to 60 minutes of intentional physical activity is preferable.
- **Children and adolescents:** Engage in at least 60 minutes per day of moderate to vigorous physical activity at least 5 days per week.

### Benefits of Physical Activity

Physical activity acts in a variety of ways to reduce the risk of several types of cancer, including cancers of the breast, colon, prostate, and endometrium.<sup>109</sup> A physically active lifestyle also reduces the risk of other chronic diseases, such as heart disease, diabetes, osteoporosis, and hypertension.<sup>117</sup>

### Types of Activity and Recommendations

Usual physical activity during a person's daily routine is typically of low intensity and short duration. Intentional activities associated with fitness or transportation (e.g., bike riding, brisk walking) generally require more effort, engage large muscle groups, and cause a noticeable increase in heart rate, breathing depth and frequency, and sweating. (For selected examples of moderate and vigorous activities see sidebar, page 21.)

Although the optimal intensity, duration, and frequency of physical activity needed to reduce cancer risk are unknown, evidence suggests that 45-60 minutes on five or more days of the week may be optimal based on studies of colon and breast cancer.<sup>109</sup> Other studies have shown that one hour of exercise on five or more days each week helps to prevent weight gain and obesity.<sup>115, 118</sup> In addition to having a direct impact on reducing the risk of breast and colon cancers, physical activity may also have an indirect effect on reducing the risk of

## Examples of Moderate and Vigorous Physical Activity

	Moderate-intensity Activities	Vigorous-intensity Activities
<b>Exercise and leisure</b>	Walking, dancing, leisurely bicycling, ice and roller skating, horseback riding, canoeing, yoga	Jogging or running, fast bicycling, circuit weight training, aerobic dance, martial arts, jumping rope, swimming
<b>Sports</b>	Volleyball, golfing, softball, baseball, badminton, doubles tennis, downhill skiing	Soccer, field or ice hockey, lacrosse, singles tennis, racquetball, basketball, cross-country skiing
<b>Home activities</b>	Mowing the lawn, general yard and garden maintenance	Digging, carrying and hauling, masonry, carpentry
<b>Occupational activity</b>	Walking and lifting as part of the job (custodial work, farming, auto or machine repair)	Heavy manual labor (forestry, construction, fire fighting)

developing obesity-related cancers because of its role in helping to maintain a healthy weight.

For people who are largely inactive or just beginning a physical activity program, a gradual increase to 30 minutes per day of moderate physical activity on at least five days per week will provide substantial cardiovascular benefits. After this duration is achieved, increasing intensity to vigorous levels may further improve health benefits for those individuals who are physically able. Most children and young adults can safely engage in moderate physical activity without consulting their physicians. However, men older than 40 years, women older than 50 years, and people with chronic illnesses and/or established cardiovascular risk factors should consult their physicians before beginning a vigorous physical activity program. Stretching and warm-up periods before and after activity can reduce the risk of musculoskeletal injuries and muscle soreness.

Individuals who are already active at least 30 minutes on most days of the week should strive to accumulate 60 minutes of moderate or greater intensity activity on most days of the week.

### Current Physical Activity Level in Adolescents

- In 2007, 34.7% of US youth were physically active for at least 60 minutes on more than five days per week and 30.3% attended physical education classes daily (Table 2A).
- In 2007, 35.4% of US high school students reported watching three or more hours of television per day (Table 2A).

### Current Physical Activity Level in Adults

- In 2007, 23.9% of adults reported no leisure-time physical activity. The percentage of adults reporting no leisure-time physical activity ranged from 16.7% in Minnesota to 31.9% in Mississippi (Table 2B).
- In 2007, 48.9% of adults reported engaging in moderate levels of activity and 27.7% in vigorous levels of physical activity (Table 2B).

Physical activity plays an important role in the health and well-being of children and adolescents, and has important physical, mental, and social benefits. Children and adolescents should therefore be encouraged to be physically active at moderate to vigorous intensities for at least 60 minutes per day on five or more days per week.<sup>119, 120</sup> The availability of routine, high-quality physical education programs is a critically important and recognized way of increasing physical activity among youth. Daily physical education and activities should be provided for children at school and sedentary activities (e.g., watching television, playing video games) should be minimized at home.

### 3. Consume a Healthy Diet with an Emphasis on Plant Sources

**Choose foods and beverages in amounts that help to achieve and maintain a healthy weight.**

- Become familiar with standard serving sizes, and read food labels to become more aware of actual servings consumed.
- Eat smaller portions of high-calorie foods. Be aware that “low-fat” or “nonfat” does not mean “low-calorie,” and that low-fat cakes, cookies, and similar foods are often high in calories.

- Substitute vegetables, fruits, and other low-calorie foods and beverages for calorie-dense foods and beverages, such as French fries, cheeseburgers, pizza, ice cream, doughnuts and other sweets, and regular sodas.
- When you eat away from home, choose food low in calories, fat, and sugar, and avoid large portion sizes.

**Eat five or more servings of vegetables and fruits each day.**

- Include vegetables and fruits at every meal and for snacks.
- Eat a variety of vegetables and fruits each day.
- Limit French fries, chips, and other fried vegetable products.
- Choose 100% juice if you drink vegetable or fruit juices.

**Choose whole grains in preferences to processed (refined) grains and sugars.**

- Choose whole-grain rice, bread, pasta, and cereals.

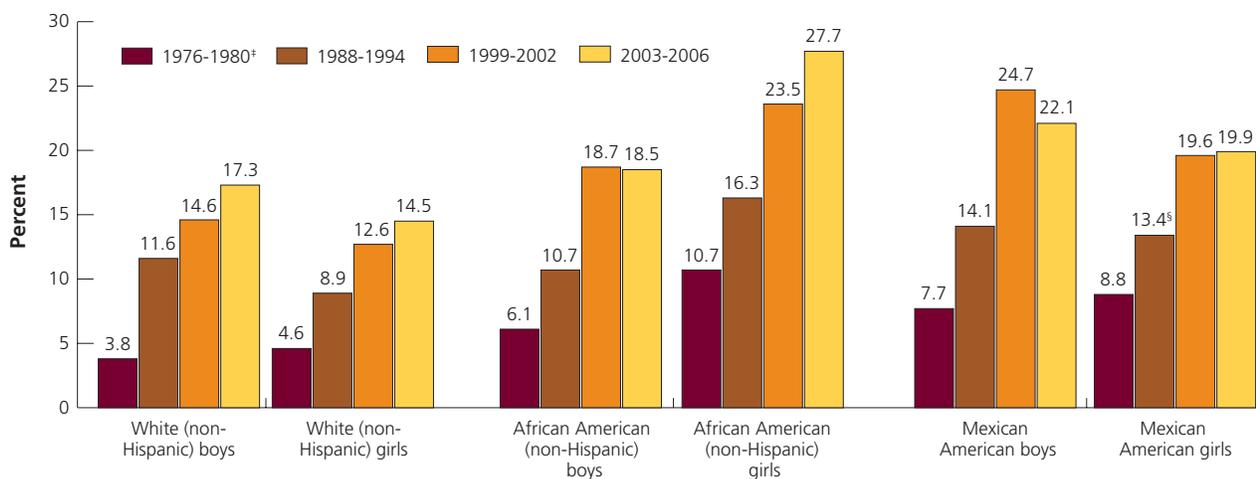
- Limit consumption of refined carbohydrates, including pastries, sweetened cereals, and other high-sugar foods.

**Limit consumption of processed and red meats.**

- Choose fish, poultry, or beans as an alternative to beef, pork, and lamb.
- When you eat meat, select lean cuts and eat smaller portions.
- Prepare meat by baking, broiling, or poaching rather than by frying or charbroiling.

The study of nutrition and cancer is complex, and many important questions remain unanswered. For example, it is not completely understood how single or combined foods or nutrients affect a person's risk of specific cancers. It has been shown that diets that are very low in vegetables, fruits, and whole grains, and high in processed and red meats are linked to an increased risk of some of the most common types of cancers. However, until more is known about how specific dietary components influence cancer risk, the best advice is to consume whole foods within a healthy dietary pattern, with special emphasis on controlling total caloric intake to help achieve and maintain a healthy weight.

**Figure 2A. Obesity\*, Adolescents 12-19 Years, by Gender & Race/Ethnicity†, US, 1976-2006**



\*BMI at or above the sex- and age-specific 95th percentile BMI cutoff points from the 2000 sex-specific BMI-for-age CDC Growth Charts. †Persons of Mexican origins may be of any race. Data estimates for White (non-Hispanic) and African American (non-Hispanic) races for 1999-2002 may not be strictly comparable with estimates for earlier years because of changes in Standards for Federal Data on Race and Ethnicity. The differences in overweight estimates for current and earlier standards for these race categories do not exceed 0.5 percentage points. ‡Data for Mexican Americans are for 1982-84. §Estimate is considered unreliable.

Source: National Health and Nutrition Examination Survey, Hispanic Health and Nutrition Examination Survey (1982-84). 1976-2002: Centers for Disease Control and Prevention, National Center for Health Statistics, Health, United States, 2008, With Special Feature on the Health of Young Adults. Hyattsville, Maryland: 2009.

### Control portion size to achieve and maintain a healthy weight.

Current trends indicate that the largest percentage of calories in the American diet comes from foods high in fat, sugar, and refined carbohydrates or soft drink beverages loaded with sugar. Consuming a varied diet that emphasizes plant foods may help to displace these calorie-dense foods. Limiting portion sizes (see sidebar, right), especially of calorie-dense foods, will also reduce total caloric intake.

It should be noted that simply replacing foods high in fat with foods high in calories from sugar and other refined carbohydrates does not protect against unhealthy weight gain and obesity. Consuming processed foods high in added sugars, such as soft drinks and fruit drinks, presweetened cereals, pastries, candies, and syrups adds little nutritional value to the diet and may contribute to insulin resistance, altered amount and distribution of body fat, and increased concentrations of growth factors that promote the growth of cancers.

### Vegetables and Fruits

Vegetables (including legumes) and fruits contain numerous vitamins, minerals, fiber, carotenoids, and other bioactive substances that may help prevent cancer.

### What Counts as a Serving

**Fruits:** 1 medium apple, banana, or orange; ½ cup of chopped, cooked, or canned fruit; ¼ cup of dried fruit; ½ cup of 100% fruit juice

**Vegetables:** 1 cup of raw leafy vegetables; ½ cup of other cooked or raw vegetables, chopped; ½ cup of 100% vegetable juice

**Grains:** 1 slice of bread; 1 ounce of ready-to-eat cereal; ½ cup of cooked cereal, rice, or pasta

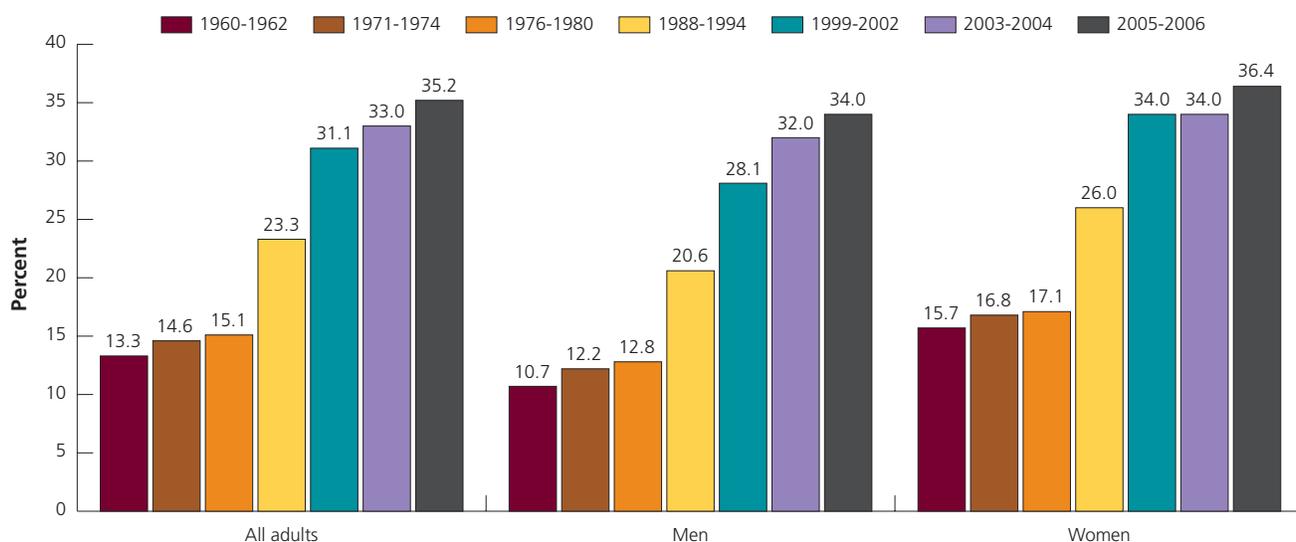
**Beans and nuts:** ½ cup of cooked dry beans; 2 tablespoons of peanut butter; ⅓ cup of nuts

**Dairy food or eggs:** 1 cup of milk or yogurt; 1 ½ ounces of natural cheese; 2 ounces of processed cheese; 1 egg

**Meats:** 2-3 ounces of cooked lean meat, poultry, fish

Greater consumption of vegetables and fruits is associated with decreased risk of lung, esophageal, stomach, and colorectal cancer.<sup>121</sup> Limited data are currently available for other types of cancers, although research is ongoing. The potential benefits of vegetable and fruit consumption may also stem from their replacement of other, more calorie-dense foods and associated maintenance of a healthy weight.

Figure 2B. Obesity\*, Adults 20-74 years, by Gender, US, 1960-2006†



\*Body mass index of 30.0 kg/m<sup>2</sup> or greater. †Age adjusted to the 2000 US standard population.

Source: National Health and Nutrition Examination Survey, Hispanic Health and Nutrition Examination Survey (1982-84). 1960-2002: Centers for Disease Control and Prevention, National Center for Health Statistics, Health, United States, 2008, With Special Feature on the Health of Young Adults. Hyattsville, Maryland: 2009. 2003-2004, 2005-2006: National Health and Nutrition Examination Survey Public Use Data Files, 2003-2004, 2005-2006, National Center for Health Statistics, Centers for Disease Control and Prevention, 2006, 2007.

American Cancer Society, Surveillance and Health Policy Research

**Table 2A. Overweight, Obesity, and Related Factors, High School Students, by State and City, US, 2007**

	% Overweight*	% Obese†	Rank‡	% Watched three or more hours per day of television§	% Met currently recommended levels of physical activity¶	% Attended physical education classes daily	% Played on one or more sports teams#	% Ate fruits and vegetables five or more times a day**
<b>United States</b>	15.8	13.0		35.4	34.7	30.3	56.3	21.4
<b>State</b>								
Alaska	16.2	11.1	10	23.0	42.5	17.7	61.7	15.7
Arizona (Including Charter Schools)	14.2	11.7	17	28.2	32.0	26.9	46.0	17.1
Arkansas	15.8	13.9	31	34.3	42.0	31.3	51.1	13.3
Connecticut	13.3	12.3	21	30.1	45.1	N/A	N/A	21.5
Delaware	17.5	13.3	28	39.0	40.4	28.3	55.0	N/A
Florida	15.2	11.2	15	40.2	38.4	23.0	49.8	22.1
Georgia	18.2	13.8	29	43.1	43.8	34.3	51.9	19.0
Hawaii	14.3	15.6	35	32.9	34.3	7.8	N/A	17.2
Idaho	11.7	11.1	11	22.0	46.8	32.0	57.6	17.4
Illinois	15.7	12.9	26	35.0	43.5	47.3	58.0	21.1
Indiana	15.3	13.8	30	28.7	43.7	25.2	57.0	18.2
Iowa	13.5	11.3	16	24.9	49.9	20.0	65.4	18.9
Kansas	14.4	11.1	12	25.9	45.1	25.7	59.4	20.8
Kentucky	16.4	15.6	36	27.4	32.9	20.0	48.6	13.2
Maine	13.1	12.8	24	23.6	43.1	6.7	N/A	20.4
Maryland	15.2	13.1	27	41.9	30.6	15.6	54.3	19.0
Massachusetts	14.6	11.1	13	28.4	41.0	18.2	59.5	N/A
Michigan	16.5	12.4	22	32.6	44.0	29.8	N/A	17.0
Mississippi	17.9	17.9	39	47.4	36.1	23.4	53.4	19.4
Missouri	14.3	12.0	20	29.6	43.5	24.1	56.5	18.1
Montana	13.3	10.1	5	22.2	44.9	32.8	59.6	17.1
Nevada	14.5	11.0	9	35.1	46.2	N/A	N/A	19.0
New Hampshire	14.4	11.7	18	25.1	46.9	17.2	57.1	22.3
New Mexico	13.5	10.9	7	27.9	43.6	29.8	N/A	17.9
New York	16.3	10.9	8	35.3	38.0	13.1	55.3	N/A
North Carolina	17.1	12.8	25	35.3	44.3	29.0	N/A	14.8
North Dakota	13.7	10.0	4	25.0	47.8	N/A	N/A	16.6
Ohio	15.0	12.4	23	32.0	44.7	26.2	56.7	15.5
Oklahoma	15.2	14.7	33	33.3	49.6	34.3	58.6	15.7
Rhode Island	16.2	10.7	6	27.4	41.9	23.1	N/A	19.0
South Carolina	17.1	14.4	32	38.6	38.0	23.1	49.7	17.1
South Dakota	14.5	9.1	2	23.8	44.0	14.5	63.1	16.0
Tennessee	18.1	16.9	38	38.3	42.0	30.4	51.9	18.3
Texas	15.6	15.9	37	38.5	45.2	40.5	57.7	17.4
Utah	11.7	8.7	1	18.2	47.5	29.9	67.1	17.7
Vermont	14.5	11.8	19	N/A	48.0	18.6	N/A	23.8
West Virginia	17.0	14.7	34	32.0	42.8	25.5	51.8	19.8
Wisconsin	14.0	11.1	14	25.4	38.3	N/A	N/A	17.9
Wyoming	11.4	9.3	3	20.8	48.2	21.9	59.8	17.3
<b>City/County</b>								
Baltimore, MD	19.9	18.5	21	59.5	33.4	20.8	46.1	22.5
Boston, MA	18.5	14.5	11	40.1	29.7	6.5	49.9	N/A
Broward County, FL	15.4	8.4	1	40.7	32.8	21.6	49.3	23.1
Charlotte-Mecklenburg, NC	16.5	9.8	4	37.2	43.2	21.8	N/A	N/A
Chicago, IL	18.7	15.8	14	45.2	28.8	43.6	51.6	20.4
Dallas, TX	19.0	19.3	22	50.8	33.4	25.9	49.6	17.9
DeKalb County, GA	16.3	13.1	10	52.3	35.7	28.2	52.8	21.0
Detroit, MI	21.3	18.4	20	60.0	30.4	30.8	N/A	16.9
District of Columbia	17.8	17.7	18	52.5	30.2	16.3	50.3	19.3
Hillsborough County, FL	13.6	11.5	5	34.2	34.4	21.1	47.7	18.4
Houston, TX	17.7	16.7	17	42.8	28.9	14.4	52.5	17.1
Los Angeles, CA	22.2	16.5	16	43.8	42.1	50.5	50.9	27.4
Memphis, TN	19.7	16.2	15	60.5	36.1	32.4	53.2	21.8
Miami-Dade County, FL	15.0	13.0	9	45.4	32.4	10.8	46.0	23.6
Milwaukee, WI	19.0	17.7	19	49.4	28.1	27.7	N/A	21.6
New York City, NY	16.3	11.5	6	48.4	39.2	42.3	42.1	N/A
Orange County, FL	14.4	12.6	8	41.0	35.6	16.1	47.5	20.9
Palm Beach County, FL	12.5	8.5	2	37.8	36.4	18.6	48.9	22.8
Philadelphia, PA	18.4	15.2	13	50.6	31.1	23.8	44.3	18.0
San Bernardino, CA	18.3	15.0	12	46.3	48.5	54.0	52.8	28.8
San Diego, CA	15.1	12.3	7	37.9	46.2	41.3	54.5	20.4
San Francisco, CA	12.5	8.5	3	33.2	33.8	36.0	41.7	N/A

\*Body mass index at or above the 85th percentile but below the 95th percentile of growth chart for age and sex. Previous CPED reports used the term "at risk for overweight" to describe youth in this BMI category. †Body mass index at or above the 95th percentile of growth chart for age and sex. Previous CPED reports used the term "overweight" to describe youth in this BMI category. ‡Rank is based on % Obese. §During an average school day. ¶Were physically active doing any kind of physical activity that increased their heart rate and made them breathe hard some of the time for a total of at least 60 minutes/day on >5 of the 7 days preceding the survey. #During the 12 months preceding the survey. \*\*Had consumed 100% fruit juice, fruit, green salad, potatoes (excluding French fries, fried potatoes, or potato chips), carrots, or other vegetables >5 times/day during the seven days preceding the survey. N/A = Data not available. **Note:** Data are not available for all states since participation in the Youth Risk Behavior Surveillance System is a voluntary collaboration between a state's departments of health and education.

**Source:** Youth Risk Behavior Surveillance System, 2007, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention. *MMWR Morb Mortal Wkly Rep.* 2008;57(SS-4).  
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For these reasons, consumption of low-calorie, whole vegetables and fruits has been encouraged by a number of health organizations.<sup>115, 122</sup> However, intake of these foods remains low among American adults and children, perhaps due to reasons such as lack of access to affordable produce, preparation time, and taste preferences. Recommendations for cancer risk reduction are to consume at least five servings of a variety of vegetables and fruits each day; however, for overall health, the American Cancer Society supports the recommendation to consume higher levels, depending on calorie needs, as stated in the US Department of Health and Human Services' *Dietary Guidelines for Americans*.<sup>115</sup>

### **Current Prevalence of Consuming Vegetables and Fruits in Adults and Adolescents**

- About one in five (21.4 %) US high school students ate vegetables and fruits five or more times per day in 2007 (Table 2A).
- Only 24.7% of adults reported eating five or more servings of vegetables or fruit daily in 2007. Across states, prevalence of consuming five or more servings of vegetables or fruit ranged from 16.3% in Oklahoma to 32.5% in the District of Columbia (Table 2B).
- In general, across states, the proportion of adults consuming three or more vegetables servings daily was lower than the proportion of adults consuming two or more fruit servings per day (Table 2B).

### **Whole Grains**

Grains such as wheat, rice, oats, and barley, and the foods made from them, are an important part of a healthful diet. Whole-grain foods (made from the entire grain seed) are relatively low in caloric density and higher in fiber, certain vitamins, and minerals than processed (refined) flour products.<sup>115</sup> Although the association between whole-grain foods and different types of cancer has been inconsistent, consumption of high-fiber foods is associated with a lower risk of several chronic diseases (e.g., diabetes, cardiovascular disease) and is therefore recommended for the benefit of overall health.<sup>115</sup>

### **Processed and Red Meats**

Several studies have examined the relationship between cancer and the consumption of red meats (beef, pork, or lamb) and processed meats (cold cuts, bacon, hot dogs, etc.), and current evidence supports an increased risk of cancers of the colon and/or rectum and prostate.



Although meats are good sources of high-quality protein and can supply many important vitamins and minerals, they remain major contributors of total fat, saturated fat, and cholesterol in the American diet. However, heavy meat consumption may lead to the exposure to certain substances that could increase the risk of cancer. In particular, meat that has been fried and/or charcoal-grilled at a very high temperature can produce carcinogenic substances (heterocyclic amines). Also, substances such as nitrates or nitrites used in processed meats can contribute to the formation of nitrosamines, which are involved in carcinogenesis.

Recommendations are to limit consumption of processed and red meats by choosing lean meats and smaller portions (i.e., served as a side dish rather than the focus of a meal). Care should be taken to cook meat thoroughly to destroy harmful bacteria and parasites, while avoiding charring that can produce carcinogens. Legumes are especially rich in nutrients that may protect against cancer and can be a healthier source of protein than red meats.

**Table 2B. Overweight, Obesity, and Related Factors, Adults 18 and Older, by State, US, 2007**

	% Clinical overweight (BMI 25.0-29.9 kg/m <sup>2</sup> )	% Clinical obese (BMI 30.0 kg/m <sup>2</sup> or greater)	% Overweight or obese (BMI 25.0 kg/m <sup>2</sup> or greater)	State rank*	% No leisure-time physical activity	% Vigorous physical activity <sup>†</sup>	% Moderate physical activity <sup>‡</sup>	% Eating five or more fruit or vegetable servings a day	% Eating three or more vegetable servings a day	% Eating two or more fruit servings a day
Alabama	35.7	30.9	66.6	47	29.9	21.7	41.7	20.6	13.7	9.0
Alaska	37.0	28.2	65.2	41	20.0	39.5	60.9	24.3	9.1	17.3
Arizona	36.9	26.0	62.9	24	22.4	29.6	52.5	28.3	10.5	17.5
Arkansas	36.3	29.4	65.7	45	28.0	24.4	46.0	21.8	15.0	12.2
California	35.7	23.3	59.0	7	23.1	31.3	50.2	28.9	10.8	28.2
Colorado	36.4	19.3	55.7	2	17.3	33.0	54.7	25.8	10.1	21.4
Connecticut	37.5	21.8	59.3	8	19.7	30.4	52.5	28.4	10.1	20.6
Delaware	36.7	28.3	65.0	38	22.2	26.8	48.0	21.4	9.6	12.1
District of Columbia	33.1	22.3	55.4	1	21.3	30.8	53.9	32.5	13.2	23.0
Florida	38.0	24.2	62.1	17	25.4	26.0	47.3	26.2	10.0	17.3
Georgia	36.3	28.8	65.1	40	24.6	28.2	48.3	25.0	15.7	14.8
Hawaii	35.1	21.7	56.8	3	18.0	30.5	51.1	28.6	7.1	22.1
Idaho	38.1	25.2	63.2	29	19.6	33.4	55.7	22.2	8.6	18.7
Illinois	37.4	25.6	63.0	25	23.0	28.3	48.7	24.6	8.5	22.7
Indiana	35.6	27.5	63.1	28	24.3	26.5	47.7	22.8	11.4	17.3
Iowa	37.1	27.7	64.8	36	22.0	25.1	48.5	19.9	7.1	16.9
Kansas	36.1	27.7	63.8	32	23.0	25.8	48.5	18.8	9.2	9.4
Kentucky	40.4	28.7	69.1	51	30.1	21.8	44.3	18.3	14.2	4.1
Louisiana	34.4	30.8	65.2	42	30.1	20.5	38.6	19.6	11.1	9.3
Maine	37.8	25.2	63.0	26	20.3	31.9	56.0	28.6	13.1	21.0
Maryland	36.4	26.4	62.8	23	23.1	27.9	48.3	26.4	10.9	18.7
Massachusetts	37.1	21.8	58.9	6	21.1	29.8	51.5	27.5	10.1	21.1
Michigan	36.0	28.3	64.3	33	20.8	29.6	50.7	21.3	7.5	17.8
Minnesota	36.0	26.0	62.0	14	16.7	22.8	48.9	19.4	9.3	11.0
Mississippi	35.5	32.6	68.2	50	31.9	19.7	39.6	18.0	11.7	10.4
Missouri	35.1	28.2	63.3	30	25.6	25.4	48.8	20.1	10.3	14.5
Montana	39.1	22.7	61.8	11	19.7	32.7	57.9	25.2	9.6	15.6
Nebraska	38.2	26.6	64.8	35	22.1	30.6	52.0	24.1	8.2	18.7
Nevada	38.4	24.7	63.0	27	24.4	28.3	48.9	21.9	5.0	16.5
New Hampshire	36.8	25.2	62.0	13	19.1	31.2	54.1	28.5	11.5	19.6
New Jersey	38.2	24.3	62.5	21	26.0	27.5	48.2	27.4	8.7	19.2
New Mexico	35.8	25.1	60.9	10	21.7	29.2	53.3	22.4	9.5	13.4
New York	36.4	25.6	62.1	15	24.3	27.5	48.9	27.6	9.4	21.6
North Carolina	35.9	28.7	64.6	34	24.3	23.4	44.1	21.6	14.4	9.5
North Dakota	37.8	27.1	64.9	37	22.5	28.8	52.7	21.9	8.0	18.6
Ohio	35.4	28.1	63.5	31	24.4	28.1	49.9	20.7	7.8	14.4
Oklahoma	36.3	28.8	65.1	39	29.6	24.9	45.4	16.3	7.4	8.2
Oregon	35.7	26.3	62.1	16	17.3	31.5	56.3	27.0	12.4	20.8
Pennsylvania	34.9	27.8	62.6	22	23.3	28.6	50.4	25.4	9.5	20.3
Rhode Island	39.1	21.7	60.8	9	23.4	27.7	49.9	25.6	9.0	17.5
South Carolina	36.2	29.1	65.3	43	24.8	25.4	46.5	18.6	11.4	10.9
South Dakota	38.3	27.3	65.6	44	22.5	25.4	47.9	18.5	7.1	11.6
Tennessee	36.7	30.7	67.5	48	31.4	18.5	38.8	26.3	16.8	7.0
Texas	37.2	28.7	65.9	46	28.4	25.5	46.4	25.1	12.1	14.2
Utah	35.6	22.4	57.9	4	19.5	35.9	56.2	22.8	9.8	21.1
Vermont	37.0	21.9	58.9	5	18.3	33.2	57.6	30.0	13.0	22.6
Virginia	36.6	25.3	61.9	12	21.6	30.1	49.6	26.3	12.4	16.8
Washington	36.2	25.9	62.1	18	17.6	30.8	53.7	26.0	11.4	19.3
West Virginia	37.7	30.3	68.0	49	28.1	19.2	45.9	19.7	10.8	8.3
Wisconsin	36.9	25.3	62.3	20	19.5	32.2	55.1	24.3	8.6	21.7
Wyoming	37.8	24.5	62.3	19	21.7	32.7	56.8	24.4	9.3	18.5
United States <sup>§</sup>	36.5	26.3	62.8		23.9	27.7	48.9	24.7	10.6	17.8
Range	33.1-40.4	19.3-32.6	55.4-69.1		16.7-31.9	18.5-39.5	38.6-60.9	16.3-32.5	5.0-16.8	4.1-28.2

\*Rank based on % overweight (25kg/m<sup>2</sup> or greater). †Any activity that caused large increases in breathing or heart rate at least 20 minutes three or more times per week (such as running, aerobics, or heavy yard work). ‡Any activity that meets the criteria for vigorous physical activity (see previous definition) OR activity that caused small increase in breathing or heart rate at least 30 minutes five or more times a week (such as brisk walking, bicycling, vacuuming, or gardening) §See Statistical Notes for definition.

**Source:** Behavioral Risk Factor Surveillance System Public Use Data Tape 2007, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 2008.

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#### 4. If You Drink Alcoholic Beverages, Limit Consumption

People who drink alcohol should limit their intake to no more than two drinks per day for men and one drink a day for women.<sup>115</sup> Extensive evidence shows a link between alcohol consumption and risk of breast cancer in women. The recommended limit is lower for women because of their smaller body size and slower metabolism of alcohol. A drink of alcohol is defined as 12 ounces of beer, five ounces of wine, or 1.5 ounces of 80-proof distilled spirits.

Alcohol consumption is an established cause of cancers of the mouth, pharynx, larynx, esophagus, and liver.<sup>110, 123</sup> For each of these cancers, risk increases substantially with intake of more than two drinks per day.<sup>110, 123</sup> Alcohol consumption combined with tobacco use increases the risk of cancers of the mouth, larynx, and esophagus far more than the independent effect of either drinking or smoking.<sup>110</sup> Extensive evidence also implicates alcohol consumption as a cause of cancer of the breast, and probably colon and rectum cancer.<sup>110</sup> Reducing alcohol consumption may be an important way for many women to reduce their risk of breast cancer; in particular, women with a low intake of folate may be susceptible to the increase in breast cancer risk from alcohol. Overall, the evidence seems to indicate that total alcohol consumption is the important factor, not the type of alcoholic beverage consumed.

Complicating the recommendation for alcohol and cancer risk reduction is the fact that low to moderate intake of alcoholic beverages has been associated with decreased risk of coronary heart disease.<sup>124</sup> There is no compelling reason for adults who currently do not consume alcoholic beverages to start consuming alcohol to reduce their risk for heart disease because cardiovascular risk can be reduced by other means, such as avoiding smoking, consuming a diet low in saturated and trans fats, maintaining a healthy weight, staying physically active, and controlling blood pressure and lipids. Some groups of people should not drink alcoholic beverages at all, for example children and adolescents and individuals of any age who cannot restrict their drinking to moderate levels or who have a family history of alcoholism.



### Community Action

Obesity is a complex problem that requires an equally complex set of solutions. In addition to educating the public about healthy behaviors, environmental factors that encourage or discourage people from adopting healthy behaviors need to be addressed. There is growing agreement among experts that environmental changes are a driving force behind the obesity epidemic.<sup>125-130</sup> Historical secular societal changes that likely contributed to the obesity epidemic include reduced leisure time for physical activity, shifts from using walking as a mode of transportation to increased reliance on automobiles, shifts to more mechanized work or sedentary work, increased marketing and availability of cheap but energy-dense processed foods and increased consumption of larger portion sizes. The American Cancer Society believes that to reverse the obesity epidemic substantial changes to environmental factors through community action must occur.<sup>115, 116, 125</sup> Thus, the Society's nutrition and physical activity guidelines call attention to community action strategies that can increase access to healthy food or provide safe, enjoyable, and accessible environments for physical activity in all community settings (e.g., schools, workplaces). (See sidebar, page 28.) This section also describes some of the efforts that the Society and its nonprofit, nonpartisan advocacy affiliate, American Cancer Society Cancer Action Network<sup>SM</sup> (ACS CAN), have been engaged in to support public policy and wellness programs that help foster healthy environments for all Americans.

## Community Action Strategies

Community efforts at many levels of society are needed to create physical and social environments that promote healthy food choices and physical activity. There are multiple ways that public and private organizations at the local, state, and national levels can develop policies and allocate or expand resources to facilitate necessary changes. Employers can implement worksite health promotion programs. Schools can ensure that students participate in physical activity programs and promote the availability of healthful food and beverages. Health care professionals can advise and assist their patients on effective weight loss programs. At the state and local level, community leaders, in particular, could promote policy changes that may include regulation of the school food environment, zoning changes, and tax incentives that bring food stores into poor neighborhoods, and create safe spaces that promote physical activity.

The Centers for Disease Control and Prevention (CDC),<sup>131</sup> the Institute of Medicine,<sup>119</sup> the World Health Organization<sup>124</sup> and others have outlined a variety of evidenced-based approaches in schools, worksites, and communities to halt and ultimately turn around the obesity trends. The following are some specific approaches that have been proposed.<sup>116, 119, 131</sup> (See sidebar, below.)

Increasingly, states have begun adopting policies to facilitate environmental changes aimed at improving healthier nutrition and promotion of active lifestyle. Currently, Arkansas is the only state to have implemented a comprehensive statewide approach to

address childhood obesity; multi-year evaluation studies of this statewide initiative are under way and initial findings suggest that it has had positive impacts. (See sidebar, page 29.)

## The Society's Initiatives in Addressing Obesity/Overweight through Promotion of Nutrition and Physical Activity

The Society works in many ways to increase awareness of the importance of weight control, physically active lifestyles, and healthy diets to reduce the risk of cancer and other chronic diseases, as well as to help facilitate changes in schools, worksites and communities that make it easier for people to make healthier choices.<sup>125</sup>

The Society and ACS CAN collaborate with many organizations, such as the American Heart Association, the American Diabetes Association, and the CDC, to identify and disseminate effective public health strategies to address the epidemic of overweight and obesity.

- The Society's Great American Health Challenge ([cancer.org/greatamericans](http://cancer.org/greatamericans)) is a year-round campaign that provides tips, tools, and resources to help motivate and enable people to make better decisions about their daily eating and exercise habits.
- Through its Employer Initiative, the Society works with companies throughout the country to improve their wellness offerings to employees, including initiatives that promote physical activity and healthy eating, as well as those that enable employers to create a healthier workplace environment.

### Approaches to Improving Nutrition and Physical Activity

- Limit availability, advertising and marketing of foods and beverages of low nutritional value, particularly in schools.
- Strengthen nutritional standards in schools for foods and beverages served as part of the school meals program and for competitive foods and beverages served outside of the program.
- Encourage restaurants to provide nutrition information on menus (e.g., calories, fat, trans fat, sugars).
- Invest in community design that supports development of sidewalks, bike lanes, and access to parks and green space.
- Increase and enforce physical education requirements in grades K-12.
- Implement large-scale marketing campaign targeting consumers and decision-makers to increase awareness of the lifestyle/cancer connection and motivate people to take action to make their worksites, schools, and communities more "health-friendly."
- Develop and promote "communities of excellence" that result in policy and environmental changes within worksites, schools, and communities that increase access to healthy foods and opportunities for physical activity.
- Increase federal funding so states can implement comprehensive nutrition and physical activity plans.
- Encourage collaboration among government, nonprofit, and private sectors to develop research and intervention programs.
- Increase resources from governmental and nongovernmental sources to facilitate the implementation of a strategic and action-oriented plan to address the obesity problem.

- To promote healthy lifestyles among youth, the Society works to increase the capacity of school systems to address K-12 health education, which includes increasing student knowledge and skills related to good nutrition, lifelong physical activity, and tobacco avoidance. The Society publishes the National Health Education Standards (NHES) and has been a leader in professional development to advance implementation of NHES by states and local school districts.
- The Society also advocates improving school nutrition standards and promoting physical education requirements in schools. Together with the American Diabetes Association and the American Heart Association, the Society released statements of support for quality health education and physical education in schools that promote policy changes at state and local levels.



### Arkansas's Response to Childhood Obesity: Update on Statewide Policy Implementation

Obesity is widely recognized as one of the most pressing health threats to families and children across the country. With the creation and passage of Act 1220 in 2003 by the Arkansas General Assembly, this state has become a national leader in attempting to address and combat childhood obesity through a comprehensive school-based intervention. The goals of the landmark legislation were to improve the environment within which children go to school and learn health habits every day, to engage the community to support parents, and to build a system that encourages health, and to increase awareness of childhood obesity. Thus, the legislation was designed to be comprehensive and multifaceted.

A recent evaluation report examined the impact of the Act 1220 and concluded that broad-scale changes launched more than four years ago continue to impact students, parents, and school environments. Act 1220 was enacted to provide a comprehensive and coordinated approach to address childhood obesity through public schools and communities. The legislation:

- Created a statewide Child Health Advisory Committee to develop physical activity and nutrition standards for public schools
- Screened public school students body mass index (BMI) annually
- Created nutrition and physical activity committees in every district in order to develop local policies
- Required public reporting of vending contracts
- Prohibited student access to all food and beverage vending machines in all public elementary schools

The report finds that since 2003:

- The number of district-level policies prohibiting the sale of "junk foods" has increased.
- School vending machines have carried fewer high-fat, high-sugar items.
- The number of certified physical education teachers in elementary schools has increased.
- Approximately 95 percent of parents have reported reading annual BMI reports and limiting "junk food" and screen time at home.

**Source:** Year four Evaluation of Arkansas Act 1220 of 2003 to Combat Childhood Obesity, University of Arkansas for Medical Sciences. Fay W. Boozman College of Public Health, supported by the Robert Wood Johnson Foundation. Available at <http://rwjf.org/files/research/3300.31871.uamsyearfourval.pdf>.

# Ultraviolet Radiation and Skin Cancer

The vast majority of skin cancers are caused by unprotected exposure to excessive ultraviolet radiation (UVR), primarily from the sun.<sup>132, 133</sup> Stratospheric ozone depletion has exacerbated these health effects by allowing increased UVR to reach Earth's surface.<sup>134</sup> While UV exposure is associated with a small percentage of all cancer deaths,<sup>132, 135</sup> more than one million cases of basal and squamous skin cancers and 68,720 cases of malignant melanoma are expected in 2009.<sup>1</sup> Most skin cancer deaths are due to melanoma (8,650 deaths expected in 2009). Melanoma is primarily a disease that afflicts whites; rates are more than 10 times higher in whites than in African Americans. The incidence of melanoma in the US has been increasing for at least 30 years.<sup>1, 136</sup> It is widely thought that the increase in skin cancer over the past few decades is the consequence of changes in behavior that have resulted in increased exposure to solar UVR and use of indoor tanning booths in white young adult women.<sup>135-137</sup>

Everyone is exposed to naturally occurring solar UVR although much of this exposure can be controlled. The extent of an individual's exposure to sunlight is determined by personal behaviors, particularly intentional exposure aimed at getting a tan (e.g., sunbathing). Environmental factors such as time of day, season, geographic location, altitude, temperature, and other weather conditions can also affect the amount of solar radiation individuals receive.<sup>138</sup> A second source of exposure is artificial UVR emitted by devices (indoor tanning booths or lamps) that are increasingly available for cosmetic use and heavily promoted by the indoor tanning industry.<sup>139</sup> Studies suggest that use of indoor tanning devices is a risk factor for skin cancer.<sup>137, 140, 141</sup> An international comprehensive review reported that indoor tanning has no positive effect for health and found a 75% increase in melanoma risk among those who used indoor tanning booths in their teens and 20s.<sup>142</sup> Thus, additional exposure to artificial UVR from indoor tanning is likely to enhance the well-known detrimental consequences of excessive solar UVR exposure.<sup>142</sup>

The negative effects of UVR are cumulative over a lifetime. The immediate adverse effects of excessive UVR exposure include sunburn, eye damage, and suppression of the immune system while the long-term effects include premature aging of the skin, wrinkles, and skin cancer. Exposure to the sun or to other sources of UVR



encompasses a large variety of individual behaviors; these behavioral patterns of UVR exposure have been generally grouped into two broad categories: intentional sun exposure and non-intentional sun exposure. Epidemiological studies show that cutaneous melanoma occurrence is more associated with intentional sun exposure, which is motivated by the acquisition of a tan by exposing significant portions of the trunk, shoulders and limbs. Squamous cell carcinoma occurrence has been associated with non-intentional sun exposure situations where individuals engaging in daily activities are in sunny outdoors environments but they are not willingly acquiring a tan or intentionally spending a long time in the sun. Basal cell carcinoma occurrence has been associated with both types of sun exposure.<sup>143</sup>

On the other hand, a small amount of solar UVR exposure is necessary for the production of vitamin D, which is essential for bone health.<sup>144, 145</sup> There are two other ways to obtain vitamin D – dietary sources (particularly fortified milk and some cereals, oily fish, and eggs) and supplementation. The current national recommended daily intake of vitamin D is 200 IU to 600 IU.<sup>146</sup> Research is in progress to improve the understanding of vitamin D levels and its health effects, including development of some cancers.<sup>144</sup> More information about vitamin D and health is available online at [cancer.org/docroot/ETO/content/ETO\\_5\\_3X\\_Vitamin\\_D.asp?sitearea=ETO](http://cancer.org/docroot/ETO/content/ETO_5_3X_Vitamin_D.asp?sitearea=ETO).

## Sunburns

Sunburns typically occur as a result of excessive sun exposure on unprotected or poorly protected skin.<sup>135, 138</sup> They are characterized by skin redness (erythema), which occurs three to five hours after UVR exposure. Depending on the extent of UVR exposure, sunburns can range from mild to blistering and painful. Sunburns during childhood and intense intermittent sun exposure increase the risk of melanoma and other skin cancers later in life.<sup>147-149</sup> A meta-analysis of 57 studies indicated a two-fold increased risk for melanoma among persons with a history of sunburn, compared to those without sunburn history.<sup>150</sup> In general, individuals with light skin pigmentation who do not tan easily are more susceptible to sunburns than those with darker skin. However, everyone is at risk for other UVR-related health effects.<sup>135</sup>

The prevalence of sunburns begins to rise through childhood and reaches a peak in adolescence and early adulthood.

An American Cancer Society study in 2004<sup>151</sup> showed that:

- More than two-thirds (68.7%) of youth reported getting sunburned during summer months.
- Sunburn rates were higher (84.5%) in youth with the most sensitive skin type (those who do not tan easily but burn when exposed to the sun). Also, higher sunburn rates were reported by girls (71.5%) and white youth (76.3%).

According to the 2005 National Health Interview Survey:<sup>152</sup>

- Adult men were slightly more likely to report sunburns in the past year than women: 36.2% and 32.4%, respectively. Also, sunburn rates were higher in non-Hispanic white men and women (44.2% and 38.5%, respectively) than in other race-ethnic groups of men or women (about 16%).
- Among other racial and ethnic groups, the reported occurrence of sunburns in the past year varies widely; 30.8% in American Indians/Alaska Natives, 22.4% in Hispanics, and 18.2% in Asian Americans. Non-Hispanic African Americans had the lowest prevalence of sunburns (8.3%).

The susceptibility of the skin to UVR damage, including sunburns, is higher among individuals with fair skin, family history of skin cancer, the presence of moles and freckles, or a history of severe sunburns.<sup>135, 148</sup> To minimize the harmful effects of excessive and unprotected

## Risk Factors and Prevention Measures for Melanoma and Other Skin Cancers

### Risk factors for melanoma<sup>1, 135</sup>

- Personal or family history of melanoma
- Light skin or sun-sensitive (i.e., sunburning easily) skin types
- Presence of moles and freckles
- History of excessive sun exposure including severe sunburn
- Exposure to indoor tanning booths occurring early in life

### Risk factors for basal and squamous cell cancers<sup>135</sup>

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

### Measures to prevent skin cancer<sup>153, 154</sup>

- 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 adequately covers the arms, legs, and torso.
- Cover exposed skin with a sunscreen lotion that has a sun protection factor (SPF) of 15 or higher.
- Avoid indoor tanning booths and sunlamps, which provide an additional source of non-solar UVR.

sun exposure, sun protection behaviors should be a life-long practice. (See sidebar, above.)

## UVR Exposure Behaviors

UVR damage of unprotected skin should be minimized by limiting the amount of UVR exposure, by timing outdoor activities when UVR rays are less intense, by use of protective clothing and application of adequate amounts of sunscreen, and avoiding tanning booths and sunlamps. (See sidebar, above.)

Studies show that many adults and adolescents in the US do not regularly protect themselves when outdoors on sunny days.<sup>155-157</sup>

- In a national survey of adolescents aged 11 to 18 years in 2004,<sup>151, 158</sup> 39.4% of youth reported using sunscreen always or often during the past summer and about 22% protected themselves always or often by seeking the shade; about 23% used protective clothing (long sleeves or pants) regularly. Use of indoor tanning devices in the past year was reported by 11% of adolescents (Table 3A).

**Table 3A. Ultraviolet Radiation Exposure Behaviors, Adolescents and Adults, US, 2004, 2005**

Adolescents <sup>†</sup>	Total %*	Male %*	Female %*
Apply sunscreen	39.4	30.0	48.6
Wear a hat	4.9	6.5	3.3
Seek the shade	21.7	20.5	23.0
Wear long-sleeved shirt or pants	22.8	21.9	23.7
Wear sunglasses	32.1	24.4	40.1
Used indoor tanning device <sup>§</sup>	11.1	5.0	17.7
Adults <sup>‡</sup>	Total %*	Male %*	Female %*
Apply sunscreen	29.6	19.3	39.6
Wear a hat	12.4	12.8	12.1
Seek the shade	33.0	26.0	39.7
Wear long-sleeved shirt	10.4	11.2	9.6
Wear long pants	30.1	37.0	23.5
Used indoor tanning device <sup>§</sup>	13.8	10.9	16.5

\*Proportion of respondents reporting always or often practicing the particular UVR exposure behavior. †2004 prevalence of sun-safe practices on sunny days in the summer among US adolescents 11 to 18 years. ‡2005 prevalence of UVR exposure practices on any warm sunny day among US adults 18 years and older. §Used an indoor tanning booth or sunlamp at least once in the past 12 months. ¶Used an indoor tanning device, including a sunbed, sunlamp, or tanning booth at least once in the past 12 months.

**Source:** Adolescents: Cokkinides et al. Trends in sunburns, sun protection practices, and attitudes toward sun exposure protection and tanning among US adolescents, 1998-2004. *Pediatrics* 2006;118(3): 853-864; Cokkinides et al. Indoor tanning use among adolescents in the United States, 1998 to 2004. *Cancer* 2009;115(1):190-8. Adults: National Health Interview Survey Public Use Data File 2005, National Center for Health Statistics, Centers for Disease Control and Prevention, 2006.

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- In a national survey of adults in 2005, 29.6% reported always or often using sunscreen when outside for an hour or more on a warm sunny day in the past 12 months and 33% reported seeking shade (Table 3A). The same survey showed that 13.8% of adults reported using an indoor tanning device at least once in the past 12 months.

While sunscreen products used appropriately can protect from sunburns, skin can still be damaged by prolonged stays in the sun.<sup>138</sup> It is important that users of sunscreen (particularly those at high risk) learn about proper selection of sunscreen types and application techniques. Sunscreens with a high SPF value are best. Adequate amounts of sunscreen should be applied 30 minutes to one hour prior to outdoor activities and re-applied after sweating, bathing, swimming or accidental wiping away of sunscreen.<sup>138</sup>

The use of indoor tanning booths or sunlamps is particularly prevalent among young adults and women who perceive a tanned appearance as healthy and attractive.<sup>139</sup> In a national sample of non-Hispanic white adolescents, 24% reported using a tanning facility at least once in their lives;<sup>159</sup> in another national survey, about 18% of adolescent girls and 5% adolescent boys reported using an indoor tanning booth in the previous year (Table 3A).<sup>158</sup> At the state level, 21 states have enacted legislation limiting minors' access to indoor tanning facilities, including restricting access to use of tanning facilities by age or requiring parental permission.<sup>160</sup> Of these states, three states (California, New Jersey, and New York) prohibit minors under age 14 from using tanning facilities while Wisconsin prohibits use by minors under age 16. Despite these important regulations, studies show many facilities repeatedly provide access to underage children.<sup>161</sup> At the federal level, the Tanning Accountability and Notification Act (TAN Act) was signed into law in September 2007. The act requires the US Food and Drug Administration (FDA), under its authority to regulate tanning devices (e.g., booths, sunbeds or sunlamps), to re-examine the language and positioning of the warning label on indoor tanning devices to make sure consumers are effectively warned of the known dangers of indoor tanning, including the risk of skin cancer. Parents and adolescents alike need to be educated on the risks of using tanning booths and sunlamps, and the tanning industry needs to be regulated to protect public health.

Sun protection practices among adults and youth have improved little during the past decades despite efforts to educate the public about the harms from excessive sun exposure and the benefits of sun protection.<sup>151, 157</sup> While education is important, more systematic efforts are needed to affect broader changes in behavior practices to improve and enable skin cancer preventive practices.<sup>151, 162, 163</sup> Since children and adolescents are an important target group for skin cancer prevention, the Centers for Disease Control and Prevention (CDC) recommends developing comprehensive programs that include school intervention components to improve their sun protection practices.<sup>154, 162, 164, 165</sup> However, a CDC assessment of School Health Policies and Programs indicated low adoption of sun-safety policies (e.g. scheduling of outdoor activities during the day when the sun is not at peak intensity) in elementary, junior/middle, or senior high schools.<sup>166</sup> In states where UVR exposure is high year-round, parents should work with schools



to develop sun protection programs at all grade levels and to establish proper protection practices for their own children. Established skin cancer prevention programs such as the SunWise Programs can provide useful resources to teach people to protect themselves from overexposure to the sun through the use of classroom-, school-, and community-based components. (More information is available at [epa.gov/sunwise/](http://epa.gov/sunwise/).) Health care professionals including pediatricians can also play an important role in educating their patients and parents about the importance of skin cancer prevention.<sup>167, 168</sup>

The Task Force on Community Preventive Services (TFCPS) performs periodic reviews on the efficacy of community-based programs on skin cancer prevention (i.e. behavioral interventions designed to increase sun protection behaviors in target populations). A recent review by the Task Force found evidence of effective programs in two settings: primary schools and recreation/tourism. The interventions evaluated in primary schools had an educational and policy emphasis and were shown to increase children's covering-up behavior specifically, wearing protective clothing and hats. The interventions in recreation/tourism settings,

which were found to increase adults' covering-up behavior, had multiple strategies including education and information in sun safety by outdoor recreation staff, expanded provision of shaded areas and/or provision of sunscreen and educational brochures. State and local health departments and voluntary health organizations interested in playing a role in skin cancer prevention can use the Community Guide resources: examples of program models and policies for sun-safe environments and ready-made tools for program planning, implementation, and evaluation of these programs. (More information can be found at [http://cancercontrolplanet.cancer.gov/sun\\_safety.html](http://cancercontrolplanet.cancer.gov/sun_safety.html).)

## Early Detection of Skin Cancer

The early signs of skin cancer include changes in the surface of a mole or new appearance of skin growths.<sup>169</sup> Suspicious growths (or lesions) or progressive change in a lesion's appearance (size, shape, color, etc.) should be evaluated promptly by a physician. Melanomas often start as small, mole-like growths that increase in size and may change color. A simple ABCD rule outlines the warning signals of the most common type of melanoma: A is for asymmetry (one half of the mole does not match the other half); B is for border irregularity (the edges are ragged, notched, or blurred); C is for color (the pigmentation is not uniform, with variable degrees of tan, brown, or black); D is for diameter greater than six millimeters (about the size of a pencil eraser). Other types of melanoma may not have these signs, so be alert for any new or changing skin growths.

Individuals at high risk for skin cancer should undergo periodic screening by a trained provider. Screening examinations consist of a total body skin examination to look for new or changing skin lesions. Education about signs and symptoms and identification of high-risk individuals should occur during a preventive periodic visit or checkup.<sup>169</sup> For more information about skin cancer prevention and early detection, go to [cancer.org/docroot/PED/content/ped\\_7\\_1\\_Skin\\_Cancer\\_Detection\\_What\\_You\\_Can\\_Do.asp?sitearea=&level=#exam](http://cancer.org/docroot/PED/content/ped_7_1_Skin_Cancer_Detection_What_You_Can_Do.asp?sitearea=&level=#exam).

# Cancer Screening

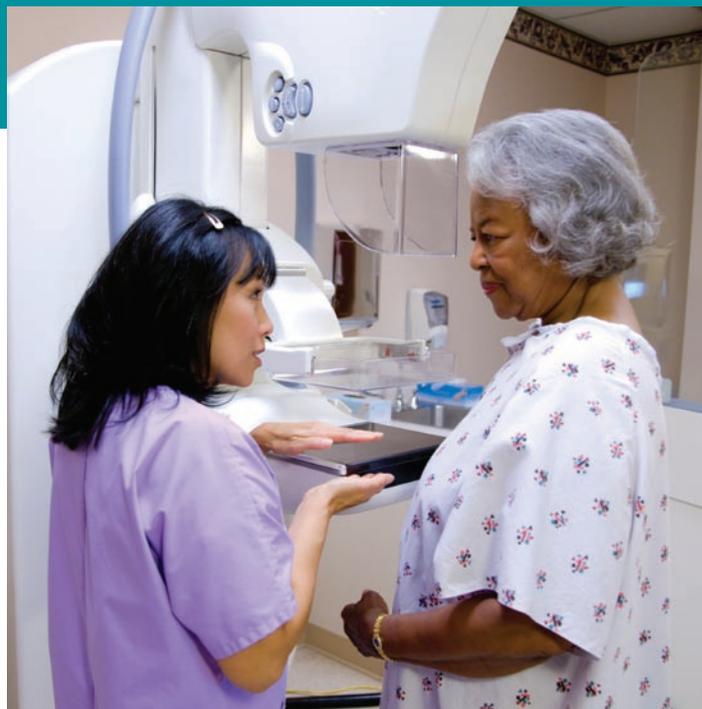
Early detection of cancer through screening has been shown to reduce mortality from cancers of the colon and rectum, breast, and uterine cervix. Screening refers to testing in individuals who are asymptomatic for a particular disease (i.e., they have no symptoms that may indicate the presence of disease). In addition to detecting cancer early, screening for colorectal or cervical cancers can identify and result in the removal of precancerous abnormalities, preventing cancer altogether.<sup>170</sup> Following the recommendations for cancer screening from the American Cancer Society is an important complement to healthy behaviors that reduces the risk of developing cancer.

The American Cancer Society screening guidelines for average-risk individuals recommend that all adults age 50 years and older be screened periodically for colon and rectum cancer, and that women of designated ages be screened regularly for breast and cervical cancer. At present, the evidence is insufficient to recommend for or against prostate cancer screening in average-risk men; thus, the Society and other organizations recommend that men 50 and older receive information about the benefits and limitations of testing for early prostate cancer detection and have an opportunity to make an informed decision about testing. Guidelines for those at higher risk of disease recommend that screening for early detection may begin at an earlier age, be performed more frequently, or use special tests, with an emphasis on informed decision-making.<sup>170, 171</sup> The American Cancer Society screening guidelines for the early detection of cancer are shown on page 35.

The American Cancer Society works through multiple avenues to promote the accessibility and the widespread use of cancer screening, as well as to support educational, advocacy, and legislative strategies to improve screening rates and quality. This is an important part of the effort to meet the Society's 2015 challenge goals of reducing cancer incidence and mortality.

## Breast Cancer Screening

Breast cancer screening has been shown to reduce breast cancer mortality.<sup>172-175</sup> In the US, death rates from breast cancer in women have been declining since 1990, due in large part to early detection by mammography screening and improvements in treatment.<sup>1</sup> Currently, 61% of breast cancers are diagnosed at a localized



stage, for which the five-year survival rate is 98%.<sup>176</sup> Further reductions in breast cancer death rates are possible by increasing mammography screening rates and providing timely access to high-quality follow-up and treatment.

Despite the relatively high prevalence of mammography screening in the US (within the past 2 years: 66.5% in 2005, Table 4A), recent studies suggest that many women are initiating mammography later than recommended, not having mammography at recommended intervals, or not receiving appropriate and timely follow-up of positive screening results.<sup>177-180</sup> These indicators of inadequate screening are associated with more advanced tumor size and stage at diagnosis. Thus, in accordance with the American Cancer Society screening guidelines, it is important that women age 40 and older receive mammography screening on an annual basis at accredited mammography screening facilities. A listing of accredited mammography screening centers or facilities is available at [fda.gov/cdrh/mammography/certified.html](http://fda.gov/cdrh/mammography/certified.html).

For women at increased risk for breast cancer, the Society recommends annual screening using magnetic resonance imaging (MRI) in addition to mammograms; the high-risk status of these women (lifetime risk approximately 20%-25% or greater) is based on the presence of mutations in the breast cancer susceptibility genes, BRCA1 and BRCA2, strong family history of breast and/or ovarian cancer, or prior chest radiation therapy (e.g., for Hodgkin disease).<sup>171</sup>

## Screening Guidelines for the Early Detection of Cancer in Average-risk Asymptomatic People

Cancer Site	Population	Test or Procedure	Frequency
<b>Breast</b>	Women, age 20+	Breast self-examination (BSE)	Beginning in their early 20s, women should be told about the benefits and limitations of breast self-examination (BSE). The importance of prompt reporting of any new breast symptoms to a health professional should be emphasized. Women who choose to do BSE should receive instruction and have their technique reviewed on the occasion of a periodic health examination. It is acceptable for women to choose not to do BSE or to do BSE irregularly.
		Clinical breast examination (CBE)	For women in their 20s and 30s, it is recommended that clinical breast examination (CBE) be part of a periodic health examination, preferably at least every three years. Asymptomatic women aged 40 and over should continue to receive a clinical breast examination as part of a periodic health examination, preferably annually.
		Mammography	Begin annual mammography at age 40.*
<b>Colorectal</b>	Men and women, age 50+	Fecal occult blood test (FOBT) <sup>†</sup> with at least 50% test sensitivity for cancer, or fecal immunochemical test (FIT) with at least 50% test sensitivity for cancer, or	Annual, starting at age 50
		Stool DNA test	Interval uncertain, starting at age 50
		Flexible sigmoidoscopy, or	Every five years, starting at age 50
		Fecal occult blood test (FOBT) <sup>†</sup> and flexible sigmoidoscopy, <sup>‡</sup> or	Annual FOBT (or fecal immunochemical test (FIT) and flexible sigmoidoscopy every five years, starting at age 50
		Double-contrast barium enema (DCBE), or	Every five years, starting at age 50
		Colonoscopy	Every 10 years, starting at age 50
		CT colonography <sup>§</sup>	Every five years, starting at age 50
<b>Prostate</b>	Men, age 50+	Digital rectal examination (DRE) and prostate-specific antigen test (PSA)	Health care providers should discuss the potential benefits and limitations of prostate cancer early detection testing with men and offer the PSA blood test and the digital rectal examination annually, beginning at age 50, to men who are at average risk of prostate cancer, and who have a life expectancy of at least 10 years. <sup>¶</sup>
<b>Cervix</b>	Women, age 18+	Pap test	Cervical cancer screening should begin approximately three years after a woman begins having vaginal intercourse, but no later than 21 years of age. Screening should be done every year with conventional Pap tests or every two years using liquid-based Pap tests. At or after age 30, women who have had three normal test results in a row may get screened every two to three years with cervical cytology (either conventional or liquid-based Pap test) alone, or every three years with an HPV DNA test plus cervical cytology. Women 70 years of age and older who have had three or more normal Pap tests and no abnormal Pap tests in the past 10 years and women who have had a total hysterectomy may choose to stop cervical cancer screening.
<b>Endometrial</b>	Women, at menopause	At the time of menopause, women at average risk should be informed about risks and symptoms of endometrial cancer and strongly encouraged to report any unexpected bleeding or spotting to their physicians.	
<b>Cancer-related checkup</b>	Men and women, age 20+	On the occasion of a periodic health examination, the cancer-related checkup should include examination for cancers of the thyroid, testicles, ovaries, lymph nodes, oral cavity, and skin, as well as health counseling about tobacco, sun exposure, diet and nutrition, risk factors, sexual practices, and environmental and occupational exposures.	

\* Beginning at age 40, annual clinical breast examination should be performed prior to mammography.

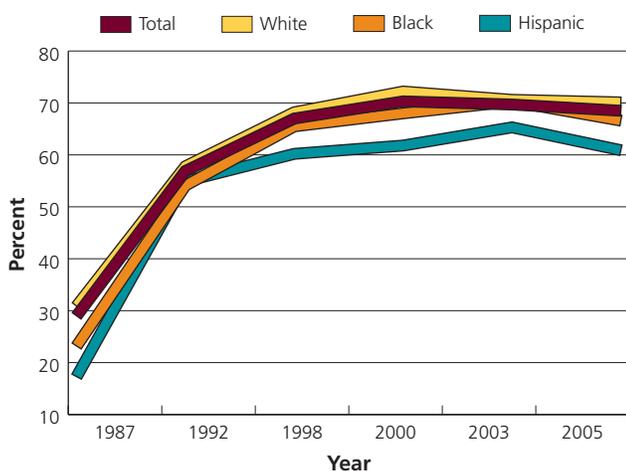
<sup>†</sup> FOBT as it is sometimes done in physicians' offices, with the single stool sample collected on a fingertip during a digital rectal examination, is not an adequate substitute for the recommended at-home procedure of collecting two samples from three consecutive specimens. Toilet bowl FOBT tests also are not recommended. In comparison with guaiac-based tests for the detection of occult blood, immunochemical tests are more patient-friendly, and are likely to be equal or better in sensitivity and specificity. There is no justification for repeating FOBT in response to an initial positive finding.

<sup>‡</sup> Flexible sigmoidoscopy, together with FOBT, is preferred, compared to FOBT or flexible sigmoidoscopy alone.

<sup>§</sup> Individuals with a personal or family history of colorectal cancer or adenomas, inflammatory bowel disease, or high-risk genetic syndromes should continue to follow the most recent recommendations for individuals at increased or high risk.

<sup>¶</sup> Information should be provided to men about the benefits and limitations of testing so that an informed decision about testing can be made with the clinician's assistance.

**Figure 4A. Mammography within the Past Two Years\*, Women 40 and Older, by Race/Ethnicity, US, 1987-2005**



\*Estimates are age-adjusted to the 2000 US standard population.

**Source:** 1987-2003: National Cancer Institute. Cancer Trends Progress Report – 2007 Update. Available at <http://progressreport.cancer.gov/>. Accessed September 10, 2008. 2005: National Health Interview Survey Public Use Data File 2005, National Center for Health Statistics, Centers for Disease Control and Prevention, 2006.

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Recent progress in breast cancer research has led to the development of chemo-preventive options for women who are at high risk of breast cancer. Currently, there are two drugs – tamoxifen and raloxifene – that have been approved by the Food and Drug Administration (FDA) for high-risk women to reduce the risk of breast cancer. Since these drugs have side effects, it is important that women who are considering taking tamoxifen or raloxifene discuss the risks and benefits with their medical providers.<sup>181 182</sup>

### Mammography Screening in the US

National breast cancer screening data are available from the National Health Interview Survey (NHIS) that measures screening within the past year and past two years. The NHIS has tracked trends in mammography since 1987.

- The percentage of women aged 40 years and older who reported having a mammogram within the past two years increased from 29% in 1987 to 70% in 2000. Since then, trends in mammography utilization by race and ethnicity stabilized through 2003 and showed small declines in 2005 (overall 66.5%).<sup>183, 184</sup>

**Table 4A. Mammography, Women 40 and Older, US, 2005**

Characteristic	% Mammogram within the past year*	% Mammogram within the past 2 years*
<b>Age</b>		
40-49	47.8	63.5
50-64	55.5	71.8
65+	50.2	63.8
<b>Race/ethnicity</b>		
White (non-Hispanic)	52.9	68.1
African American (non-Hispanic)	49.9	64.9
Hispanic/Latino	41.7	59.6
American Indian and Alaska Native†	46.9	66.6
Asian American‡	37.9	54.2
<b>Education (years)</b>		
11 or fewer	40.4	53.0
12	49.0	64.4
13-15	53.6	69.1
16 or more	60.2	76.8
<b>Health insurance coverage</b>		
Yes	54.1	69.8
No	24.1	33.2
<b>Immigration§</b>		
Born in US	52.2	67.2
Born in US territory	45.4	59.4
In US fewer than 10 years	34.9	50.0
In US 10+ years	46.0	63.3
<b>Total</b>	<b>51.2</b>	<b>66.5</b>

\*Percentages are age-adjusted to the 2000 US standard population. See Statistical Notes for more information. †Estimates should be interpreted with caution because of the small sample sizes. ‡Does not include Native Hawaiians and other Pacific Islanders. §Definition has changed such that individuals born in the US or in a US territory are reported separately from individuals born outside the US. Individuals born in a US territory have been in the US for any length of time.

**Source:** National Health Interview Survey Public Use Data File 2005, National Center for Health Statistics, Centers for Disease Control and Prevention, 2006.

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- White women aged 40 and older were more likely to report a mammogram in the past two years (68.1%) than any other racial/ethnic group. Screening rates were 66.6% in American Indian/Alaska Native women, 64.9% in African American women, 59.6% in Hispanic women, and 54.2% in Asian women (Table 4A).
- The lowest prevalence of mammography use in the past two years occurred among women who lack health insurance (33.2%), followed by immigrant women who have lived in the US for fewer than 10 years (50%) (Table 4A).

**Table 4B. Mammography and Clinical Breast Exam, Women 40 and Older, by State, US, 2006**

	% Recent Mammogram*					% Recent Mammogram and Clinical Breast Exam†				
	40 years and older	40 to 64 years	65 years and older	No usual source of medical care‡	No health insurance§	40 years and older	40 to 64 years	65 years and older	No usual source of medical care‡	No health insurance§
Alabama	59.6	59.3	60.2	26.4	29.4	52.8	54.8	48.2	21.5	23.3
Alaska	55.7	53.9	63.5	37.5	45.8	50.8	49.7	56.2	34.7	38.7
Arizona	59.7	56.1	67.1	38.5	32.1	51.8	49.9	55.8	28.3	25.5
Arkansas	54.5	52.6	58.4	20.8	27.5	46.5	46.9	45.7	15.9	23.5
California	61.0	59.4	65.2	37.2	40.1	49.7	49.9	49.2	26.7	35.0
Colorado	56.4	55.3	59.7	27.2	27.1	49.0	49.1	48.6	22.1	25.6
Connecticut	69.9	69.1	71.7	35.8	43.8	62.0	63.3	59.1	25.0	38.0
Delaware	70.2	70.2	70.2	35.7	57.1	62.8	65.0	58.0	31.2	50.0
District of Columbia	64.2	63.0	66.8	39.5	36.6	57.5	58.7	55.0	33.5	32.3
Florida	64.8	61.0	71.2	32.8	33.4	54.9	54.1	56.2	24.5	27.8
Georgia	64.0	62.2	69.1	39.3	42.5	57.4	57.9	56.0	35.0	37.9
Hawaii	62.7	61.1	66.1	31.4	27.5	53.0	53.2	52.7	25.4	25.7
Idaho	51.2	47.6	59.9	24.7	21.8	45.3	43.1	50.5	22.7	19.1
Illinois	58.1	56.9	60.8	27.6	30.7	50.2	50.7	49.1	20.9	28.8
Indiana	54.2	53.0	56.8	27.3	28.8	46.2	47.0	44.4	20.5	24.1
Iowa	63.5	62.9	64.5	33.4	29.7	55.8	57.6	52.1	29.6	25.0
Kansas	60.3	58.1	64.9	22.5	31.0	53.2	53.1	53.5	19.8	26.9
Kentucky	57.6	56.4	60.5	27.1	29.3	49.1	49.2	48.8	21.2	26.2
Louisiana	61.3	60.5	63.2	36.5	36.9	54.1	55.1	51.9	31.1	32.5
Maine	68.0	66.7	70.8	26.9	38.5	60.7	61.4	59.2	20.9	33.0
Maryland	63.9	62.7	67.0	39.7	39.6	57.0	57.2	56.3	35.2	34.3
Massachusetts	71.4	70.2	74.1	37.4	61.0	62.8	63.8	60.6	29.8	56.8
Michigan	64.2	63.4	65.9	30.8	38.3	57.7	59.4	53.9	28.4	36.9
Minnesota	68.0	67.6	69.0	33.1	27.1	63.8	64.3	62.6	30.5	26.7
Mississippi	51.2	50.6	52.4	27.7	31.1	44.5	45.3	42.7	23.5	25.3
Missouri	56.6	57.1	55.5	25.2	23.1	47.2	50.5	40.0	22.6	21.4
Montana	57.4	55.1	62.7	33.4	28.9	51.0	50.5	52.1	26.3	24.2
Nebraska	59.6	59.3	60.2	30.8	39.8	53.0	55.3	48.2	26.2	35.2
Nevada	54.5	54.7	54.0	26.7	34.0	47.1	48.7	42.8	22.6	31.7
New Hampshire	66.1	65.5	67.8	20.2	31.6	60.5	61.8	57.0	20.0	30.6
New Jersey	63.8	64.8	61.5	43.0	44.1	56.1	58.5	50.9	37.8	34.1
New Mexico	52.1	51.1	54.3	26.2	28.4	45.2	45.6	44.2	20.4	23.7
New York	65.0	63.8	67.7	37.7	46.8	57.1	58.3	54.5	26.3	37.4
North Carolina	63.9	63.5	64.9	34.4	35.9	53.9	55.3	50.5	28.6	29.8
North Dakota	63.0	62.0	65.1	40.7	50.2	56.0	57.4	53.3	36.0	48.8
Ohio	61.0	58.9	65.7	27.1	49.5	53.0	54.5	49.5	24.1	44.1
Oklahoma	48.7	46.9	52.5	21.7	26.2	41.1	41.6	39.9	18.9	24.3
Oregon	61.1	57.6	69.1	25.9	26.3	52.3	51.0	55.5	19.4	23.8
Pennsylvania	62.2	60.8	64.8	31.6	26.2	54.9	55.4	53.9	30.2	23.0
Rhode Island	70.8	71.0	70.3	41.0	50.3	64.8	66.9	60.5	37.1	46.2
South Carolina	57.4	55.7	61.2	26.3	34.0	49.2	49.3	48.9	22.3	28.8
South Dakota	59.1	56.5	63.9	30.1	29.9	51.9	51.9	52.1	27.5	27.3
Tennessee	61.7	61.1	63.0	39.9	37.0	55.6	56.5	53.3	34.0	31.3
Texas	56.0	54.0	61.4	27.2	30.2	50.4	50.4	50.2	24.9	26.7
Utah	48.9	45.7	57.0	21.0	22.2	39.5	38.6	41.8	16.4	18.0
Vermont	64.2	62.7	67.8	28.1	38.0	56.5	57.5	54.1	25.7	33.4
Virginia	62.2	60.6	66.5	33.5	25.2	54.6	55.0	53.4	28.1	23.9
Washington	59.5	57.4	65.0	27.5	29.4	51.7	51.6	51.8	23.2	26.0
West Virginia	61.9	61.5	62.7	27.0	28.3	54.2	56.6	49.3	24.6	26.1
Wisconsin	62.2	60.9	65.2	20.6	38.0	57.8	57.3	58.9	19.1	36.5
Wyoming	52.7	50.0	59.6	29.2	22.2	45.3	44.7	47.1	24.5	19.1
United States¶	61.2	59.7	64.6	32.2	34.9	53.2	53.8	51.9	26.2	30.3
Range	48.7-71.4	45.7-71.0	52.4-74.1	20.2-43.0	21.8-61.0	39.5-64.8	38.6-66.9	39.9-62.6	15.9-37.8	18.0-56.8

\*A mammogram within the past year. †Both a mammogram and clinical breast exam within the past year. ‡Women 40 and older who reported that they did not have a personal doctor or health care provider. §Women aged 40 to 64 who reported that they did not have any kind of health care coverage, including health insurance, prepaid plans such as HMOs, or government plans such as Medicare. ¶See Statistical Notes for definition.

**Source:** Behavioral Risk Factor Surveillance System Public Use Data Tape 2006, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 2007.

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- Only 51.2% of women aged 40 and older reported having a mammogram within the past year (Table 4A). The American Cancer Society recommends annual mammograms for women starting at age 40.

## State-level Mammography Screening

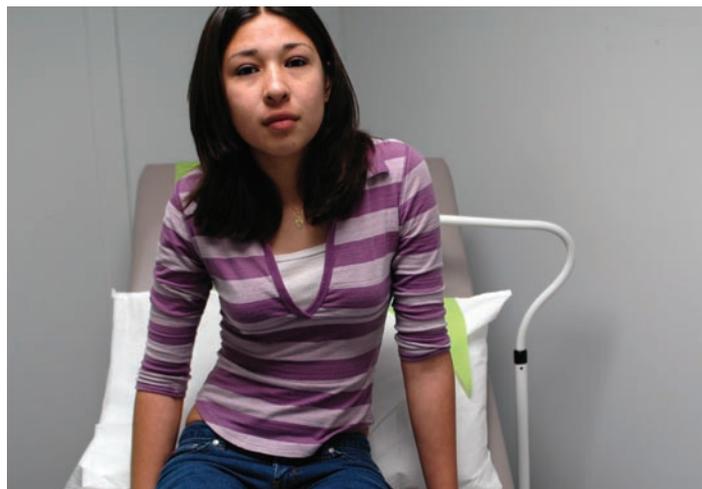
Current state-level breast cancer screening data are available from the 2006 Behavioral Risk Factor Surveillance System (BRFSS):

- In 2006, the percentage of women aged 40 and older who reported having a mammogram in the past year ranged from 48.7% in Oklahoma to 71.4% in Massachusetts (Table 4B).
- Utah is the only state that does not have legislation to improve private insurance coverage for mammography screening; Utah has the second lowest prevalence of mammography screening (48.9%).<sup>185</sup>
- Screening participation rates are approximately 6 to 9 percentage points lower when measuring the percentage of women who had a mammogram *and* clinical breast exam, ranging from 39.5% in Utah to 64.8% in Rhode Island.
- Having a usual source of care is an indicator of access to preventive health care services and is related in part to health care coverage. In almost all states, women who lack a usual source of care or are uninsured have a much lower prevalence of breast cancer screening than the general population (Table 4B).

There is a need for continued monitoring of mammography utilization in US women since recent national studies suggest either stable trends between 2000 and 2006<sup>186</sup> or small declines between 2000 and 2005.<sup>183</sup> Of importance to cancer outcomes is the need to improve access to screening since rates of mammography continue to be low among those with low income levels, recent immigrants, and individuals who lack health insurance coverage.<sup>186, 187</sup> Access barriers to screening may lead to more advanced stage at breast cancer diagnosis and poorer survival.<sup>178, 188</sup> Programs and policies that both promote and enable access to mammography screening for all eligible low-income uninsured and underinsured women need to be enhanced and supported.<sup>189</sup>

## Cervical Cancer Screening

Cervical cancer incidence and mortality rates have decreased 67% over the past three decades, with most of



the reduction attributed to the Pap test, which detects cervical cancer and precancerous lesions.<sup>190</sup> Between 60% and 80% of women with advanced cervical cancer have not had a Pap test in the past five years.<sup>191</sup> For women in whom precancerous lesions have been detected through Pap tests, the likelihood of survival is nearly 100% with appropriate evaluation, treatment, and follow-up.<sup>191</sup> Historically, the American Cancer Society played a critical role in developing and promoting the use of the Pap test. Cervical cancer is now one of the most successfully controlled cancers<sup>190</sup> particularly in developed countries and with the approved vaccine for immunization against HPV among young girls, there is a great potential for further reducing the occurrence of cervical cancer in the US. In developing countries, where the burden of cervical cancer is high, the control of cervical cancer through screening and prevention via HPV vaccines are important priorities for cancer control. At present, most developing countries have limited capacity for cervical cancer screening and the cost of the HPV vaccine is a significant barrier for implementing vaccine programs.<sup>192</sup>

## HPV Vaccine and Cervical Cancer (and Vulvar Cancer) Prevention

The human papillomavirus (HPV) is the most common sexually transmitted infection in the US, with approximately 6.2 million people becoming newly infected annually.<sup>193, 194</sup> There are more than 100 types of HPV, and more than 40 of these types can infect the genitals. Although most HPV infections are benign and transient, virtually all cervical cancers are causally related to infections by HPV. Approximately 70% of cervical cancers are caused by HPV types 16 or 18.<sup>195</sup> Vaccines have been developed against HPV-16 and HPV-18 and other subtypes. Recent clinical trials show that the vaccines are effective in preventing persistent new infections<sup>195, 196</sup>

## Summary of American Cancer Society Recommendations for HPV Vaccine Use to Prevent Cervical Cancer and its Precursors<sup>201</sup>

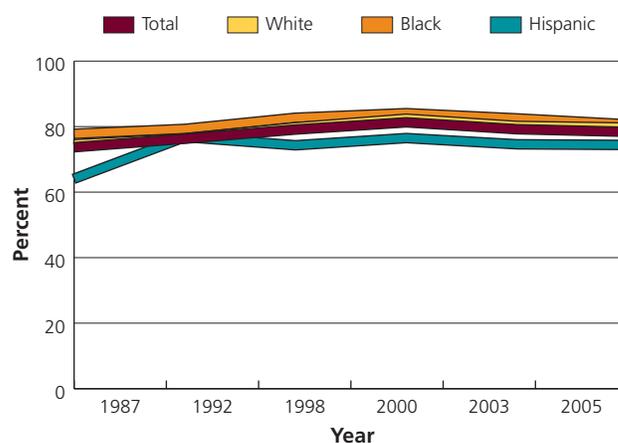
- Routine HPV vaccination is recommended for females aged 11 to 12 years.
- Females as young as 9 years may receive HPV vaccination.
- HPV vaccination is also recommended for females 13 to 18 years of age to catch up on missed vaccine or complete the vaccination series.
- There are currently insufficient data\* to recommend for or against universal vaccination of females ages 19 to 26 years in the general population. A decision about whether a woman aged 19 to 26 years should receive the vaccine should be based on an informed discussion between the woman and her health care provider regarding her risk of previous HPV exposure and potential benefit from vaccination. Ideally, the vaccine should be administered prior to potential exposure to genital HPV through sexual intercourse, because the potential benefit is likely to diminish with an increasing number of lifetime sexual partners.
- The HPV vaccination is not currently recommended for women over age 26 or for men.
- Screening for cervical intraepithelial neoplasia (CIN) and cancer should continue in both vaccinated and unvaccinated women according to current Society early detection guidelines.

\*Insufficient evidence of benefit in 19- to 26-year-old women refers to (1) clinical trial data in women with an average of two – and not more than four – lifetime sexual partners, indicating a limited reduction in the overall incidence of CIN2/3; (2) the absence of efficacy data for the prevention of HPV 16/18 related CIN2/3 in women who have had more than four lifetime sexual partners; and (3) the lack of cost-effective analyses for vaccination in this age group.

and in reducing rates of precursor lesions (adenoma in situ or intraepithelial neoplasia) in the cervix.<sup>197, 198</sup> These vaccines, made from non-infectious HPV-like particles, offer a promising new approach to the prevention of cervical cancer as well as other HPV-associated conditions (e.g., vulvar cancer and genital warts).<sup>194</sup>

In June 2006, a vaccine (Gardasil®) that protects against four types of HPV including types 16 and 18, was approved by the US Food and Drug Administration (FDA) for use in females aged 9 to 26 years. To be most effective, the HPV vaccine should be given before a person becomes sexually active, and in three doses within one year. The Federal Advisory Committee on Immunization Practices (ACIP) has recommended that the vaccine be routinely given to females aged 11 to 12 years and as early as age 9 years at the discretion of doctors. The committee also recommended females ages 13 to 26 who have not yet been vaccinated receive “catch-up” vaccinations.<sup>193, 199</sup> Based on ongoing assessments of

**Figure 4B. Pap Test within the Past Three Years\*, Women 18 and Older, by Race/Ethnicity, US, 1987-2005**



\*Estimates are age-adjusted to the 2000 US standard population.

**Source:** 1987-2003: National Cancer Institute. Cancer Trends Progress Report – 2005 Update. Available at <http://progressreport.cancer.gov/>. Accessed October 10, 2008. 2005: National Health Interview Survey Public Use Data File 2005, National Center for Health Statistics, Centers for Disease Control and Prevention, 2006.

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vaccine safety information,<sup>200</sup> the FDA and Centers for Disease Control and Prevention (CDC) continue to find that Gardasil® is safe and its side effects, which include pain or tenderness at the injection site, are mild.<sup>193</sup> In January 2007, the Society published its own recommendations for HPV vaccine use.<sup>201</sup> (See sidebar, page 39.) These guidelines are generally consistent with those of the ACIP.

The HPV vaccine cost in the US is approximately \$120 per dose (or \$360 for the entire three-dose series during one year). This cost does not include the cost for giving the injections or the doctor’s charge. Most large health insurance companies include ACIP-recommended vaccines as a plan benefit and most have agreed to cover the HPV vaccine. However, there may be a lag time between the vaccine’s approval and when it is covered by health plans.<sup>194</sup>

The CDC announced that the HPV vaccine is available in all 50 states through the federal Vaccine for Children (VFC) entitlement program, which covers vaccine costs for children and teens who do not have insurance and for some children and teens who are underinsured or Medicaid eligible.<sup>194</sup> The CDC has implemented the Pre-teen Vaccine Campaign to inform parents, caregivers, family physicians, and pediatricians about the new

**Table 4C. Pap Test\*, Women 18 and Older, US, 2005**

Characteristic	% Pap test within past 3 years <sup>†</sup>
<b>Age (years)</b>	
18 to 20	61.4
21 to 29	84.7
30 to 39	88.9
40 to 49	86.5
50 to 59	82.0
60 to 64	79.2
65 to 85	59.1
<b>Race/ethnicity</b>	
White (non-Hispanic)	81.4
African American (non-Hispanic)	80.2
Hispanic/Latina	74.5
American Indian/Alaska Native	75.8
Asian <sup>‡</sup>	65.8
<b>Education (years)<sup>§</sup></b>	
11 or fewer	68.0
12	77.0
13-15	83.7
16 or more	88.1
<b>Health insurance coverage</b>	
Yes	82.4
No	61.4
<b>Immigration<sup>¶</sup></b>	
Born in US	81.4
Born in US territory	74.5
In US fewer than 10 yrs	66.8
In US 10+ years	73.0
<b>Total</b>	<b>79.6</b>

\*A Pap test within the past three years for all women 18 and over with intact uteri. †Percentages are age-adjusted to the 2000 US standard population. See Statistical Notes for more information. ‡Does not include Native Hawaiians or other Pacific Islanders. §Women aged 25 and older. ¶Definition has changed such that individuals born in the US or in a US territory are reported separately from individuals born outside the US. Individuals born in a US territory have been in the US for any length of time.

**Source:** National Health Interview Survey Public Use Data File 2005, National Center for Health Statistics, Centers for Disease Control and Prevention, 2006.

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vaccination recommendations (including HPV vaccine for girls) for 11- and 12-year-olds. Research shows that pre-teens generally do not get preventive health care, and visit the doctor only when they are sick. One goal of this campaign is to encourage parents to take their pre-teens in for the recommended 11- or 12-year-old checkup, which is endorsed by the American Academy for Pediatrics and the American Academy of Family Physicians, as well as the CDC.<sup>193</sup> According to the 2007 National Immunization Survey of Teens, 25.1% of US female adolescents aged 13 to 17 years initiated the

HPV vaccination series (i.e., had at least one of the three shots as recommended for the HPV vaccine).<sup>202</sup>

The HPV vaccine will only supplement rather than replace the Pap test, since the vaccine will not provide protection against all types of HPV that cause cervical cancer. Also, women may not receive the full benefits of the vaccine if they do not complete the vaccine series, or if they receive the vaccine after becoming infected with one or more HPV types. Thus, women of all ages should continue to receive regular cervical cancer screening.<sup>201</sup>

The promise of cancer prevention vaccines from a broad public health perspective can be fully realized only if vaccination reaches those subgroups of women for whom access to cervical cancer screening services is especially challenging, particularly immigrants, those living in rural areas, low-income and uninsured females, and others who have limited access to health care services.<sup>201</sup> Hence, the Society supports and advocates for the widespread availability and use of the vaccine consistent with published guidelines.<sup>203</sup> Legislators in at least 41 states and the District of Columbia have introduced legislation to require, fund, or educate the public about the HPV vaccine and to date, 17 states have enacted such legislation. (For more details refer to the National Conference of State Legislature's HPV vaccine legislation tracking resource.<sup>204</sup>)

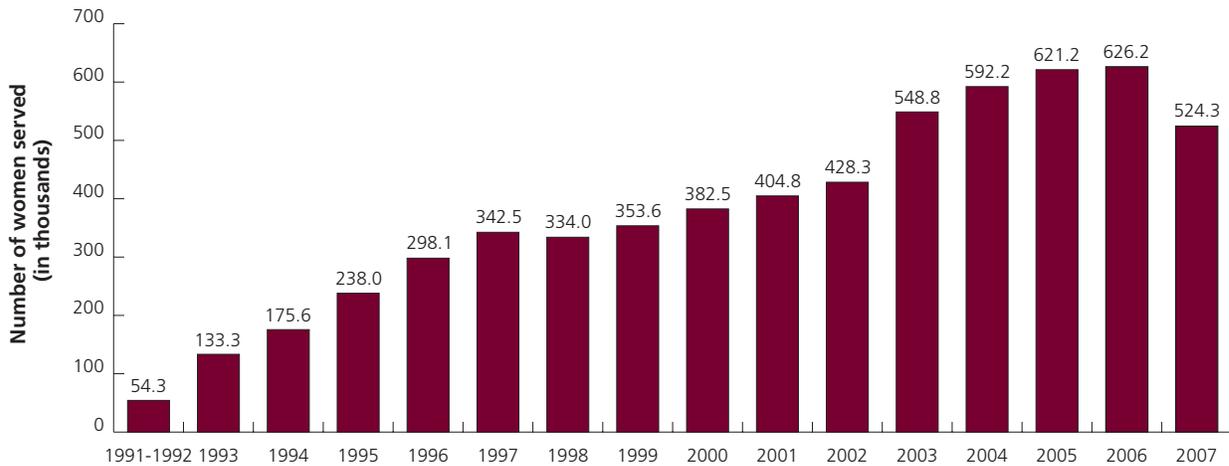
### Pap Test Screening in the US

- According to data from the NHIS,<sup>184</sup> 79.6% of women 18 years and older reported having a Pap test within the past three years in 2005, up from 74% in 1987. Increases in Pap test use have occurred among women of all racial and ethnic groups (Figure 4B).
- In 2005, the prevalence of recent Pap test use varied by race and ethnicity: white women (81.4%) were most likely to have had a recent test and Asian women (65.8%) were least likely (Table 4C).
- In 2005, the prevalence of recent Pap test use was lowest among older women (59.1%), women with no health insurance (61.4%), and recent immigrants (66.8%), (Table 4C).

### State-level Pap Test Screening

- Across the states surveyed by the BRFSS in 2006 (Table 4D), the recent Pap test percentage among women aged 18 and older with an intact uterus was 83.7 %, ranging from 73.4% in Utah to 89% in Maine and the District of Columbia.

**Figure 4C. Number of Women Screened\* in the National Breast and Cervical Cancer Early Detection Program (NBCCEDP), 1991-2007†**



\*Those who received NBCCEDP-funded Pap test, mammogram, or clinical breast exam. †In Program Years, defined as July 1 through June 30.

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## Programs to Increase the Rate of Breast and Cervical Cancer Screening

The CDC's National Breast and Cervical Cancer Early Detection Program (NBCCEDP) provides low-income, uninsured women with access to timely, high-quality screening exams for the early detection of breast and cervical cancers and diagnostic services.<sup>205</sup> The program is currently implemented in all 50 states, the District of Columbia, five US territories, and 12 American Indian/Alaska Native organizations. About 50% of the women screened have been from racial/ethnic minority groups. Since 1991, the NBCCEDP has served more than 3.2 million women, provided more than 7.8 million screening examinations, and diagnosed more than 35,000 breast cancers, 114,000 precancerous cervical lesions, and 2,161 cases of invasive cervical cancer.<sup>205</sup>

In addition to locating women eligible to receive services, state programs funded by NBCCEDP conduct outreach to priority populations (i.e., older women for breast cancer screening, women rarely or never screened for cervical cancer, and racial and ethnic minority women). Reaching priority populations can be difficult and costly and requires ongoing efforts with community partners and health care providers.<sup>205</sup> In contrast to an early period of the program's growth between 1991 to 2005, in recent years the numbers

of eligible women served by the NBCCEDP have been steady (Figure 4C). The CDC estimates that the program is currently reaching approximately 13% of the estimated 4 million US women, aged 40 to 64 years who are low-income uninsured and/or are underinsured.<sup>189</sup> The total funding available for the NBCCEDP program has remained flat since fiscal year 2005 at \$200 million (despite an authorization level of \$225 million). In recognition of the limited program resources, the CDC is assisting state programs in finding way to enhance program efficiencies through economic evaluation studies.<sup>206</sup> The Society and its nonprofit, nonpartisan advocacy affiliate, the American Cancer Society Cancer Action Network<sup>SM</sup> (ACS CAN), continue to advocate for additional NBCCEDP funding from Congress and are also partnering with state health departments and other key organizations to implement best practices in communities that could strengthen the NBCCEDP.

The 2000 Breast and Cervical Cancer Prevention and Treatment Act has given states the option to provide Medicaid coverage of medical assistance and follow-up and treatment for women diagnosed with cancer through the NBCCEDP; all 50 states and the District of Columbia have elected to provide this coverage.<sup>205</sup> Currently, the Society and ACS CAN are working to ensure that state Medicaid dollars supporting the treatment program are protected.

**Table 4D. Pap Test, Women 18 and Older, by State, US, 2006**

	% Recent Pap Test*				
	18 years and older	18 to 64 years	65 years and older	No usual source of medical care <sup>†</sup>	No health insurance <sup>‡</sup>
Alabama	82.7	83.9	74.8	76.0	72.7
Alaska	86.4	87.1	77.7	72.8	77.6
Arizona	83.8	85.4	70.9	75.6	69.7
Arkansas	79.9	82.1	66.1	70.0	69.9
California	83.5	84.9	71.8	77.1	76.8
Colorado	84.9	86.4	69.3	70.8	74.9
Connecticut	86.8	90.0	69.4	75.3	76.6
Delaware	88.7	91.2	74.1	78.2	71.0
Dist. of Columbia	89.0	90.1	80.4	81.4	82.2
Florida	82.7	84.5	73.5	70.5	71.4
Georgia	87.2	88.0	78.7	76.9	76.1
Hawaii	81.9	83.3	73.4	66.0	64.1
Idaho	76.4	78.5	56.7	63.1	74.0
Illinois	83.4	86.2	63.3	69.6	70.0
Indiana	80.7	82.9	65.7	67.1	69.5
Iowa	85.9	89.0	68.6	72.1	76.3
Kansas	83.0	85.5	65.3	67.7	69.7
Kentucky	82.6	84.4	66.2	70.2	69.3
Louisiana	83.9	85.0	74.7	72.0	77.5
Maine	89.0	91.9	72.6	66.4	78.1
Maryland	87.7	89.0	76.9	71.8	73.2
Massachusetts	87.7	90.1	73.4	71.3	70.3
Michigan	85.5	86.6	78.3	62.5	68.4
Minnesota	86.0	88.0	73.0	71.9	82.6
Mississippi	83.6	86.4	61.9	76.1	81.0
Missouri	79.6	82.4	63.2	65.4	69.9
Montana	81.8	83.4	71.4	70.1	72.3
Nebraska	81.1	84.3	62.3	74.6	76.4
Nevada	81.7	83.8	64.8	73.5	79.9
New Hampshire	87.8	89.8	73.3	63.1	77.9
New Jersey	83.7	86.5	67.9	72.6	73.3
New Mexico	82.6	85.1	63.1	73.5	74.3
New York	85.2	87.1	74.1	76.4	73.6
North Carolina	86.5	88.2	74.6	78.6	78.6
North Dakota	84.0	86.5	71.2	76.4	76.0
Ohio	83.0	85.2	68.6	73.3	59.4
Oklahoma	78.6	81.2	58.9	66.1	67.9
Oregon	83.2	85.4	66.5	76.4	78.0
Pennsylvania	82.6	85.4	67.9	67.9	67.7
Rhode Island	87.5	90.5	70.1	74.1	80.1
South Carolina	86.3	87.6	77.6	73.5	75.8
South Dakota	84.7	88.2	66.8	77.0	76.2
Tennessee	85.7	88.3	65.9	72.3	75.5
Texas	79.9	80.3	76.5	70.9	70.6
Utah	73.4	74.4	61.7	58.6	58.7
Vermont	86.8	89.3	72.1	66.9	73.7
Virginia	85.4	87.6	67.6	80.9	74.1
Washington	83.6	85.6	67.3	71.7	73.0
West Virginia	83.3	86.1	68.0	72.9	76.1
Wisconsin	85.7	88.6	68.2	67.2	63.1
Wyoming	80.2	81.9	66.9	66.6	67.4
United States <sup>§</sup>	83.7	85.6	70.8	72.8	72.8
Range	73.4-89.0	74.4-91.9	56.7-80.4	58.6-81.4	58.7-82.6

\*A Pap test within the past three years for women with intact uteri. †Women 18 and older who reported that they did not have a personal doctor or health care provider. ‡Women aged 18 to 64 who reported that they did not have any kind of health care coverage, including health insurance, prepaid plans such as HMOs, or government plans such as Medicare. §See Statistical Notes for definition.

**Source:** Behavioral Risk Factor Surveillance System Public Use Data Tape 2006, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 2007.

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## Colorectal Cancer Screening

Colorectal cancer is the third leading cause of cancer death in the US in men and women. Promoting colorectal cancer screening is a major priority for the American Cancer Society because screening can reduce death rates from colorectal cancer both by preventing the disease and by detecting it at earlier, more treatable stages. The relative five-year survival is 90% for colorectal cancer patients diagnosed at an early, localized stage; however, only 40% of cases are diagnosed at this stage.<sup>1</sup> Colorectal cancer is one of the few cancers that can also be prevented through screening because precancerous polyps, from which colon cancers often develop, can be identified and removed.<sup>207, 208</sup> Of the 49,920 people expected to die of colorectal cancers in 2009, early detection could save more than half.<sup>209</sup> In the past several years, there has been unprecedented progress in reducing colorectal cancer incidence and death rates in most US population groups; progress that has come about through prevention of colorectal cancer, early detection and improved treatments. (For more information refer to the *Colorectal Cancer Facts & Figures, Special Edition 2008-2010* (available at [cancer.org/downloads/STT/F861708\\_finalforweb.pdf](http://cancer.org/downloads/STT/F861708_finalforweb.pdf).)

The American Cancer Society and other organizations have independently developed and promoted colorectal cancer screening guidelines for more than two decades. Recently, the Society, the American College of Radiology, and the US Multisociety Task Force on Colorectal Cancer (a consortium representing the American College of Gastroenterology, the American Society of Gastrointestinal Endoscopy, and the American Gastroenterological Association) all collaborated on updated consensus guidelines released in March 2008. The new guidelines categorize screening methods into two distinct groups: tests that primarily detect cancer and tests that detect both cancer and precancerous adenomatous polyps (and thus have a greater potential to contribute to cancer prevention). The new guidelines also highlight the potential of some newer screening methods as well as the importance of quality in colorectal cancer screening by delineating a number of quality factors required to attain optimal benefits from screening. As with previous guidelines, there are several recommended options for colorectal cancer screening. (For American Cancer Society screening guidelines, see sidebar, page 35.) Methods in the cancer detection group consist of stool home-test kits – the guaiac-based fecal occult blood test (gFOBT) and the fecal immunochemical test (FIT) – and

**Table 4E. Colorectal Cancer Screening, Adults 50 and Older, US, 2005**

Characteristic	% Fecal Occult Blood Test**§	% Endoscopy†§	% Combined FOBT/Endoscopy‡§
<b>Gender</b>			
Male	12.7	44.6	48.2
Female	11.7	42.0	45.8
<b>Age (years)</b>			
50-64	10.6	37.7	41.8
65+	13.8	49.5	52.7
<b>Race/ethnicity</b>			
White (non-Hispanic)	12.6	45.8	49.5
African American (non-Hispanic)	10.3	36.9	40.1
Hispanic/Latino	9.4	28.3	31.9
American Indian/Alaska Native¶	5.8	31.7	34.4
Asian#	10.8	28.3	33.8
<b>Education (years)</b>			
11 or fewer	8.9	32.4	35.0
12	11.2	39.9	44.0
13 to 15	13.8	46.3	50.5
16 or more	15.3	53.7	57.3
<b>Health insurance coverage</b>			
Yes	12.7	45.0	48.8
No	3.1	13.1	14.9
<b>Immigration**</b>			
Born in US	12.5	44.7	48.5
Born in US Territory	12.8	43.4	48.1
In US fewer than 10 years	2.6	13.6	15.7
In US 10 years or more	9.1	31.3	34.0
<b>Total</b>	<b>12.1</b>	<b>43.1</b>	<b>46.8</b>

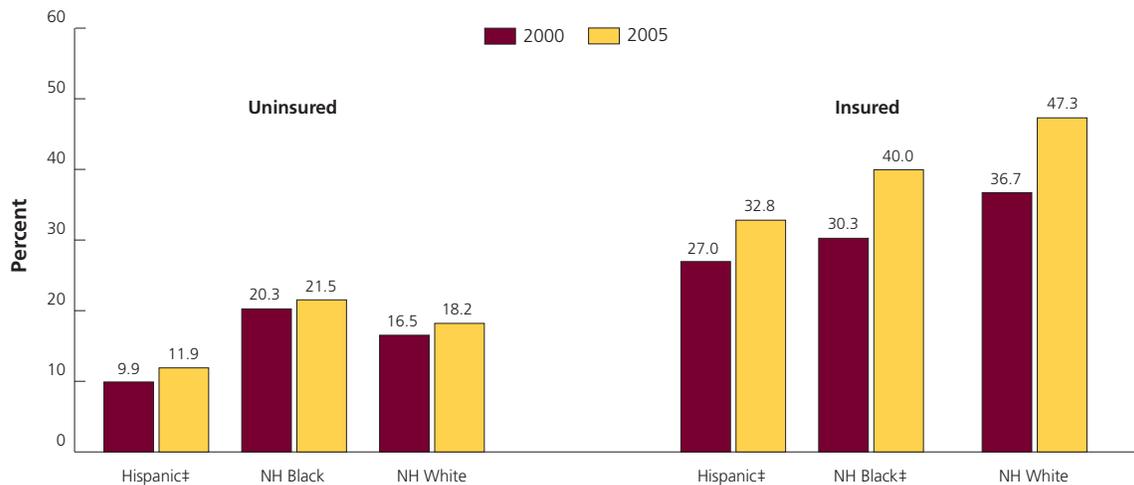
\*A home fecal occult blood test within the past year. †A sigmoidoscopy within the past five years or a colonoscopy within the past 10 years. ‡Either a fecal occult blood test within the past year, sigmoidoscopy within the past five years or a colonoscopy within the past 10 years. §Percentages are age-adjusted to the 2000 US standard population. See Statistical Notes for more information. ¶Estimates should be interpreted with caution because of the small sample sizes. #Does not include Native Hawaiians or other Pacific Islanders. \*\*Definition has changed such that individuals born in the US or in a US territory are reported separately from individuals born outside the US. Individuals born in a US territory have been in the US for any length of time.

**Source:** National Health Interview Survey Public Use Data File, 2005, National Center for Health Statistics, Centers for Disease Control and Prevention, 2006.

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the stool DNA test. The methods for structural examinations include flexible sigmoidoscopy, colonoscopy, CT colonography, and double-contrast barium enema, which not only find cancer, but also are more likely to result in the detection and removal of adenomatous polyps/lesions, which are associated with an increased risk of colorectal cancer.<sup>207</sup>

**Figure 4D. Colorectal Cancer Screening\*, Adults 50 to 64 years, by Race and Ethnicity and Insurance Status†, US, 2000, 2005**



\*Either a fecal occult blood test within the past year or sigmoidoscopy in the past 5 years or colonoscopy within the past 10 years. Estimates are age-adjusted to the 2000 US standard population. †The uninsured are those who did not report having health insurance at the time of the interview. ‡Uninsured: NH Whites are significantly more likely to have been tested than Hispanics (2000 and 2005). Insured: NH Whites are significantly more likely to have been tested than Hispanics and NH Blacks (2000 and 2005).

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## Colorectal Cancer Screening in the US

Although utilization is improving, colorectal cancer screening prevalence continues to lag behind use of mammography and Pap testing.<sup>187, 210-212</sup> According to the 2005 NHIS:

- Among adults aged 50 and older, the use of any colorectal cancer (CRC) testing within recommended time intervals (either an FOBT within the past year or a sigmoidoscopy within the past five years or a colonoscopy within the past 10 years) increased between 2000 (38%) and 2005 (47%). The increase appears to be due entirely to an increase in use of endoscopy procedures<sup>211</sup> for CRC testing (in 2005: 43%) while use of FOBT testing declined (in 2005: 12%).(Table 4E)
- People with no health insurance coverage have significant access barriers, and as a result are less likely to be up-to-date with CRC screening compared to their insured counterparts. Between 2000 and 2005, there were significant increases in the use of CRC screening within recommended time intervals across race and ethnic groups of insured adults (aged 50 to 64 years). In contrast, there were no significant increases in CRC screening among any uninsured race and ethnic group. The largest increases in CRC screening utilization occurred among insured Non-Hispanic whites (Figure 4D).

- In 2005, the prevalence of colorectal cancer screening varied by race, education, health insurance coverage, and immigration status; those without health insurance, those with less than a high school education, Hispanics, and immigrants who had been in the US for fewer than 10 years were the least likely to have had a colorectal cancer screening test (Table 4E).

## State-level Colorectal Cancer Screening

- Across the states surveyed in 2006, the recent fecal occult blood test percentages for adults aged 50 and older ranged from 10.5% in Alaska to 22.4% in Maine and 22.5% in the District of Columbia (Table 4F). Colorectal cancer screening with endoscopy tests (either a sigmoidoscopy or colonoscopy within the past 10 years) ranged from 46.6% in Mississippi and Louisiana to 66.4% in Rhode Island (Table 4F).

The recent increases in colorectal cancer screening may be attributed to multiple efforts to increase awareness of the importance of colorectal cancer screening, expansions in coverage for colonoscopy screening by Medicare since 2001, changes in private health plans screening policies as a result of state legislation, and the establishment of screening programs in certain states.<sup>210, 211</sup> However, further efforts to increase utilization are needed, especially for persons with lower socioeconomic status who are more likely to lack health care

**Table 4F. Colorectal Cancer Screening, Adults 50 and Older, by State, US, 2006**

	% Recent Fecal Occult Blood Stool Test*					% Recent Sigmoidoscopy or Colonoscopy†					2006 Combined FOBT/ Endoscopy past 10 years¶
	50 years and older	50 to 64 years	65 years and older	No usual source of medical care‡	No health insurance§	50 years and older	50 to 64 years	65 years and older	No usual source of medical care‡	No health insurance§	
Alabama	15.3	14.4	16.6	8.0	7.7	49.9	42.8	59.7	25.8	26.2	54.5
Alaska	10.5	9.0	14.6	2.7	8.9	49.0	45.8	58.0	33.8	25.8	51.4
Arizona	18.9	15.2	23.4	8.2	7.3	53.3	45.8	62.6	28.9	29.1	59.0
Arkansas	15.4	13.7	17.7	10.2	8.8	48.0	42.0	55.8	24.2	19.0	52.7
California	15.5	12.1	20.7	4.1	1.8	53.9	47.3	64.2	21.5	8.0	57.8
Colorado	18.8	16.4	23.0	7.2	8.6	53.1	48.3	61.5	19.3	18.0	59.1
Connecticut	18.0	15.6	21.2	2.9	7.6	66.2	62.4	71.4	38.5	42.8	69.7
Delaware	14.4	13.1	16.1	11.2	7.1	65.7	60.8	72.4	38.7	38.5	69.1
Dist. of Columbia	22.5	19.6	26.6	8.0	9.1	62.0	54.3	72.5	40.7	30.9	65.6
Florida	21.9	17.2	26.9	9.9	9.4	56.1	47.8	64.7	30.8	25.7	61.6
Georgia	17.8	16.2	20.5	10.7	11.7	53.9	47.9	63.9	24.6	27.8	58.5
Hawaii	19.1	17.7	21.0	4.0	7.3	50.0	42.8	60.1	18.9	21.8	54.7
Idaho	13.3	11.4	16.1	5.1	7.3	50.1	42.2	61.9	24.5	14.8	54.5
Illinois	12.8	9.9	16.9	6.0	8.7	51.9	44.6	62.1	22.3	23.9	55.8
Indiana	13.3	10.9	16.6	8.6	6.5	52.0	44.9	62.1	23.1	20.9	55.8
Iowa	15.5	13.8	17.6	3.3	4.5	51.8	45.3	60.2	15.2	17.7	57.0
Kansas	16.6	13.1	21.3	5.9	4.3	51.7	46.4	58.7	16.1	17.5	57.2
Kentucky	13.4	11.4	16.4	6.3	5.6	55.8	52.4	60.9	33.1	28.8	58.7
Louisiana	16.7	14.4	20.3	10.4	10.5	46.6	41.0	55.0	22.4	22.9	52.5
Maine	22.4	19.2	26.9	5.3	9.6	60.8	56.7	66.6	23.1	27.7	66.9
Maryland	19.0	16.2	23.2	8.5	7.1	63.0	58.0	70.6	34.5	31.4	66.9
Massachusetts	18.6	14.5	24.0	3.5	6.9	63.5	58.8	69.7	24.9	23.3	66.9
Michigan	17.6	15.6	20.5	7.3	8.6	61.7	57.3	68.0	29.5	28.0	65.7
Minnesota	14.5	10.9	19.8	4.7	4.3	66.2	60.4	74.7	37.8	24.5	68.6
Mississippi	14.6	11.5	19.0	7.0	8.0	46.6	41.4	54.0	21.1	23.5	50.6
Missouri	13.0	11.0	15.7	6.3	5.1	53.9	49.0	60.6	19.7	25.0	58.5
Montana	17.6	16.5	19.2	8.2	6.7	48.5	40.1	61.3	25.9	18.0	55.0
Nebraska	18.1	14.7	22.5	8.4	7.5	47.8	42.2	54.9	21.1	22.8	54.9
Nevada	17.5	14.8	21.6	8.5	5.1	48.6	44.8	54.4	19.7	19.6	53.1
New Hampshire	19.6	15.7	25.7	9.7	11.3	61.5	57.3	68.0	22.1	23.5	66.1
New Jersey	14.3	11.3	18.4	5.3	7.4	55.2	50.5	61.4	28.9	24.8	59.0
New Mexico	13.0	10.8	16.4	4.9	6.6	49.0	43.1	57.8	23.0	23.1	53.5
New York	15.1	13.5	17.4	6.7	12.7	60.7	56.3	66.6	26.8	31.4	64.0
North Carolina	20.7	17.6	25.0	6.7	11.3	58.8	54.2	65.3	28.5	30.7	64.0
North Dakota	15.1	13.0	17.7	8.0	13.3	51.9	43.3	62.7	28.8	26.2	56.0
Ohio	15.6	13.7	18.2	7.6	14.9	53.5	48.1	61.3	24.3	38.0	57.7
Oklahoma	13.0	10.8	16.0	8.1	9.4	47.1	40.6	56.0	16.2	20.9	51.2
Oregon	18.8	15.9	23.2	6.6	5.7	57.0	49.8	67.7	26.3	25.1	61.6
Pennsylvania	14.1	10.4	18.6	4.0	10.6	55.2	50.9	60.3	26.0	35.2	59.5
Rhode Island	17.5	14.3	21.6	7.8	11.0	66.4	61.9	72.2	32.8	33.0	69.2
South Carolina	14.5	13.4	16.1	11.1	8.4	56.0	50.4	63.9	25.5	33.9	60.0
South Dakota	14.4	11.5	17.7	7.4	6.1	52.7	44.3	62.5	29.1	28.0	57.1
Tennessee	15.7	13.7	18.7	10.2	9.0	53.4	49.4	59.4	24.4	31.6	57.9
Texas	13.5	11.6	16.5	4.6	7.3	52.2	45.1	63.6	28.6	21.7	55.8
Utah	6.6	5.1	8.9	2.1	2.5	59.3	53.5	67.9	35.8	28.5	60.7
Vermont	16.8	13.6	21.7	10.1	11.6	62.0	57.7	68.8	22.7	31.1	66.6
Virginia	16.3	13.9	20.1	8.6	5.6	62.6	57.5	71.0	27.5	35.5	65.1
Washington	20.5	17.2	25.7	7.3	9.5	59.4	53.3	69.4	29.1	26.0	64.0
West Virginia	18.6	17.0	20.6	11.9	16.4	49.7	45.6	55.0	26.5	23.3	56.1
Wisconsin	12.6	10.0	16.0	2.6	6.1	60.3	55.1	67.4	23.4	39.2	63.3
Wyoming	12.8	12.2	13.8	5.9	7.9	47.9	41.3	58.5	27.4	17.8	52.2
United States#	16.1	13.4	20.0	6.6	7.9	55.6	49.8	63.8	26.0	24.5	59.8
Range	6.6-22.5	5.1-19.6	8.9-26.9	2.1-11.9	1.8-16.4	46.6-66.4	40.1-62.4	54.0-74.7	15.2-40.7	8.0-42.8	50.6-69.7

\*A fecal occult blood test within the past year. †A sigmoidoscopy or colonoscopy within the past 10 years. ‡Adults 50 and older who reported that they did not have a personal doctor or health care provider. §Adults 50 to 64 who reported that they did not have any kind of health care coverage, including health insurance, prepaid plans such as HMOs, or government plans such as Medicare. ¶A fecal occult blood test within the past year or a sigmoidoscopy or colonoscopy within the past 10 years. Note: The colorectal cancer screening prevalence estimates do not distinguish between examinations for screening or diagnosis. #See Statistical Notes for definition.

Source: Behavioral Risk Factor Surveillance System Public Use Data Tape 2006, National Center for Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 2007.

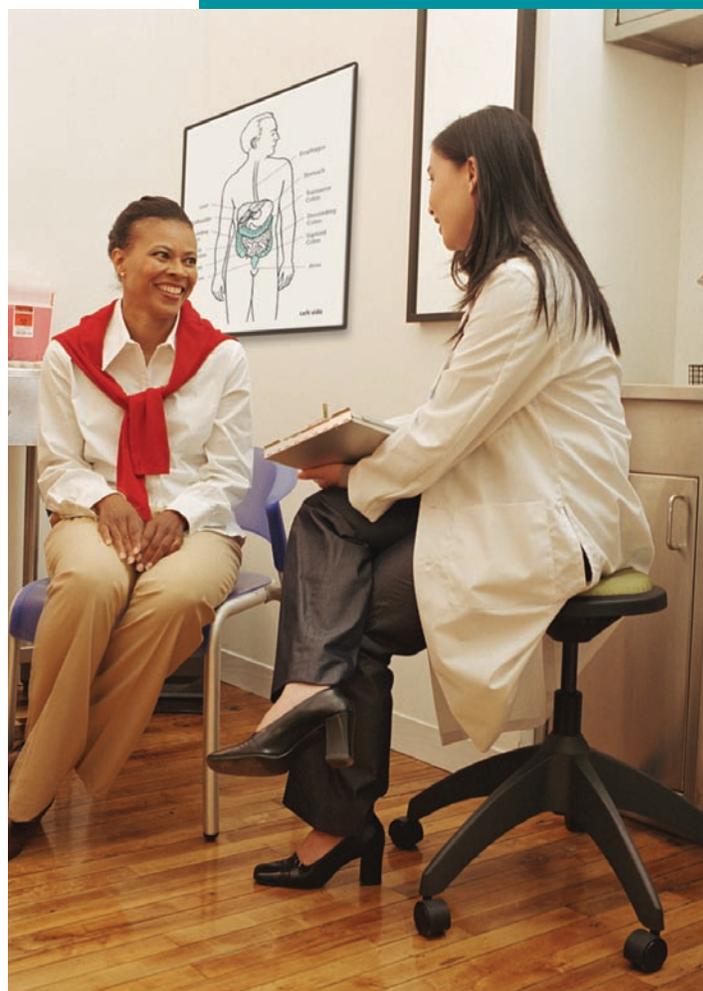


The Society and ACS CAN are currently involved in advocacy efforts at the federal level to eliminate the current cost sharing Medicare requires for mammography and colonoscopy services. Since 2005, for all new beneficiaries Medicare has covered an initial preventive physical exam (the “Welcome to Medicare” visit), which includes colorectal cancer screening. The Society and ACS CAN have been fighting to improve access to cancer screening for seniors and beginning January 1, 2009, Medicare beneficiaries will have a full year to schedule a “Welcome to Medicare” visit. The time expansion will give beneficiaries more time to realize they have this benefit and give doctors enough time to fit an in-depth visit into their schedules.

### Initiatives

The National Colorectal Cancer Roundtable (NCCRT), co-founded by the Society and the CDC, is a national coalition of public, private, and voluntary organizations, and invited experts dedicated to reducing the incidence of – and mortality from – colorectal cancer in the US through coordinated leadership, strategic planning, and advocacy. The Roundtable works as a catalyst to stimulate key member organizations to act earlier, more effectively, and collaboratively in the area of colorectal cancer. The Roundtable taps into the expertise of its member organizations to create tools, conduct studies, develop consensus on outreach, and support projects that can advance the community’s overall work in this area. Many of these projects, such as the creation of the blue star symbol to signify the fight against colon cancer, the development of a colorectal cancer Clinician’s Evidence-Based Toolbox and Guide, and the development of a study designed to measure how increasing screening rates in individuals aged 50 to 64 years will decrease Medicare colorectal cancer costs, fill a key need among collaborating partners. Such initiatives enhance the efforts of each member organization, including the Society, and create a multiplier effect in the community’s work against the disease.

The American Cancer Society has launched an aggressive outreach effort to health care providers to remind them about their crucial role in getting patients screened for colorectal cancer. This outreach includes the newly implemented Society-NCCRT Colorectal Cancer Speaker Bureau (a cadre of knowledgeable, trained physicians available to speak on colorectal cancer



science, practice, and resources in a wide variety of settings), articles and advertisements in medical journals, a direct e-mail campaign, and working with health plans to reach their contracted providers. (More information on health professional resources is available at [cancer.org/colonmd](http://cancer.org/colonmd).)

The American Cancer Society has ongoing advertising campaigns to raise awareness and to encourage consumers to talk with their doctors about colorectal cancer testing. In addition, the Society has developed an educational video and an information resource kit explaining the various colorectal cancer screening options to help consumers talk with their physicians and decide what is best for them. (More information on these and other programs can be found in the *Colorectal Cancer Facts & Figures, Special Edition 2008-2010* (available at [cancer.org/docroot/STT/F861708\\_finalforweb.pdf](http://cancer.org/docroot/STT/F861708_finalforweb.pdf).)

## Prostate Cancer Early Detection Testing

Among US men, cancer of the prostate is the most common type of cancer (other than skin cancer) and the second leading cause of cancer death. Although declining mortality trends for prostate cancer suggest that early detection using the prostate-specific antigen test (PSA, a blood test to assess the levels of a protein made by the prostate) or digital rectal exam (DRE) may be beneficial, most experts agree that the current evidence is insufficient to recommend for or against population routine testing for early prostate cancer detection.<sup>169, 170</sup> The American Cancer Society recommends that clinicians talk with men about the potential benefits and possible harms of prostate screening and offer the PSA test and the DRE annually, beginning at age 50, to men who are at average risk with a life expectancy of at least 10 years.<sup>169, 218</sup> Men at high risk of developing prostate cancer (African Americans or men with a strong family history) should have this discussion with their clinician beginning at age 45.

### Prostate Cancer Testing in the US

According to the 2005 NHIS:

- The prevalence of having a PSA test in men aged 50 and older within the past year was 40.7% (Table 4G).
- Among men aged 50 and older the least likely to have a PSA test were those who had no health insurance (12.5%), followed by those with less than a high school education (28.6%) (Table 4G).
- Based on the 2000 NHIS, among men who reported testing for early prostate cancer detection, 67% of men aged 50 to 74 years and 66.5% of men aged 75 and older said they had a discussion about the advantages and disadvantages of the test with their doctor before PSA testing.<sup>219</sup>

### State-level Prostate Cancer Testing

Across states (Table 4H), the prevalence of recent PSA testing in 2006 for men aged 50 and older ranged from 41.6% in Hawaii to 62.4% in Delaware. The recent DRE percentages in 2006 for men aged 50 and older ranged from 35.5% in Hawaii to 68.8% in Rhode Island. For both of these tests, use is greater among men 65 and older than in those 50 to 64 years old. Across all states, men aged 50 years and older who lack a usual source of care and uninsured men aged 50 to 64 years were significantly less likely to have had a recent PSA or a DRE.

**Table 4G. Prostate Cancer Screening, Men 50 and Older, US, 2005**

Characteristic	% PSA in the past year**
<b>Race/ethnicity</b>	
White (non-Hispanic)	42.9
African American (non-Hispanic)	33.5
Hispanic/Latino	29.7
American Indian/Alaska Native <sup>†</sup>	44.9
Asian <sup>§</sup>	29.6
<b>Education (years)</b>	
11 or fewer	28.6
12	37.2
13 to 15	44.4
16 or more	49.8
<b>Health insurance coverage</b>	
Yes	42.3
No	12.5
<b>Immigration</b>	
Born in US	42.2
Born in US Territory <sup>¶</sup>	25.1
In US fewer than 10 yrs <sup>‡</sup>	34.1
In US 10+ years	30.0
<b>Total</b>	<b>40.7</b>

\*A prostate-specific antigen test within the past year for men 50 and older who did not report that they had ever been diagnosed with prostate cancer. Note: The 2005 estimate for PSA screening is not comparable to estimates from 2003 and prior. In 2005, questions assessing PSA screening were asked among all men 40 or older, whereas prior to 2005 these questions were asked only of men 40 or older who reported ever having **heard** of a PSA test. †Percentages are age-adjusted to 2000 US standard population. See Statistical Notes for more information. ‡Estimates should be interpreted with caution because of the small samples sizes. §Does not include Native Hawaiians and other Pacific Islanders. ¶Definition has changed such that individuals born in the US or in a US territory are reported separately from individuals born outside the US. Individuals born in a US territory have been in the US for any length of time.

**Source:** National Health Interview Survey Public Use Data File 2005, National Center for Health Statistics, Centers for Disease Control and Prevention, 2006.

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## Cancer Screening Obstacles and Opportunities to Improve Participation

People who lack health insurance have less access to preventive care and are less likely to get timely cancer screening examinations.<sup>220</sup> Furthermore, studies have shown that those who lack health insurance are more likely to be diagnosed at an advanced stage of cancer, when treatment is more expensive and survival rates are much lower.<sup>179, 188</sup> These patients face much more difficult and far more extensive medical treatments, as well as a diminished quality of life – avoidable outcomes if they had the same level of access as insured patients to the current advances in cancer prevention, detection, and treatment options.

**Table 4H. Prostate Cancer Test Use, Men 50 and Older, by State, US, 2006**

	% Recent Prostate-specific Antigen Test*					% Recent Digital Rectal Exam†				
	50 years and older	50 to 64 years	65 years and older	No usual source of medical care‡	No health insurance§	50 years and older	50 to 64 years	65 years and older	No usual source of medical care‡	No health insurance§
Alabama	53.9	48.0	64.3	26.0	¶	42.4	37.1	51.6	12.8	¶
Alaska	43.8	41.8	51.4	20.5	¶	44.0	41.3	52.7	19.9	¶
Arizona	56.6	50.1	66.0	32.2	37.1	51.0	44.4	60.7	22.8	33.0
Arkansas	53.5	48.1	62.2	20.2	29.8	47.8	43.0	55.4	18.7	24.6
California	48.6	42.2	61.0	20.0	26.1	46.3	42.9	53.0	19.5	14.2
Colorado	55.9	53.7	60.5	24.6	27.9	51.2	49.5	55.0	27.5	23.8
Connecticut	55.6	49.9	66.4	18.5	34.7	60.3	56.0	68.5	18.2	32.9
Delaware	62.4	54.8	74.7		¶	58.7	51.0	71.4	¶	¶
Dist. of Columbia	55.2	49.9	65.2	23.8	¶	58.4	56.4	62.1	28.3	¶
Florida	60.7	53.6	69.8	26.5	26.0	52.4	48.2	57.8	27.7	25.8
Georgia	57.4	52.7	67.7	26.0	30.9	51.8	49.8	56.1	25.7	35.8
Hawaii	41.6	36.4	50.2	10.3	7.5	35.5	33.1	39.7	11.5	12.5
Idaho	52.0	47.6	60.3	29.5	16.8	46.4	42.9	53.4	24.6	18.2
Illinois	52.8	46.5	64.7	13.0	33.5	48.0	43.0	57.4	14.5	32.9
Indiana	50.5	42.9	64.5	30.7	20.7	43.7	38.1	54.2	22.5	18.1
Iowa	51.1	44.8	62.0	25.4	¶	47.5	43.9	53.5	20.7	¶
Kansas	55.2	47.2	68.5	21.9	20.5	49.4	43.9	58.8	15.7	17.8
Kentucky	51.0	46.3	60.3	22.7	13.8	45.2	41.8	51.9	22.9	11.6
Louisiana	53.1	49.5	60.1	27.6	25.9	39.9	35.8	47.8	16.6	15.4
Maine	49.6	47.6	53.0	19.6	24.7	59.9	58.7	61.9	17.9	29.0
Maryland	57.1	51.3	67.9	28.9	22.4	56.4	49.8	69.1	23.9	23.5
Massachusetts	55.9	51.7	63.6	27.7	29.0	59.5	56.6	64.5	21.0	9.7
Michigan	59.3	56.8	64.3	22.8	17.2	54.8	52.6	59.1	21.2	11.0
Minnesota	53.3	46.3	67.1	25.0	¶	53.7	50.1	60.6	27.0	¶
Mississippi	53.1	49.5	59.7	27.7	38.7	46.8	43.5	52.7	22.4	30.1
Missouri	51.3	43.7	64.8	21.7	19.9	43.3	39.2	50.5	16.8	15.3
Montana	56.7	53.9	61.8	28.9	27.8	54.4	49.9	62.8	32.3	29.5
Nebraska	53.4	46.9	64.4	17.7	24.0	46.3	41.3	54.7	18.5	15.5
Nevada	52.6	42.5	72.4	17.9	16.4	40.2	34.5	50.7	9.6	16.2
New Hampshire	53.3	47.0	66.0	19.9	19.0	61.1	57.7	68.0	30.0	26.0
New Jersey	58.0	52.4	68.1	27.0	23.9	48.5	43.1	58.3	25.0	17.5
New Mexico	46.3	41.8	54.4	19.4	20.0	43.1	40.9	47.2	15.6	22.1
New York	53.6	49.1	61.9	26.7	25.9	50.1	45.7	58.4	24.1	24.2
North Carolina	56.1	50.5	66.8	22.4	30.5	56.0	53.7	60.4	26.5	34.9
North Dakota	49.2	43.3	59.6	33.7	33.7	47.0	44.4	51.6	31.6	26.0
Ohio	58.4	55.4	64.1	14.9	32.1	57.8	57.7	58.1	20.5	33.0
Oklahoma	49.2	44.9	56.7	21.6	21.0	41.0	37.7	46.9	18.9	19.4
Oregon	49.6	42.8	62.2	17.0	20.1	49.0	44.5	57.5	14.9	21.1
Pennsylvania	52.8	47.6	61.0	28.1	36.1	51.0	46.2	58.7	18.7	25.6
Rhode Island	61.9	59.2	66.8	22.5	¶	68.8	67.2	71.7	35.3	¶
South Carolina	54.4	49.0	64.0	23.0	26.7	49.1	43.1	59.9	24.2	24.7
South Dakota	55.1	49.3	64.1	33.6	25.8	50.2	45.7	57.5	29.5	21.8
Tennessee	52.3	48.7	59.4	30.0	41.3	48.5	46.5	52.7	34.7	35.9
Texas	54.5	52.0	59.5	32.0	30.4	49.6	45.2	58.9	26.4	17.3
Utah	47.8	42.0	58.7	27.6	38.9	43.5	40.7	48.8	20.1	37.2
Vermont	47.3	43.1	55.6	14.7	26.8	52.0	50.2	55.5	16.6	28.4
Virginia	53.9	47.0	67.4	27.0	27.1	53.3	50.4	59.1	21.0	28.2
Washington	48.3	43.1	58.8	13.5	18.3	49.8	46.5	56.6	17.1	18.8
West Virginia	53.9	49.2	61.6	23.3	¶	45.4	41.0	52.8	23.2	¶
Wisconsin	47.6	41.7	58.1	15.8	26.1	48.4	44.5	55.2	18.3	32.2
Wyoming	59.3	55.2	67.7	31.1	38.1	38.6	35.9	44.0	15.4	26.6
United States#	53.8	48.5	63.4	24.0	27.0	50.0	46.2	56.9	22.1	22.5
Range	41.6-62.4	36.4-59.2	50.2-74.7	10.3-33.7	7.5-41.3	35.5-68.8	33.1-67.2	39.7-71.7	9.6-35.3	9.7-37.2

\*A prostate-specific antigen test within the past year for men 50 and older who reported they were not told by a doctor, nurse, or other health professional they had prostate cancer. †A digital rectal exam within the past year for men 50 and older who reported they were not told by a doctor, nurse, or other health professional they had prostate cancer. #Men 50 and older who reported that they did not have a personal doctor or health care provider. §Men 50 to 64 who reported they did not have any kind of health care coverage, including health insurance, prepaid plans such as HMOs, or government plans such as Medicare. ¶Sample size is insufficient to provide a stable estimate. #See Statistical Notes for definition.

**Source:** Behavioral Risk Factor Surveillance System Public Use Data Tape 2006, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 2007.

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In people aged 65 and older, health insurance coverage is nearly universal because of the Medicare program.<sup>215, 221</sup> In contrast, health insurance coverage in the population under the age of 65 varies depending on age, employment status, and other factors and so it is that in this population the uninsured are over-represented. For example, 19.3% of adults aged 18 to 64 had no health insurance coverage in 2006.<sup>222</sup> As a group, uninsured adults are more likely to have a lower income, to be Hispanic or African American, or have less education.<sup>220, 223</sup> Among adults 18 to 64, it is estimated that 8% had Medicaid coverage and 64.2% had employer-sponsored coverage.<sup>224</sup> Even among the employed, changes in employment status can also affect health care coverage.<sup>221</sup> Despite recent efforts to expand coverage, the number of uninsured Americans is at nearly 46 million and millions more face shrinking coverage, higher deductibles, and periods without insurance.<sup>223, 225</sup> Recent reports document that higher-wage workers are more likely than their lower-paid counterparts to have health insurance and health-related benefits, such as paid sick leave and coverage for preventive care services. Low-wage workers and uninsured persons are much more likely to delay or forgo needed health care because of cost and to report problems paying medical bills.<sup>226, 227</sup>

Clinicians and the health care systems play a major role in enabling patient participation in cancer screening and ensuring quality services. Research on barriers related to cancer screening in the population shows that multiple factors – public policy, organizational systems and practice settings, clinicians, and the patients themselves – influence cancer screening and that a diverse set of intervention strategies targeted at each of these can improve cancer screening rates.<sup>86, 228</sup> Studies have shown that people who received a clinician's recommendation for cancer screening are more likely to be screened than those who did not receive a recommendation.<sup>86, 228</sup> To maximize the potential impact of interventions for improving cancer screening, a diverse set of strategies should be implemented. These include centralized or office-based systems including computer-based reminder systems to assist clinicians in counseling age/risk-eligible patients about screening, as well as organizational support systems to help manage referrals and follow-up of cancer screening tests.<sup>86, 228-230</sup> In addition, multiple interventions directed at patients



(strategies to raise awareness about the importance of cancer screening), physicians (strategies for cancer screening counseling and follow-up), and health care systems (strategies to ensure the delivery of high-quality and timely cancer screening) may provide the best approaches to improving rates of cancer screening.<sup>228, 231</sup> Efforts among the American Cancer Society and partners in the nonprofit sector, health care, and government are under way to implement interventions, integrate screening into routine care, and address health disparities.

The Society and ACS CAN, continue to advocate for state and federal policy initiatives to promote and increase cancer screening among the uninsured. As more and more states develop innovative models to provide screening services and treatment for the uninsured, the American Cancer Society and ACS CAN will play a larger role in advocating for and helping to replicate these programs.

# Statistical Notes

## Sample Surveys

In measuring the **prevalence** of certain behaviors in a **population**, it is usually costly and unfeasible to survey every person. Therefore, most **population-based surveys** are conducted by choosing a randomly selected **sample** of people to estimate the true prevalence in a population. Such surveys are considered to have high external validity; therefore, results are considered applicable to the entire population that the sample represents. All of the adult and youth statistics presented in this publication have been **weighted** and are estimates of the true prevalence in the population. 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 confidence interval. (See Other Statistical Terms, page 52.)

**Prevalence:** The percentage of people exhibiting the behavior out of the total number in the defined population. For example, in 2004, 60.5% of Florida women aged 40 years and older had a mammogram within the past year. The percentage of people exhibiting the behavior is 60.5%, and the defined population is women aged 40 and older living in Florida in 2004.

**Population:** A group of people defined by the survey. For example, the Behavioral Risk Factor Surveillance System (BRFSS) targets adults 18 and older, and the Youth Risk Behavior Surveillance System (YRBSS) targets students in grades nine through 12 at public and private high schools.

**Population-based surveys:** A survey conducted to estimate the prevalence of a disease, risk factor, or other characteristic 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 a city, state, or nationwide.

**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 provides enough responses to make valid estimates for a particular population of interest.

**Weighted data:** Data that are representative of an entire city or state, or nationwide. 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 or state, or nationwide). For example, BRFSS data in this publication are representative of all non-institutionalized, civilian adults with telephones. The YRBSS data in this publication are representative of all public and private high school students in grades nine through 12.

**Standard error:** A measure of variability around the estimated prevalence. A small value indicates a more precise prevalence estimate, whereas a larger value indicates a less precise prevalence estimate. The size of this measure is dependent upon the size of the sample.

**Data quality:** The sources of data used for this report are from government-sponsored national and state systems of behavioral surveillance. These systems employ systematic, standardized techniques for sampling and use the latest advances in survey research methodology to survey targeted population groups on an ongoing basis in order to monitor a variety of characteristics (e.g., behaviors). The design and administration of these surveillance systems can provide sources of good-quality data from which to derive population estimates of specific behaviors in a targeted population. However, factors such as cost, feasibility, and practical aspects of monitoring behaviors in the population may play a role in data quality. Therefore, the data reported in this report are subject to three limitations. First, with regard to telephone-based surveys such as the BRFSS, the participants are those from households with a telephone. Second, both in-person and telephone surveys have varying proportions of individuals who do not participate for a variety of reasons (e.g., cannot be reached during the time of data collection or refused to participate once reached). Third, survey measures in general are based on self-reported data, which may be subject to recall bias and cannot be easily validated.

## Other Statistical Terms

**Age-adjusted prevalence:** A statistical method used to adjust prevalence estimates to allow for valid comparisons between populations with different age compositions

**Confidence interval:** A range of possible values for the estimated prevalence. A 90% confidence interval is one that will contain the true value in 90 out of 100 samples surveyed. Similarly, a 95% confidence interval will contain the true value in 95 out of 100 samples surveyed. A 95% confidence interval is commonly reported, and the accompanying table reports the confidence interval ranges for the survey data. **Example:** The confidence interval range for current cigarette smoking among adults is between 0.7% and 2.7%. The narrowest confidence interval is around the percentage for Washington (16.8%±0.7%) or (16.1, 17.5), and the percentage for Alaska has the widest range of possible values (22.2%±2.7%) or (19.5, 24.9).

**Correlation:** Correlation quantifies the extent to which two independent quantities (variable X and Y) “go

together.” When high values of X are associated with high values of Y, a positive correlation is said to exist. When high values of X are associated with low values of Y, a negative correlation is said to exist. The strength of a correlation between two variables, X and Y, is evaluated by using a statistical measure called the correlation coefficient. The p-value measures the likelihood that the observed association occurred by chance alone; p-values less than 0.05 are considered statistically significant (unlikely that the association occurred by chance).

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

**US definition for state tables:** The state-based BRFSS data were aggregated to represent the US. Thus, the median BRFSS values for all US states/territories published by the Centers for Disease Control and Prevention (CDC) will differ from these. Due to the differences in sampling methodology and survey methods, this percentage may not be the same as the percentage reported by the National Health Interview Survey (NHIS).

**Confidence Interval (CI) Ranges for Percentages Listed in Tables, by State, CPED 2009**

Table	Description	95% CI Range
1A	Current cigarette smoking, high school students, total	± 1.4% to 7.0%
2A	At risk for becoming overweight, high school students, total	± 1.3% to 3.2%
	Overweight, high school students, total	± 1.1% to 3.8%
	Met currently recommended levels of physical activity, high school students, total	± 1.9% to 7.6%
	Ate fruits and vegetables five or more times a day, high school students, total	± 1.3% to 4.0%
1B	Current cigarette smoking, adults 18 and older	± 0.7% to 2.7%
	Current cigarette smoking, men 18 and older	± 1.2% to 4.5%
	Current cigarette smoking, women 18 and older	± 0.8% to 3.0%
2B	Clinical overweight, adults 18 and older	± 0.9% to 3.1%
	Clinical obese, adults 18 and older	± 0.8% to 2.8%
	No leisure time physical activity, adults 18 and older	± 0.7% to 2.4%
	Moderate physical activity, adults 18 and older	± 0.9% to 3.1%
	Vigorous physical activity, adults 18 and older	± 0.9% to 3.3%
	Eating five or more fruits and vegetables a day, adults 18 and older	± 0.8% to 2.8%
4B	Recent mammogram, women 40 and older	± 1.2% to 4.9%
	Recent mammogram, women 65 and older	± 1.9% to 10.0%
4D	Recent Pap test, women 18 and older	± 1.1% to 3.7%
	Recent Pap test, women 65 and older	± 2.7% to 11.6%
4F	Recent fecal occult blood test, adults 50 and older	± 1.1% to 4.8%
	Recent sigmoidoscopy or colonoscopy, adults 50 and older	± 0.9% to 2.9%
4H	Recent prostate-specific antigen test, men 50 and older	± 1.9% to 7.5%
	Recent digital rectal examination, men 50 and older	± 1.9% to 7.3%

# Survey Sources

The statistics reported in this publication are compiled from several different publicly available surveys designed to provide prevalence estimates of health-related behaviors and practices for a city, state, or nationwide. 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 each survey follows:

## **Behavioral Risk Factor Surveillance System (BRFSS).**

The BRFSS is a survey of the Center for Disease Control and Prevention's (CDC), National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP), and the US states and territories. It 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 with adults aged 18 years and 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. For example, 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://cdc.gov/brfss/>.

**National Health and Nutrition Examination Survey (NHANES).** The NHANES is a survey of the CDC's 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 of major diseases, 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 and 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://cdc.gov/nchs/nhanes.htm>.

**National Health Interview Survey (NHIS).** The NHIS is a survey of the CDC's 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 of adults aged 18 years and older living in households in the US. The NHIS is an annual survey and has been conducted by NCHS since 1957. For more information, visit the NHIS Web site at <http://cdc.gov/nchs/nhis.htm>.

**National Youth Tobacco Survey (NYTS).** The NYTS was conducted by the CDC in 2004, and was previously funded by the American Legacy Foundation. The survey is designed to provide national data for public and private students in grades six through 12. It allows for the design, implementation, and evaluation of a comprehensive tobacco-control program with more detailed tobacco-related questions than the YRBSS, including those on nontraditional tobacco products such as bidis, secondhand-smoke exposure, smoking cessation, and school curriculum. Data are gathered through a self-administered questionnaire completed during a required subject or class period. The NYTS was first conducted in fall 1999, again in spring 2000, and has been subsequently conducted every other year.

## **Youth Risk Behavior Surveillance System (YRBSS).**

The YRBSS is a survey of the CDC's 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, page 51.) Data are gathered through a self-administered questionnaire completed during a required subject or class period. The YRBSS is a biennial survey that began in 1991. The state and local surveys are of variable data quality, and caution should be used in comparing data

among 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 nine through 12 in the respective jurisdiction. However, data from states and local areas without an overall response rate of 60% and those with inadequate documentation

are reported unweighted and are only applicable to students participating in the survey. Beginning with the 2003 survey, state data that do not meet the weighting requirements described above will no longer be made publicly available through the CDC. For more information, visit the YRBSS Web site at <http://cdc.gov/HealthyYouth/yrbs/index.htm>.

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