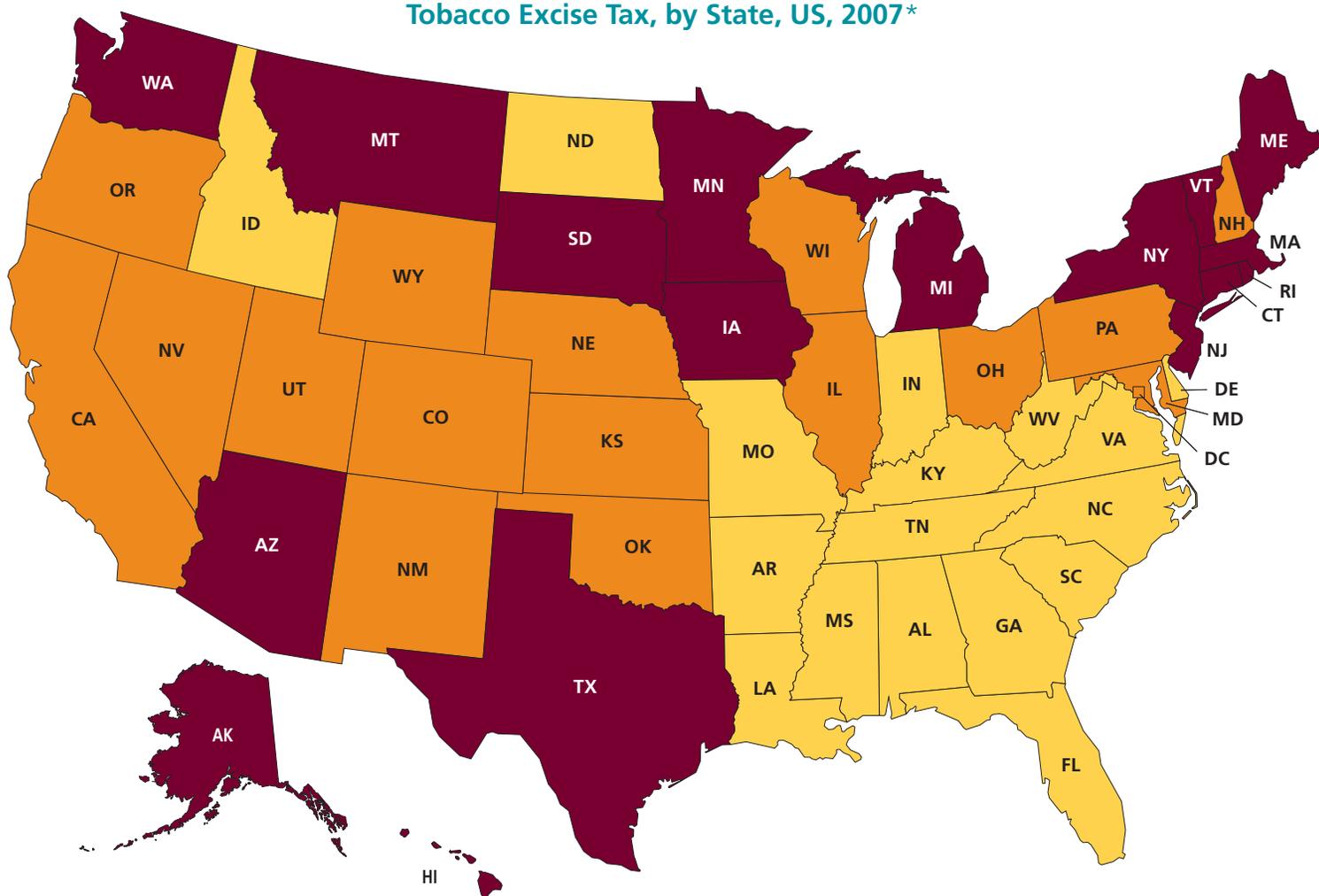


# Cancer Prevention & Early Detection Facts & Figures

# 2007

Tobacco Excise Tax, by State, US, 2007\*



\*Taxes reported as of March 14, 2007. **Note:** At the time of publication of this report, scheduled tax increases in AK, AZ, HI, and VT, as reported here, were not yet in effect.

**Source:** Campaign for Tobacco-Free Kids, et al. State cigarette excise tax rates & rankings. National Center for Tobacco-Free Kids, 2007.

- Top third (greater than or equal to 136 cents)
- Middle third (between 60 and 135 cents)
- Bottom third (below 60 cents)

# Contents

<b>Preface</b>	1
<b>Tobacco Use</b>	3
Youth Tobacco Use	3
Adult Tobacco Use	5
Comprehensive Tobacco Control Programs	6
<b>Overweight and Obesity, Physical Activity and Nutrition</b>	16
Community Action	16
Individual Choices	17
Impact of Diet and Physical Activity on Specific Cancers	25
<b>UV Radiation and Skin Cancer</b>	27
Sunburns	27
Early Detection of Skin Cancer	29
<b>Cancer Screening</b>	30
Breast Cancer Screening	30
Cervical Cancer Screening	32
Programs to Increase the Rate of Breast and Cervical Cancer Screening	37
Colon and Rectum Cancer Screening	37
Prostate Cancer Screening	42
Cancer Screening Obstacles and Opportunities for Improvement	43
<b>Statistical Notes</b>	46
<b>Survey Sources</b>	48
<b>References</b>	49
<b>List of Tables and Figures</b>	56

*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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# 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, and expand the use of established screening tests. The American Cancer Society estimates that in 2007 about 168,000 cancer deaths will be caused by tobacco use alone. In addition, approximately one-third (186,550) of the 559,650 cancer deaths expected to occur in 2007 are attributed to poor nutrition, physical inactivity, overweight, and obesity.<sup>1-3</sup> Regular use of established screening tests can prevent the development of cancer by finding and removing premalignant abnormalities; screening tests can also improve survival by detecting cancer at an early stage when treatment is more effective. New discoveries have expanded the opportunities for prevention. A vaccine is now available that prevents chronic infection with the most common forms of human papillomavirus (HPV),

the principal cause of cervical cancer, just as vaccination against hepatitis B greatly reduces the future risk of liver cancer.

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 level. *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 mission and its 2015 goals. The 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,

## Highlights, CPED 2007

- Tobacco use prevention works. By even the most conservative estimate, more than 40% of the reduction in male cancer deaths between 1991 and 2003 can be attributed to declines in smoking in the last half century.
- Declines in smoking among adults and high school students appear to have stalled. This stall may reflect increased tobacco industry expenditures on marketing and promotion, and declines in funding for comprehensive tobacco control programs. Industry expenditures to promote smoking in 2003 exceeded total funding for tobacco control by a ratio of nearly 23 to 1.
- Twenty-two states, the District of Columbia, and Puerto Rico now protect nonsmokers by prohibiting smoking in workplaces, and/or restaurants, and/or bars. The number of statewide bans has increased from 15 states last year, despite aggressive efforts by tobacco companies to defeat smoke free laws. The tobacco industry spent \$84 million nationally to defeat smoke free legislation and increases in excise taxes in the 2006 mid-term elections.
- The new American Cancer Society *Guidelines on Nutrition and Physical Activity for Cancer Prevention* highlight the importance of maintaining a healthy weight and regular physical activity for the prevention of many types of cancer. Despite increasing scientific evidence, public awareness of the relationship between obesity and cancer remains low.<sup>2,3</sup>
- A vaccine to protect women against infection with common subtypes of human papillomavirus (HPV) was approved by the Food and Drug Administration in 2006. Vaccination will supplement rather than replace Pap screening, according to newly released American Cancer Society guidelines for immunization.
- Mammography usage has not increased since 2000. Overall, 69.7% of women aged 40 and older reported getting a mammogram in the past two years. Women who lack health insurance have the lowest breast cancer screening rates.
- Fewer than half of Americans aged 50 and older have had a recent colorectal cancer screening test. The American Cancer Society has advocated for state legislation ensuring coverage for the full range of colorectal cancer screening tests. To date, 19 states and the District of Columbia have passed such legislation.
- Sunlight exposure is by far the most significant risk factor for several types of skin cancer. Preventive behaviors such as avoiding sun exposure at peak hours of the day, wearing protective hats and clothing, and proper use of sunscreen are recommended to reduce the harmful effects of excessive sun exposure.

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). 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 are not limited to cancer. 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 level can increase access to preventive health services, including cancer screening.<sup>6</sup> For example, at the federal level the American Cancer Society has advocated for increased funding of the Centers for Disease Control and Prevention's National Breast and Cervical Cancer Early Detection program to assist low-income and uninsured women in obtaining screening and treatment. 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 will be 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 (under 18) who are current cigarette smokers.
- Reduce to 1% the proportion of high school students (under 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., sun lamps, 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, smoking results in an estimated 438,000 premature deaths, of which about 38,000 deaths are in nonsmokers as a result of exposure to secondhand smoke. Smoking also accounts for \$167 billion in health care expenditures and productivity losses.<sup>4</sup>

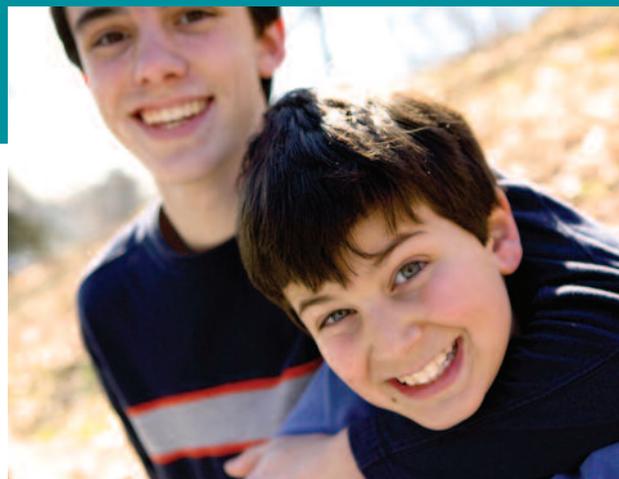
## Youth Tobacco Use

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> Since 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.<sup>6</sup>

## Current Patterns and Trends

- In 2005, data from the Youth Risk Behavior Survey showed that 23% of high school students reported current smoking (smoking at least one day in the last 30 days) and 9.4% reported frequent smoking (defined as smoking for 20 or more of the last 30 days) (Table 1A).<sup>7</sup>
- Although the percentage of high school students who smoke cigarettes decreased from 1997 to 2003, the rate of decrease appears to be slowing. Smoking rates for all gender and racial/ethnic groups did not differ significantly between 2003 and 2005.<sup>7</sup>
- According to the Monitoring the Future survey, cigarette smoking varies by race/ethnicity among 12th graders, with prevalence being highest among non-Hispanic whites, intermediate among Hispanics/Latinos, and lowest among African Americans (Figure 1A).

The decrease in smoking among high school students between 1997 and 2003 has been attributed at least in part to increased cigarette prices, restrictions on public smoking, and counter-advertising.<sup>8-11</sup> 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.<sup>7</sup>

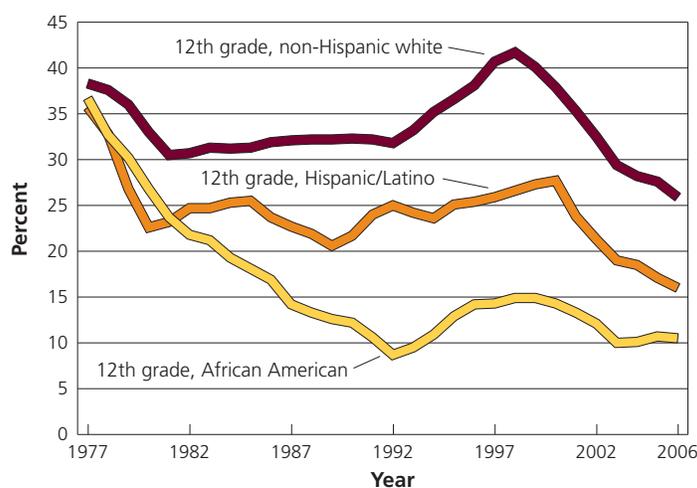


## Other Tobacco Products

While cigarettes remain the primary tobacco product used by youth, cigars, smokeless tobacco products, and hookahs (tobacco water pipes) have grown in popularity. Table 1A provides data on current cigar and oral tobacco use among high school students in states and cities for which these data were available for 2005.

- In 2005, 28.4% of high school students reported current use of any tobacco product.<sup>12</sup> Of these products, cigarettes (23%) were most commonly used followed by cigars (14%) and smokeless tobacco (8%) products.<sup>12</sup>
- Non-Hispanic white and Hispanic/Latino students smoke predominantly cigarettes, while non-Hispanic African Americans were equally likely to smoke cigarettes and cigars.<sup>12</sup>

**Figure 1A. Current\* Cigarette Smoking Among 12th Graders, by Race/Ethnicity, US, 1977-2006**



\*Used cigarettes in the last 30 days.

Source: Monitoring the Future Survey, 1975-2006, University of Michigan.

American Cancer Society, Surveillance Research

**Table 1A. Tobacco Use, High School Students, by State and City/County, US, 2005**

Location	% Current cigarette smoking*	Rank†	% Frequent cigarette smoking‡	% Current cigar use§	% Current oral tobacco use¶
<b>United States</b>	23.0		9.4	14.0	8.0
<b>State</b>					
Alabama	24.4	31	10.2	18.7	14.1
Arizona	21.4	22	7.5	N/A	N/A
Arkansas	25.9	36	13.4	17.6	13.7
Colorado	18.7	14	6.4	16.4	9.1
Connecticut	18.1	12	7.5	N/A	N/A
Delaware	21.2	20	9.6	11.3	5.1
Florida	17.2	9	6.4	12.3	5.9
Georgia	17.2	10	7.0	15.1	7.4
Hawaii	16.4	6	4.8	N/A	N/A
Idaho	15.8	2	6.0	13.8	9.1
Indiana	21.9	24	10.6	15.6	8.6
Iowa	22.2	26	9.7	14.5	7.9
Kansas	21.0	19	8.9	14.7	10.8
Kentucky	26.2	37	14.4	15.5	14.8
Maine	16.2	4	7.9	14.1	6.9
Maryland	16.5	7	7.4	11.6	2.9
Massachusetts	20.5	17	8.9	13.5	4.4
Michigan	17.0	8	7.8	13.3	6.9
Missouri	21.3	21	10.8	14.7	6.9
Montana	20.1	16	8.8	17.6	14.8
Nebraska	21.8	23	9.6	16.8	8.7
Nevada	18.3	13	7.1	N/A	5.9
New Hampshire	20.5	18	8.6	17.7	6.5
New Jersey	19.8	15	7.0	N/A	N/A
New Mexico	25.7	35	7.8	21.3	8.5
New York	16.2	5	6.3	9.6	4.2
North Carolina	24.9	33	11.0	N/A	N/A
North Dakota	22.1	25	11.9	12.2	11.2
Ohio	24.4	32	12.8	N/A	7.9
Oklahoma	28.6	40	10.7	16.2	11.0
Rhode Island	15.9	3	8.3	12.3	4.2
South Carolina	23.5	29	11.4	15.3	10.7
South Dakota	28.2	39	14.5	N/A	12.7
Tennessee	26.3	38	13.7	16.5	14.0
Texas	24.2	30	7.5	17.1	7.6
Utah	7.4	1	2.1	5.4	3.7
Vermont	17.9	11	8.0	N/A	7.9
West Virginia	25.3	34	13.6	15.6	14.9
Wisconsin	22.8	28	10.7	17.1	8.4
Wyoming	22.5	27	10.1	N/A	14.3
<b>City/County</b>					
Baltimore, MD	10.1	5	4.2	7.5	2.0
Boston, MA	15.3	17	5.0	7.2	2.7
Broward County, FL	13.7	13	5.1	9.8	3.6
Charlotte-Mecklenburg, NC	19.7	21	7.2	N/A	N/A
Chicago, IL	14.4	15	3.9	13.0	2.2
Dallas, TX	17.5	18	2.5	19.5	2.4
DeKalb County, GA	8.8	2	2.5	10.1	2.2
Detroit, MI	6.4	1	1.2	7.3	2.0
District of Columbia	9.2	3	2.0	6.3	1.8
Hillsborough County, FL	17.6	19	6.5	14.7	7.7
Los Angeles, CA	11.8	9	1.4	9.5	1.6
Memphis, TN	9.6	4	2.6	16.6	1.8
Miami-Dade County, FL	12.8	10	3.4	8.4	1.8
Milwaukee, WI	13.1	12	5.1	16.6	2.7
New Orleans, LA	11.0	7	3.4	11.5	6.0
New York City, NY	11.2	8	3.6	5.7	3.4
Orange County, FL	17.6	20	6.4	11.6	3.8
Palm Beach County, FL	12.9	11	4.9	10.0	3.6
San Bernardino, CA	14.7	16	4.2	13.1	3.9
San Diego, CA	14.2	14	3.5	11.6	3.4
San Francisco, CA	10.9	6	3.7	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, 2005, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention. *MMWR Morb Mortal Wkly Rep.* 2006;55(SS-5).

American Cancer Society, Surveillance Research

- Male and female students were equally likely to smoke cigarettes, but males were six times more likely to use smokeless tobacco products and two times more likely to smoke cigars than females.<sup>12</sup>
- In 2004, 2.4% of middle school and 2.7% of high school students used bidis (small brown cigarettes from India made of tobacco wrapped in a leaf and tied with a thread) on one or more of the 30 days preceding the survey.<sup>13,14</sup> Similarly, 1.6% of middle school and 2.5% of high school students used kreteks (flavored cigarettes containing tobacco and clove extract) on one or more of the 30 days preceding the survey.<sup>13,14</sup>

Use of any tobacco products by young smokers may induce nicotine dependence.<sup>15</sup> Prevention and cessation programs should cover other tobacco products in addition to cigarettes.<sup>16</sup>

### Adult Tobacco Use

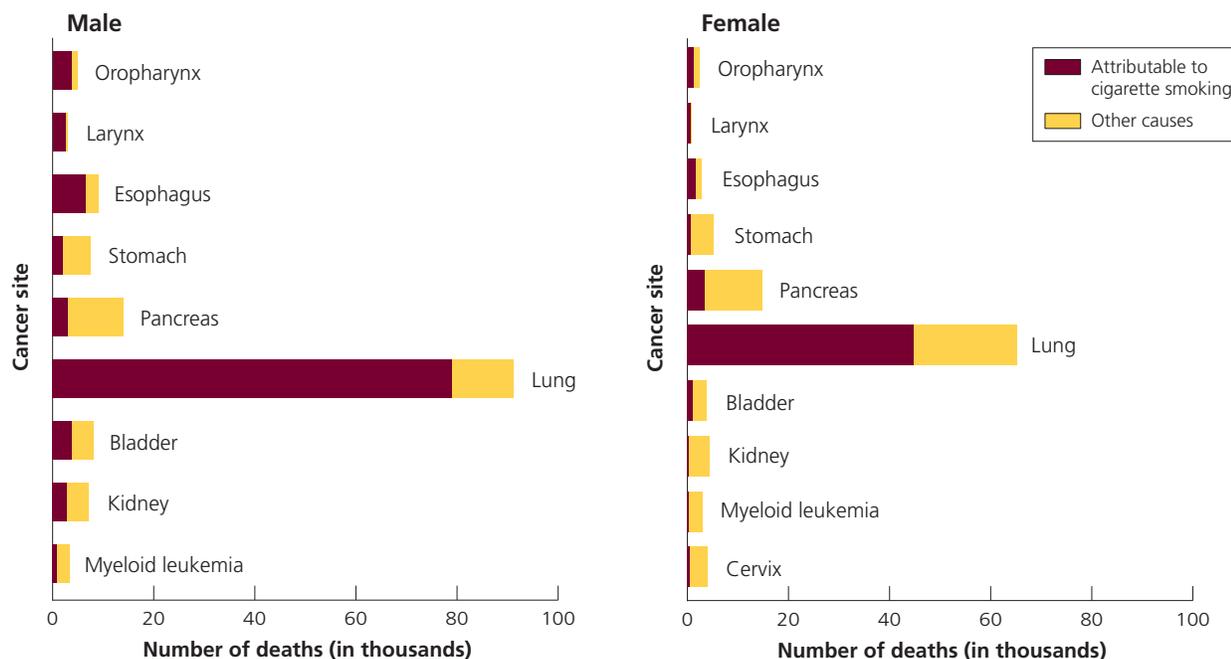
Tobacco use increases the risk of cancer of the lung, mouth, nasal cavities, larynx, pharynx, esophagus, stomach, liver, pancreas, kidney, bladder, uterine cervix, and myeloid leukemia.<sup>17</sup> Exposure to secondhand smoke increases the risk of lung cancer.<sup>18,19</sup> Thirty percent of cancer deaths, including 87% of lung cancer deaths, can be attributed to tobacco.<sup>2,17,19</sup> (Figure 1B)

### Current Patterns and Trends

Both cigarette consumption and the prevalence of smoking in the US have declined since the release of the first US Surgeon General's Report on Smoking and Health in 1964. However, progress in reducing smoking prevalence has stalled in the past year and smoking rates remain high among some population subgroups.

- 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. In 2005, these rates remained essentially unchanged at 23.9% in men and 18.1% in women. Currently, an estimated 80.8% of smokers smoke cigarettes daily.<sup>20</sup>
- Smoking prevalence varies by level of education, although this relationship has reversed over time. In the early 1960s, college-educated adults had the highest smoking prevalence. By 2005, only 9.1% of college graduates were current smokers, compared to 28.2% of those who did not graduate from high school (Figure 1C).
- Smoking prevalence is higher among men than women and varies by race, ethnicity, and socioeconomic status. The prevalence of smoking is highest among American Indian/Alaska Native men and women, and

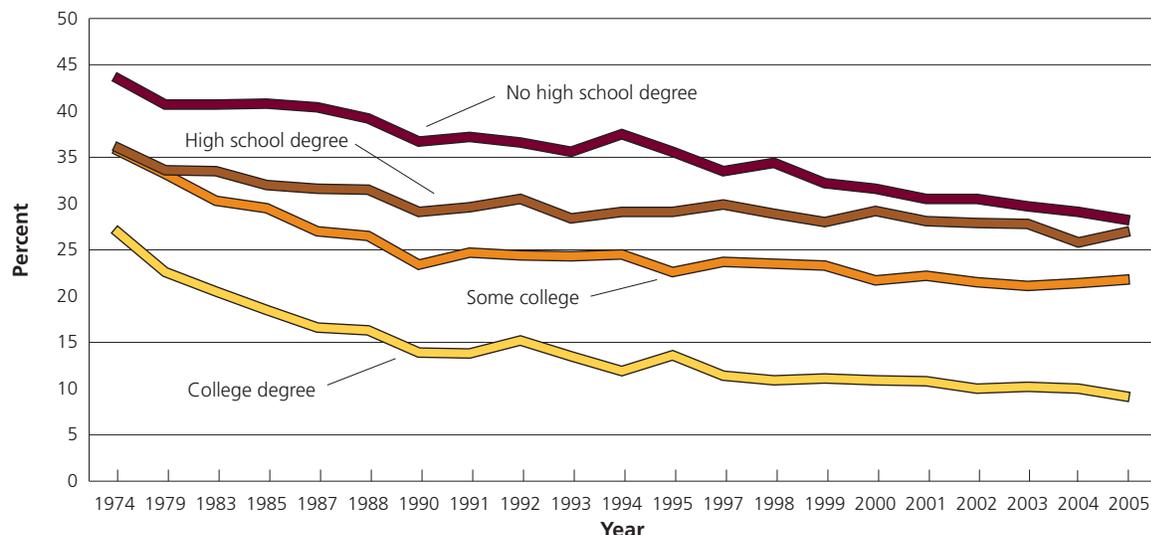
**Figure 1B. Annual Number of Cancer Deaths Attributable to Smoking, Males and Females, by Site, US, 1997-2001**



Source: Centers for Disease Control and Prevention. Annual smoking-attributable mortality, years of potential life lost, and productivity losses – United States, 1997-2001. *MMWR Morb Mortal Wkly Rep.* 2005;54(25):625-628.

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**Figure 1C. Current\* Cigarette Smoking by Education†, Adults 25 and Older, US, 1974-2005**



\*Adults 25 and older who have ever smoked 100 cigarettes in their lifetime and who are current smokers (regular and irregular). †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: 1974-2003: National Center for Health Statistics, Health, United States, 2005. With Chartbook on Trends in the Health of Americans. Hyattsville, Maryland: 2005. 2004 & 2005: National Health Interview Survey Public Use Data File, 2004 & 2005. National Center for Health Statistics, Centers for Disease Control and Prevention, .

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lowest among Asian American men and women (Table 1B).

- Across the states, smoking prevalence ranges from 11.5% in Utah to 28.7% in Kentucky (Table 1C).

### 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.<sup>21,22</sup>

Cigar smoking increases the risk of cancers of the lung, oral cavity, larynx, esophagus, and probably pancreas. Cigar smokers have a four- to 10-times increased risk of dying from laryngeal, oral, or esophageal cancers compared to non-smokers.<sup>23</sup>

- The consumption of large cigars and cigarillos increased by an estimated 138% from 1993 to 2005.<sup>24,25</sup>
- According to a state-based survey in 1998, the median percentage of adults aged 18 years and older who ever smoked cigars was 40%. More men than women had ever smoked cigars in all 50 states.<sup>26</sup>
- In 2004, the percentage of adults aged 18 years and older who have smoked cigars in the past month was 6%.<sup>27</sup>

In 1986, the US Surgeon General concluded that chewing tobacco and snuff are not safe substitutes for smoking cigarettes or cigars, as these products cause various

cancers and non-cancerous oral conditions, and can lead to nicotine addiction.<sup>28</sup> Despite this evidence, tobacco companies have promoted smokeless tobacco products as a low-risk option for smokers who are unable to quit.<sup>29</sup> There is no evidence that switching to snuff or chewing tobacco is more effective or as safe in helping smokers quit than conventional cessation therapies.<sup>30</sup>

- In 2004, about 3% of US adults used smokeless tobacco products in the past month; 6% of men and 1% of women. Whites (4%) and American Indian/Alaska Natives (4%) were more likely to use smokeless tobacco products than African Americans (2%), Asians (1%) or Hispanic/Latinos (1%).<sup>28</sup>
- According to the US Department of Agriculture, US output of moist snuff has increased more than 76% in the past decade.

### Comprehensive Tobacco Control Programs

The American Cancer Society estimates that more than 40% of the reduction in male cancer deaths between 1991 and 2003 can be attributed to declines in smoking in the last half century.<sup>31</sup> Studies have shown that comprehensive tobacco control programs that include increases in excise taxes, effective anti-tobacco media campaigns and restrictions on smoking in public places reduce cigarette smoking.<sup>32</sup> Further reductions in tobacco use

**Table 1B. Current Cigarette Use\*, Adults 18 and Older, US, 2005**

Characteristic	% Men	% Women	% Total
<b>Age group (years)</b>			
18 to 24	28.0	20.7	24.4
25 to 44	26.8	21.4	24.1
45 to 64	25.2	18.8	21.9
65 or older	8.9	8.3	8.6
<b>Race/ethnicity</b>			
White (non-Hispanic)	24.0	20.0	21.9
African American (non-Hispanic)	26.7	17.3	21.5
Hispanic/Latino	21.1	11.1	16.2
American Indian/Alaskan Native†	37.5	26.8	32.0
Asian‡	20.6	6.1	13.3
<b>Education (years)§</b>			
8 or fewer	21.0	13.4	17.1
9 to 11	36.8	29.0	32.6
12	28.8	20.7	24.6
13 to 15	26.2	19.5	22.5
16	11.9	9.6	10.7
More than 16	6.9	7.4	7.1
<b>Total</b>	<b>23.9</b>	<b>18.1</b>	<b>20.9</b>

\*Persons who reported having smoked at least 100 cigarettes or more and who reported now smoking every day and/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.

**Source:** National Health Interview Survey, 2005, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention. Cigarette smoking among adults – United States, 2005. *MMWR Morb Mortal Wkly Rep.* 2006;55(42):1145-1148.

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will require implementation of economic, policy, and regulatory interventions that reduce tobacco use and protect nonsmokers from secondhand smoke.<sup>32</sup>

The goals of comprehensive tobacco control are to:<sup>32</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

Best practices for comprehensive tobacco control programs have been published by the Centers for Disease Control and Prevention (CDC).<sup>33</sup> Effective state-based tobacco control programs include the following components:<sup>33</sup>

- Community programs that reduce tobacco use
- Chronic disease programs that reduce the burden of tobacco-related diseases

- School programs
- Enforcement programs
- Statewide programs that promote media advocacy, smoke-free policies, and tax increases or that have access to different racial, ethnic and diverse communities
- Counter-marketing campaigns such as anti-smoking ads
- Cessation programs and policies (smoking cessation telephone services, benefits coverage for tobacco cessation therapies)
- Surveillance and evaluation programs
- Strong administrative and management structure

Evidence for these recommendations stems in part from efficacy studies in states that have implemented such programs (including California, Massachusetts, Oregon, Maine, Florida, Minnesota, and Mississippi) and documented the beneficial impact of comprehensive tobacco control programs in reducing tobacco use and consumption.<sup>32,34-43</sup> In a study of the California Tobacco Control Program (CTCP) begun in 1990, analyses of lung cancer incidence in California between 1975 and 1999 found a significantly greater rate of decline in lung cancer during the period of 1988 to 1999 than would have been predicted from prior lung cancer trends in the state. This decline was also much greater than declines in lung cancer incidence trends (if any) in other areas, measured by the Surveillance, Epidemiology, and End Results Program (SEER).<sup>43</sup>

### Tobacco Excise Taxes

Excise taxes on tobacco serve the dual purpose of reducing tobacco consumption, especially among children, and of raising governmental revenues that can be used for tobacco control.<sup>32</sup>

- Cigarette taxes can be levied at the federal, state, local, and municipal levels. Currently, the federal excise tax is 39 cents per pack in all states but there is wide variation in state cigarette excise taxes levied, ranging from 7 cents per pack in South Carolina to \$2.58 per pack in New Jersey (Figure 1D, Table 1D).
- Currently, 37 states have a state excise that is less than \$1.50 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, Figure 1D, Table 1D).

**Table 1C. Current Cigarette Smoking\*, Adults 18 and Older, by State, US, 2005**

	% 18 and older	State Rank†	% Men 18 and older	% Women 18 and older	% Low education‡
Alabama	24.8	45	29.5	20.5	35.7
Alaska	25.0	46	27.9	22.0	50.1
Arizona	20.4	22	22.0	18.8	24.6
Arkansas	23.5	42	25.2	21.9	33.3
California	15.2	2	19.2	11.3	17.2
Colorado	19.9	16	21.6	18.1	30.3
Connecticut	16.5	3	16.9	16.2	22.7
Delaware	20.7	27	22.5	19.0	32.3
Dist. of Columbia	20.1	21	22.9	17.6	31.0
Florida	21.6	33	24.8	18.7	26.7
Georgia	22.2	35	25.0	19.4	32.0
Hawaii	17.1	4	19.3	15.0	26.5
Idaho	17.9	7	19.7	16.2	31.3
Illinois	19.9	17	21.2	18.7	24.3
Indiana	27.3	50	29.7	25.1	46.8
Iowa	20.4	23	21.8	19.1	30.2
Kansas	17.8	6	18.9	16.8	25.4
Kentucky	28.7	51	30.6	26.9	41.3
Louisiana	22.6	37	24.6	20.6	29.2
Maine	20.9	29	22.4	19.5	38.3
Maryland	19.0	11	19.7	18.4	39.9
Massachusetts	18.1	8	18.1	18.0	24.2
Michigan	22.1	34	24.1	20.2	35.5
Minnesota	20.0	18	21.0	19.1	26.8
Mississippi	23.7	43	25.9	21.7	28.8
Missouri	23.4	41	24.9	22.1	35.9
Montana	19.2	12	19.3	19.1	36.2
Nebraska	21.3	30	23.4	19.2	22.7
Nevada	23.1	40	25.2	20.9	27.6
New Hampshire	20.5	24	20.4	20.5	34.3
New Jersey	18.1	9	19.6	16.8	23.0
New Mexico	21.5	32	24.4	18.8	28.8
New York	20.5	25	23.0	18.2	24.4
North Carolina	22.7	39	25.6	19.9	27.4
North Dakota	20.0	19	21.5	18.6	23.4
Ohio	22.3	36	21.9	22.8	39.9
Oklahoma	25.1	47	26.5	23.8	34.9
Oregon	18.5	10	20.6	16.5	28.8
Pennsylvania	23.7	44	25.0	22.5	34.5
Rhode Island	19.8	14	19.4	20.1	26.6
South Carolina	22.6	38	25.3	20.1	31.7
South Dakota	19.8	15	20.4	19.2	30.7
Tennessee	26.8	49	29.3	24.5	36.8
Texas	20.0	20	23.3	16.8	23.5
Utah	11.5	1	13.7	9.3	28.0
Vermont	19.3	13	21.6	17.0	37.1
Virginia	20.6	26	21.5	19.7	29.2
Washington	17.6	5	19.1	16.1	29.2
West Virginia	26.6	48	27.4	26.0	35.5
Wisconsin	20.8	28	22.1	19.5	31.9
Wyoming	21.3	31	20.5	22.1	38.7
United States#	20.6		22.7	18.6	27.2
Range	10.5-27.6		11.7-29.3	9.4-26.4	15.2-44.3

\*Adults 18 and older who have smoked 100 cigarettes and are current smokers (regular and irregular). †Rank is based on % 18 and older. ‡Adults 25 and older with less than a high school education.

**Source:** Cigarette smoking percentages: Behavioral Risk Factor Surveillance System Public Use Data Tape 2005, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 2006.

American Cancer Society, Surveillance Research

- Although 48 states and the District of Columbia have increased their cigarette taxes since 2000, only 20 states have laws requiring that a portion of their excise tax be dedicated to tobacco control or cancer programs.<sup>44</sup>

The price of cigarettes is inversely and predictably related to consumption: a 10% increase in price reduces overall cigarette consumption by 3%-5%.<sup>32</sup> Young people who smoke are up to three times more responsive to price increases than adults.<sup>45</sup> States that have imposed higher excise taxes thereby increasing cigarette prices have seen declines in smoking prevalence.

Even though state excise taxes have risen in the past few decades, tobacco companies currently spend approximately \$11 billion on cigarette price discounts, promotional allowances to retailers or wholesalers, and other strategies to buffer price-sensitive smokers from the shock of price increases.<sup>46,47</sup> Further increases in state excise taxes are needed to counter these strategies.

To generate funds for tobacco control and reduce smoking initiation among adolescents, the American Cancer Society has joined with other leading health organizations to issue the *Tobacco Tax Challenge* that encourages governors to enact an above-average excise tax on cigarettes.<sup>32,48</sup>

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

Smoke-free initiatives (also referred to as clean indoor air laws or ordinances) are another important component of comprehensive tobacco control for youth and adults.<sup>11</sup> Smoking bans in workplaces, and/or restaurants, and/or bars protect nonsmokers from secondhand smoke. A recent study showed that the rates of exposure to secondhand smoke (SHS) among non-smoking adults living in US counties decreased with increasing smoke-free law coverage: 12.5% of adults in counties with extensive smoke-free coverage laws were exposed to SHS, compared to 35.1% in counties with limited smoke-free coverage and 45.9% in counties with no law.<sup>49</sup>

Smoking bans also change social norms about smoking and motivate smokers to quit or reduce their consumption.<sup>18</sup> Recent research also indicates a relationship between smoke-free legislation and reduced adolescent smoking. One study demonstrated that local restaurant smoking bans reduced progression from occasional to established smoking among adolescents.<sup>50</sup> At the state level, stronger clean indoor air laws were related to lower levels of youth smoking.<sup>51</sup>

Smoke-free laws are largely responsible for a decline in the exposure of the US population to SHS between 1988

and 2002, as measured by levels of cotinine, a metabolite of nicotine considered to be the best biomarker for measurement of SHS exposure. From 1988-1991 to 2001-2002, cotinine levels among nonsmokers declined by 74% in children aged 4-11 years, 79% in adolescents aged 12-19 years, and about 75% in adults 20 years or over.<sup>52</sup>

Smoke-free legislation can be enacted at federal, state, and local levels.<sup>32</sup>

- More than 2,507 municipalities have passed some form of local smoke-free legislation.<sup>53</sup> Currently, 187 municipalities in the country have passed local laws to establish 100% smoke-free workplaces, restaurants, and bars.<sup>53</sup>

- Twenty two states (Arizona, California, Colorado, Connecticut, Delaware, Florida, Hawaii, Idaho, Louisiana, Maine, Massachusetts, Montana, Nevada, New Jersey, New York, North Dakota, Ohio, Rhode Island, South Dakota, Utah, Vermont, and Washington), 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>53,54</sup> Currently, only Arizona, Delaware, the District of Columbia, Hawaii, Massachusetts, New Jersey, New York, Ohio, Puerto Rico, Rhode Island, and Washington provide comprehensive smoke-free protection, meaning that all workplaces, restaurants, and bars are 100% smoke-free (Table 1D).<sup>53,54</sup> Several other states have had success enacting limited forms of smoke-free legislation which may not be 100% smoke-free.

- Currently, 52.9% of the US population is covered by a 100% smoke-free provision in workplaces, and/or restaurants, and/or bars.<sup>53</sup>

- Currently, 14 states have enacted either partial or complete preemption laws that prohibit local governments from enacting smoke-free air laws.<sup>54</sup>

- Currently, with the exception of New Mexico and Wyoming, all states and the District of Columbia have enacted clean indoor air laws restricting smoking in school buildings; however, just 16 states explicitly specify smoking restrictions in private schools.<sup>55</sup>

### Economic and Health Impact of Smoke-Free Laws

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 the

**Table 1D. Comprehensive Tobacco Control Measures, by State, US, 2001, 2007**

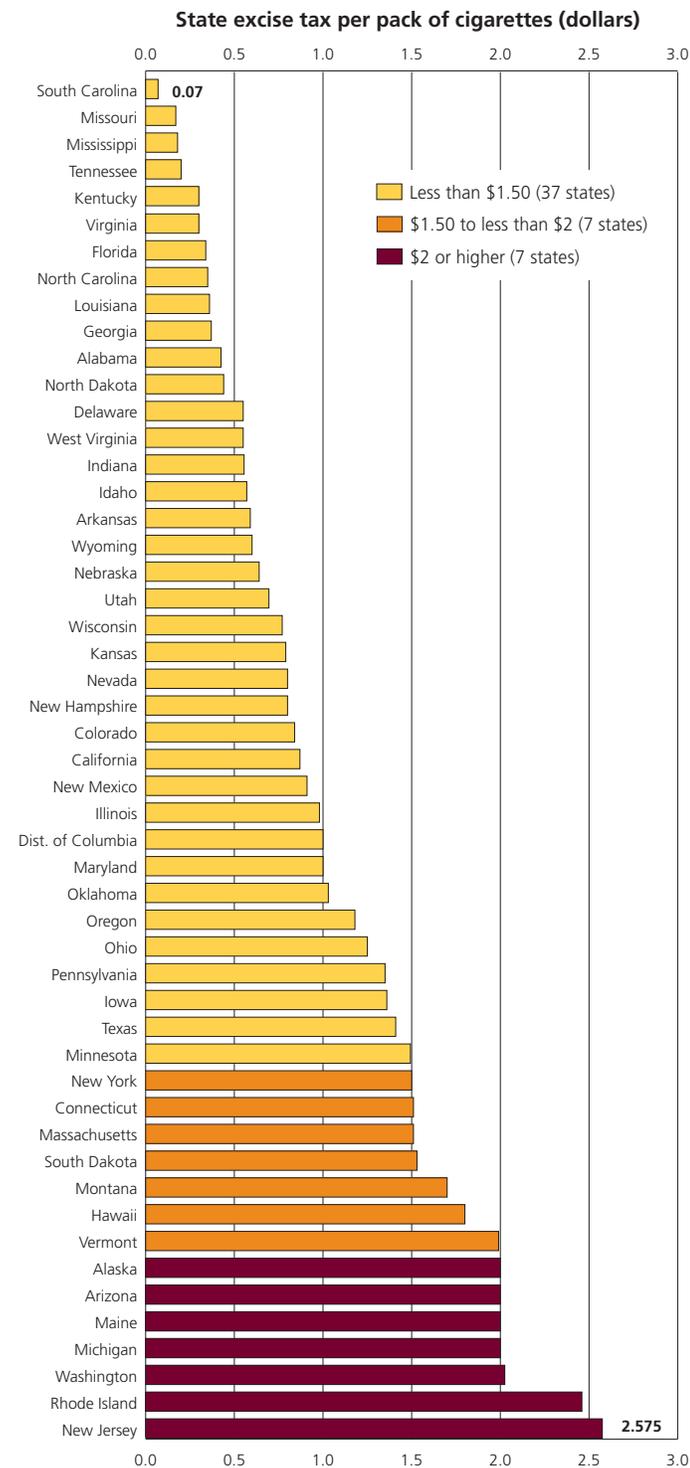
	Cigarette tax per pack (\$)*	100% smoke-free laws in workplaces and/or restaurants and/or bars <sup>¶</sup>	Fiscal year 2001 per capita tobacco control funding (\$)	Fiscal year 2007 per capita tobacco control funding (\$)	Difference in per capita tobacco control funding (2001-2007)
Alabama	0.425		1.35	0.15	-1.20
Alaska	2.00 <sup>§</sup>		2.23	9.89	7.66
Arizona	2.00 <sup>§</sup>	W, R, B	6.72	4.97	-1.75
Arkansas	0.59		6.02	5.65	-0.37
California	0.87	R, B	3.38	2.48	-0.90
Colorado	0.84	R, B	2.95	5.81	2.86
Connecticut	1.51 <sup>§</sup>	R, B	0.29	0.59	0.29
Delaware	0.55	W, R, B	3.57	13.14	9.57
Dist. of Columbia	1.00	W, R, B	0.00	0.87	0.87
Florida	0.339	W, R	2.75	0.35	-2.40
Georgia	0.37		1.93	0.28	-1.65
Hawaii	1.80 <sup>§</sup>	W, R, B	7.68	7.51	-0.17
Idaho	0.57	R, B	0.93	0.70	-0.23
Illinois	0.98		2.30	0.68	-1.62
Indiana	0.555		5.76	1.79	-3.96
Iowa	1.36		3.21	2.22	-0.99
Kansas	0.79		0.19	0.37	0.19
Kentucky	0.30		1.44	0.54	-0.89
Louisiana	0.36	W, R	0.92	1.79	0.87
Maine	2.00 <sup>§</sup>	R, B	14.75	11.53	-3.22
Maryland	1.00		5.66	3.53	-2.13
Massachusetts	1.51 <sup>§</sup>	W, R, B	6.79	1.31	-5.48
Michigan	2.00 <sup>§</sup>		0.00	0.00	0.00
Minnesota	1.493		7.11	4.41	-2.70
Mississippi	0.18		10.90	0.00	-10.90
Missouri	0.17		0.00	0.00	0.00
Montana	1.70 <sup>§</sup>	W, R	3.88	7.65	3.77
Nebraska	0.64		4.09	1.75	-2.34
Nevada	0.80		1.50	1.90	0.40
New Hampshire	0.80		2.43	0.00	-2.43
New Jersey	2.575 <sup>§</sup>	W, R, B	3.57	1.31	-2.26
New Mexico	0.91		1.26	4.23	2.97
New York	1.50 <sup>§</sup>	W, R, B	1.58	4.51	2.92
North Carolina	0.35		0.00	2.12	2.12
North Dakota	0.44	W	0.00	4.83	4.83
Ohio	1.25	W, R, B	5.28	3.96	-1.32
Oklahoma	1.03		1.83	2.90	1.07
Oregon	1.18		2.48	1.02	-1.46
Pennsylvania	1.35		0.00	2.47	2.47
Rhode Island	2.46 <sup>§</sup>	W, R, B	2.19	0.91	-1.29
South Carolina	0.07		0.45	0.50	0.05
South Dakota	1.53 <sup>§</sup>	W	2.25	0.94	-1.31
Tennessee	0.20		0.00	0.00	0.00
Texas	1.41		0.45	0.25	-0.20
Utah	0.695	R	2.69	3.22	0.54
Vermont	1.99 <sup>§</sup>	R, B	10.68	8.38	-2.30
Virginia	0.30		1.78	1.91	0.13
Washington	2.025 <sup>§</sup>	W, R, B	2.54	4.60	2.05
West Virginia	0.55		3.26	2.99	-0.28
Wisconsin	0.77		3.95	1.86	-2.09
Wyoming	0.60		1.82	11.95	10.13
United States <sup>#</sup>	1.03		3.11	3.07	-0.04
Range	0.07-2.46		0.0-14.75	0.0-13.17	-10.90-10.13

\*Taxes reported as of March 14, 2007. At the time of publication of this report, scheduled tax increases in AK, AZ, HI, and VT, as reported here, were not yet in effect. <sup>§</sup> Taxes more than \$1.50. <sup>¶</sup>Reported as of January 12, 2007. AZ smoke-free law scheduled to go into effect on May 1, 2007. <sup>#</sup>See Statistical Notes for definition of prevalence measures; average value (including District of Columbia) for taxes and per capita funding. **Note:** W-workplaces, R-restaurants, B-bars.

**Source:** Cigarette Taxes: Campaign for Tobacco-Free Kids, et al. State cigarette excise tax rates & rankings. National Center for Tobacco-Free Kids, 2007. 100% Smoke-free laws: American Nonsmokers' Rights Foundation. Overview List-How Many Smokefree Laws? 2007. Per Capita Funding: calculated by dividing state prevention funding (Campaign for Tobacco-Free Kids, et al. A Broken Promise to Our Children: the 1998 Master Settlement Agreement Eight Years Later. National Center for Tobacco-Free Kids, 2006) by 2000 US Census state population counts (<http://www.census.gov>).

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**Figure 1D. Cigarette Excise Tax, by State, US, 2007\***



\*Taxes reported as of March 14, 2007. At the time of publication of this report, scheduled tax increases in AK, AZ, HI, and VT, as reported here, were not yet in effect.

Source: Campaign for Tobacco-Free Kids, et al. State cigarette excise tax rates & rankings. National Center for Tobacco-Free Kids, 2007.

American Cancer Society, Surveillance Research

business.<sup>56</sup> The gaming industry, including most tribally owned casinos and bars, is increasingly the only portion of the hospitality industry exempted from smoke-free laws. However, a recent study in Delaware found that a comprehensive statewide smoke-free law had no effect on revenue from the gaming industry.<sup>57</sup> Additionally, in Massachusetts charitable bingo has not been negatively affected by smoke-free ordinances.<sup>58</sup> Several studies have documented a positive health effect of smoke-free ordinances that have been associated with decreases in heart attacks, colds, sinus infections, and respiratory symptoms among restaurant and bar workers.<sup>59-62</sup> A decrease of 80%-90% of fine particulate matter has been measured in the air of restaurants and bars following the implementation of smoke-free ordinances.<sup>63,64</sup>

The American Cancer Society, through its advocacy and public awareness efforts, is leading the charge to pass smoke-free legislation at the community and state levels so that all Americans have the right to work or dine where they choose without compromising their health.

### Counter-Advertising

Exposure to tobacco industry marketing more than doubles the likelihood that adolescents will initiate tobacco use and ultimately begin to smoke.<sup>65</sup> Although direct and indirect tobacco marketing to children is prohibited by the 1998 Master Settlement Agreement between states and tobacco companies, a variety of marketing and promotion strategies that appeal to children are still employed by the tobacco industry including marketing of candy-flavored cigarettes, discounting cigarettes, and sponsoring sporting events.<sup>46,66,67</sup>

Counter-advertising uses media advocacy and paid advertisements to discourage tobacco use and expose the industry's marketing and promotional tactics.<sup>32</sup> In developing its "Truth" campaign, the Florida Governor's Office worked with teen advisors to develop a media campaign that countered the image perception of smoking as cool and rebellious. In California, the statewide media campaign promotes core messages (e.g., "the tobacco industry lies," "secondhand smoke kills," and "nicotine is addictive") to foster a social and legal climate in which tobacco use is recognized as undesirable.<sup>68</sup>

Antismoking media campaigns are effective in helping to reduce smoking initiation in early adolescence.<sup>69</sup> The nationwide youth antismoking media campaign called "Truth" accounted for approximately 22% of the decline



in youth smoking prevalence between 1999-2002.<sup>70</sup> Florida's version of the "Truth" campaign produced a 40% reduction in smoking prevalence among middle school students from 1998 to 2000.<sup>71,72</sup> States that have combined extensive paid media campaigns with other anti-tobacco activities have seen rapid declines in youth smoking prevalence.<sup>71</sup> The state of Massachusetts initiated a multi-faceted youth tobacco control program that included community-based efforts, statewide media campaigns, and school-based tobacco education. The implementation of these efforts was associated with a decline in youth smoking prevalence from 36% in 1995 to 30% in 1999.<sup>73</sup>

Tobacco companies, on the other hand, initiated lawsuits against several anti-tobacco media campaigns, including the "Truth" campaign,<sup>74</sup> and launched their own media campaigns that purport to discourage youth smoking and help adult smokers quit. Recent research has shown that the industry advertisements are not effective in deterring youth smoking and those which target parents may actually encourage youth smoking.<sup>75</sup>

## Tobacco Cessation

### Cessation Support for Young Smokers who Want to Quit

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>13</sup> Adolescents often underestimate the strength and rapidity of tobacco dependence.<sup>5</sup> Nicotine dependence has been shown to develop soon after initiation and lead to smoking intensification, with one study showing that approximately 20% of adolescents reported nicotine dependence symptoms within one month of beginning

## Youth Cessation Resource

The Centers for Disease Control and Prevention recommends that all comprehensive tobacco control programs include cessation interventions for youth and adults.<sup>33</sup> However, the evidence for the effectiveness of smoking cessation treatments is more limited for children and adolescents than for adults. To address this issue, the Youth Tobacco Cessation Collaborative, a coalition of 10 public, private, and voluntary health organizations (including the American Cancer Society), convened an expert advisory panel to review existing scientific evidence on youth tobacco cessation.<sup>79</sup> The review concluded that there is evidence that treatment increases quit rates in adolescents, but the panel did not find sufficient evidence to recommend routine pharmacotherapy or specific types of delivery settings and interventions to aid youth smoking cessation.<sup>79</sup> *Youth Tobacco Cessation: a Guide for Making Informed Decisions*, a document developed by the panel, is a useful resource to guide health professionals, policymakers, and researchers through the process of developing, implementing, and evaluating a youth tobacco cessation program. More information can be found at [http://www.cdc.gov/tobacco/educational\\_materials/cessation/youth\\_cess/](http://www.cdc.gov/tobacco/educational_materials/cessation/youth_cess/).

regular smoking.<sup>76</sup> Adolescents generally overestimate their ability to successfully quit smoking. One study of 12th grade daily smokers found only 3% thought that they would "definitely" be smoking in 5 years, yet 7 to 9 years later, more than 60% of them were still smoking.<sup>77</sup> Most adolescent smokers who try to quit by themselves are unsuccessful.<sup>6,78</sup>

The majority of young smokers want to quit smoking and have tried to quit.<sup>14</sup> In 2004, about 58% of current high school smokers made an attempt to quit in the preceding 12 months. However, just 29.2% of these students were successful at staying off cigarettes for more than a month. These data highlight the importance of providing children and adolescent smokers with appropriate resources and support to successfully quit (see sidebar).

### 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 approximately 10 years longer than those who continue to smoke.<sup>17,80</sup> One study showed that those who quit smoking at age 60, 50, 40, or 30 gained, respectively, about 3, 6, 9, or 10 years of life expectancy.<sup>80</sup> Of the 45.1 million Americans who smoke, more than 42.5% report attempting to quit for at least one day in the past year.<sup>20</sup>

A variety of effective treatments can help smokers quit (e.g., nicotine replacement products alone or in combi-

nation with prescription medication, counseling, or behavioral therapies).<sup>81</sup> Although the chances of success are approximately doubled by use of such treatments, a recent national study showed that only 22% of smokers trying to quit used any pharmacological or behavioral therapies for treating tobacco dependence.<sup>82</sup>

Health care providers can be especially influential in counseling and offering assistance to their patients who smoke. A recent assessment of physicians' and health care organizations' compliance with the US Public Health Service 5-step treatment model for smoking cessation indicated that 90% of the patients who were smokers were *asked* about their smoking status and 71% were *advised* to quit smoking. Only 56% were *assessed* for their willingness to quit, and 49% were *assisted* in quitting by being provided with information and materials, specialist referrals, and pharmacotherapy. However, just 9% reported that their clinician *arranged* a follow-up visit or phone call about quitting.<sup>83</sup> The task of aiding smokers to quit remains unfinished unless health care professionals offer assistance to smokers in quitting and follow up with them over the course of their treatment.

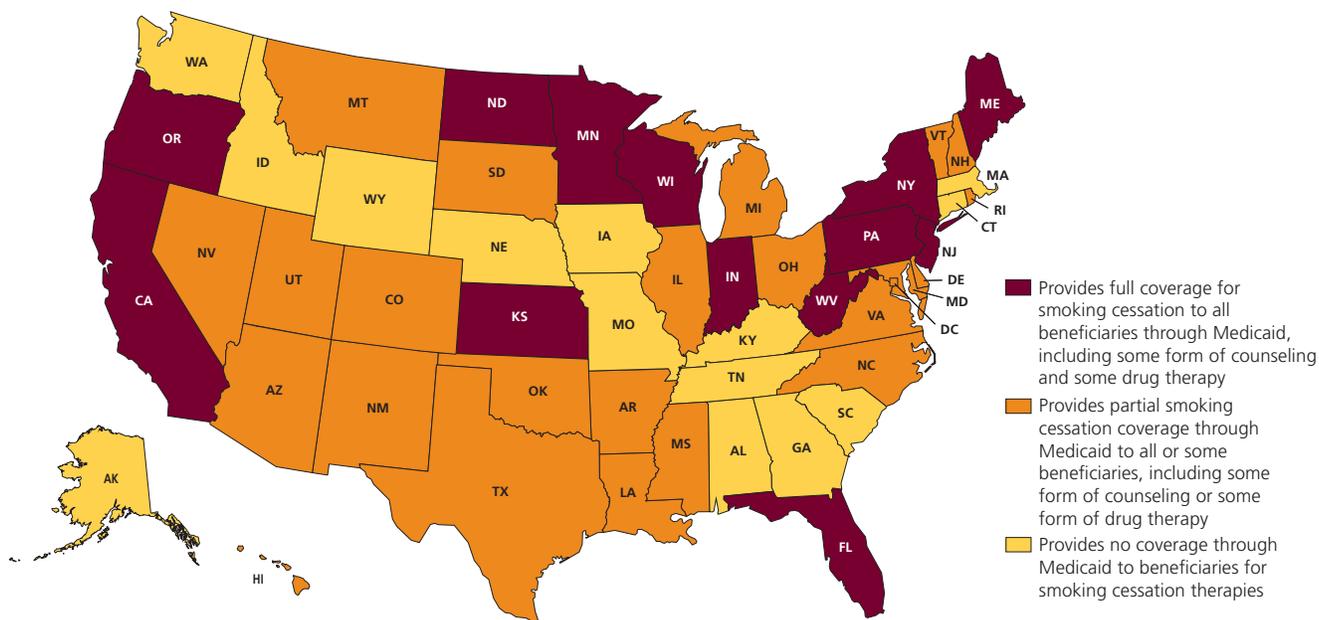
Health insurance coverage for smoking cessation treatments increases smokers' access to and use of treatments, as well as population quit rates.<sup>84-86</sup> However, such coverage for treatments is not consistent and even

insured smokers bear a significant portion of the cost of pharmacotherapy because of deductibles and co-payments.<sup>87</sup>

- Among national surveys to assess health insurance coverage of any tobacco cessation treatments, estimates range from 96% among health maintenance plans to 20% among employer-provided plans.<sup>85,88,89</sup>
- In 2003, Medicaid programs covered one or more treatments for tobacco dependence in 36 states and the District of Columbia; in 14 states, Medicaid covered no treatments at all (Figure 1E).<sup>90</sup>
- Medicare covers smoking cessation counseling and pharmacotherapy (excluding over-the-counter treatment) only for seniors with illnesses caused or complicated by tobacco use.<sup>91</sup>
- In 2003, 17 states (out of 45 states surveyed) ensured that state employees had access to health insurance coverage for pharmacotherapy and counseling.<sup>92</sup>

Cessation activity at the population level can be increased by providing free nicotine patches.<sup>93</sup> An innovative cessation program in New York state recently provided smokers with a free 6-week supply of nicotine patches. Results from the program's evaluation, conducted among callers to the New York State Smokers' Quitline, showed that smokers who were provided with free nicotine patches were almost 2 times more likely to

**Figure 1E. Insurance Coverage of Smoking Cessation Treatments, Medicaid Recipients, US, 2003**



Source: Halpin HA, et al. Medicaid coverage for tobacco-dependence treatments. Health Aff (Millwood). 2006;25(2):550-6.

be non-smoking after 12 months, compared to smokers who were not provided patches.<sup>93</sup> States and health insurance providers that provide access to smoking cessation treatments can increase utilization by promoting the availability of these benefits.<sup>85,94</sup>

Another strategy to facilitate cessation is the implementation of statewide telephone counseling services. These toll-free services can deliver effective behavioral counseling to large numbers of tobacco users, including low-income, rural, elderly, uninsured, and racial/ethnic subpopulations of smokers.<sup>84</sup> A recent study showed that smokers who received telephone counseling (and mailing of smoking cessation medications, if indicated) were more likely to have used smoking cessation treatments and stopped smoking for at least 6 months, compared to those who received just routine health care and mailed self-help materials.<sup>95</sup> In 2006, 45 states and a national service (1-800-QUITNOW) provided telephone cessation counseling.<sup>85</sup> In addition, an HHS Web site (<http://www.smokefree.gov>) offers online advice and downloadable information on quitting.

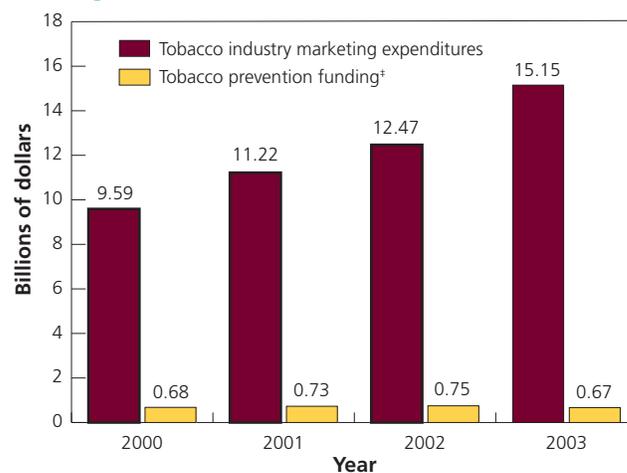
The American Cancer Society's Quitline® program (1-877-YES-QUIT (1-877-937-7848)) has offered free telephone-based cessation services since 2000 and has become the top provider of services with contracts in 11 states representing 27% of the US population. In addition, the Society's Quitline® services are available to more than 40 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://www.cancer.org/docroot/PED/PED\\_10\\_4\\_Great\\_American\\_Smokeout.asp](http://www.cancer.org/docroot/PED/PED_10_4_Great_American_Smokeout.asp) or call 1-800-ACS-2345)

### Funding for Tobacco Control

Since the Master Settlement Agreement with US states, tobacco companies have increased their cigarette advertising and promotional expenditures by 125%, from \$6.73 billion in 1998 to \$15.15 billion in 2003.<sup>46</sup> By comparison, states spent very little to counter these promotional efforts. In 2003, for every one dollar spent in the US on tobacco control efforts, the industry spent almost \$23 to promote its products (Figure 1F). Tobacco control expenditures have declined to just \$597.5 million in 2007.<sup>100</sup>

Recent research indicates that increased state tobacco control spending is associated with lower youth smoking

**Figure 1F. Tobacco Industry Expenditures on Cigarette Marketing\* versus Tobacco Prevention Funding†, US, 2000-2003**



\*Marketing includes advertising and promotional expenditures. †Tobacco prevention funding totals based on estimates calculated by the Campaign for Tobacco-Free Kids ‡Tobacco prevention funding is by Fiscal Year.

**Source:** Marketing expenditures: Federal Trade Commission, Federal Trade Commission Cigarette Report for 2003, Washington, DC, 2005. Tobacco Prevention Funding: Campaign for Tobacco-Free Kids. A Broken Promise to Our Children. The 1998 Master Settlement Agreement Eight Years Later. Washington, DC, 2006.

American Cancer Society, Surveillance Research

prevalence and fewer cigarettes smoked.<sup>96</sup> However, several of the most effective comprehensive tobacco control programs in the US have now been jeopardized by severe budget cuts.<sup>97,98</sup> Minnesota's Target Market youth anti-tobacco campaign ended in 2003, after operating for three years, when funding was cut by more than 75%.<sup>99</sup> Adolescents aged 12-17 were surveyed during and after the campaign to measure their susceptibility to smoking (i.e., the percentage of youth who agree with the statement, "you will smoke a cigarette in the next year"). Six months after the campaign was stopped, susceptibility to smoking had significantly increased from 43% to 53%.<sup>99</sup>

The Centers for Disease Control and Prevention (CDC) has recommended base and per capita levels of funding for states to address all components of comprehensive tobacco control.<sup>33</sup> These range from \$7 to \$20 per capita in smaller states (population less than 3 million), \$6 to \$17 per capita in medium-sized states (populations from 3 to 7 million), and \$5 to \$16 per capita in larger states (with populations over 7 million).<sup>33</sup>

- According to CDC estimates for minimal levels of tobacco control funding, about \$1.6 billion should be spent but only \$597.5 million has been set aside for fiscal year 2007.<sup>100</sup>

- Only three states met or exceeded the CDC *Best Practices* minimum level for funding; Colorado, Delaware, and Maine.<sup>100</sup> Fourteen other states fund tobacco prevention programs at at least half the minimum levels recommended by the CDC. The remaining 33 states and the District of Columbia fund at less than half the recommended amount (Figure 1G).<sup>100</sup>
- Recent budget deficits and other political pressures caused many states to cut their funding for tobacco control. Between 2001 and 2007, 28 states reduced their spending levels for tobacco control, while only 12 states have increased their funding for tobacco control by more than \$1 per capita (Table 1D).

Advocacy efforts are essential to sustain and increase funding for comprehensive tobacco control.

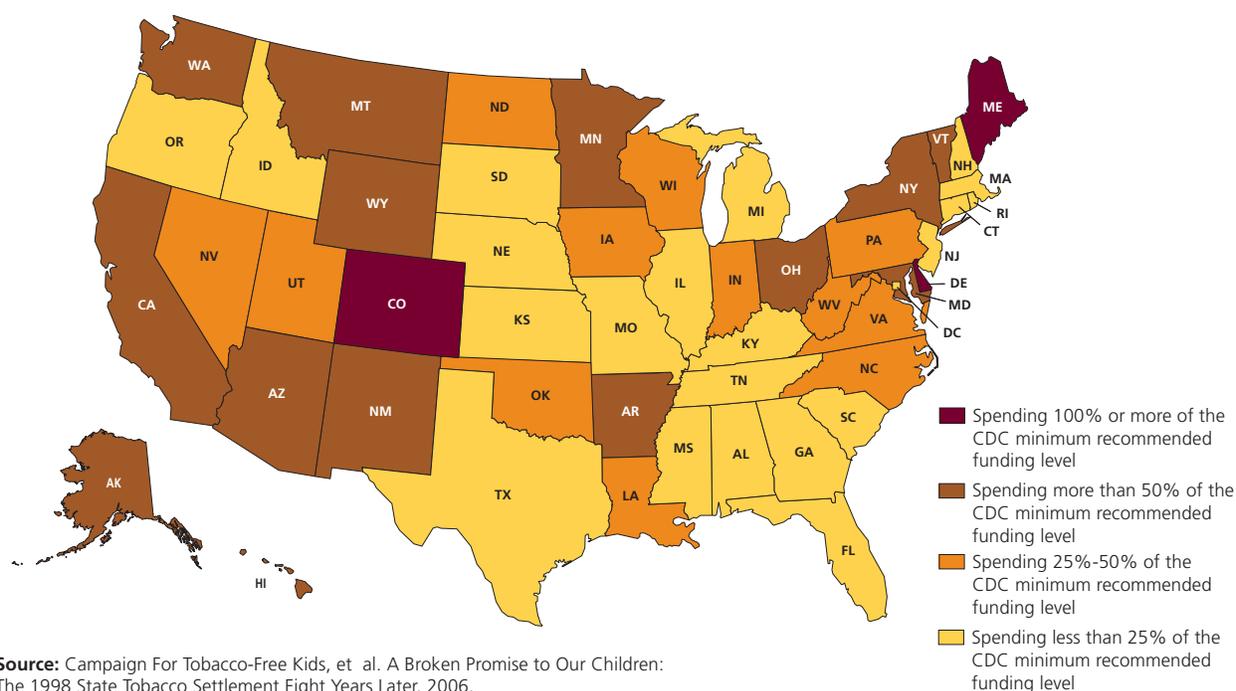
### Other Youth Tobacco Control Strategies

School-based tobacco prevention programs can be effective as part of comprehensive tobacco control programs.<sup>32</sup> Because children begin smoking at such young ages, smoking prevention classes are needed from elementary school through high school.<sup>32</sup> The Surgeon General recommends that tobacco prevention begin by 6th grade, and currently 38 states require that tobacco use prevention be taught in elementary schools.<sup>101</sup>

Nationally, in 2004, 53.5% of middle school students and 20.6% of high school students reported that they were taught ways of saying “no” to tobacco in at least one class, while 72.5% of middle school students and 42.6% of high school students reported being taught about the dangers of tobacco use. Because the long-term consequences of smoking seem remote to adolescent smokers, smoking prevention materials geared to youth should focus on the short, as well as long-term, consequences of smoking, such as reduced athletic performance and reduced physical attractiveness because of bad breath and stained teeth and fingers.<sup>5,102</sup> Prevention materials can also highlight the manipulation and exploitation of young people by tobacco companies.<sup>102</sup>

Parental guidance is important in maintaining smoke-free households, setting nonsmoking expectations early, monitoring adolescents for signs of smoking, limiting exposure to adult media, and countering the influence of glamorous or grown-up depictions of smoking in movies and other media.<sup>103</sup> There is now strong evidence of an association between exposure to smoking in movies and adolescent smoking.<sup>104-107</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 developed in order to counter the impact of smoking in movies on youth.

**Figure 1G. Funding for Tobacco Prevention, by State, US, 2007**



# Overweight and Obesity, Physical Activity, and Nutrition

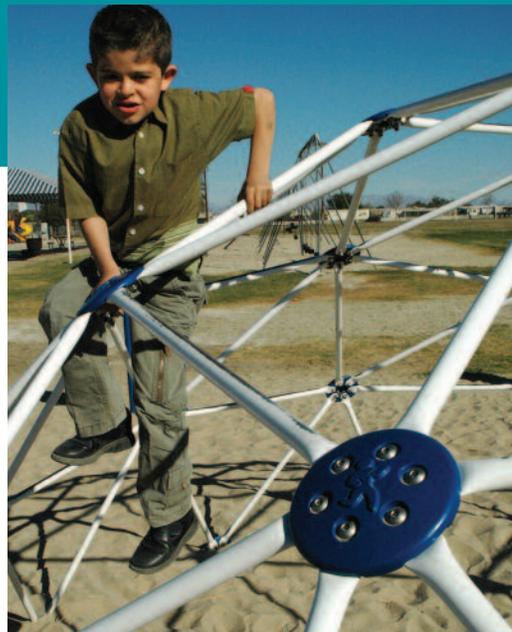
Obesity, physical inactivity, and poor nutrition are major risks factors for cancer, second only to tobacco use.<sup>109</sup> Approximately one-third of the more than 500,000 cancer deaths in the US this year can be attributed to poor diet and physical inactivity, while another third is caused by exposure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

Based upon a comprehensive review of current evidence, the Society has updated guidelines on nutrition and physical activity for cancer prevention. These guidelines contain recommendations regarding community actions and individual choices related to weight control, physical activity, and diet.

## Community Action

Since healthy individual choices may be facilitated or impeded by the social and physical environment in which people live, community efforts to create a social environment that promotes healthy food choices and physical activity are important. Facilitating improved diet and increased physical activity patterns in communities requires multiple strategies and actions, ranging from the implementation of community, worksite, and other health promotion programs to policies that affect community planning, transportation, school-based physical education, and food services.

Particular efforts will be needed to ensure that all population groups have access to healthy food choices and opportunities for physical activity. Public and private organizations at local, state, and national levels will need to develop new policies and reallocate or expand resources to facilitate necessary changes. Health care professionals and community leaders, in particular, have new opportunities to provide leadership and to promote policy changes in their communities.



## Approaches to Improving Physical Activity and Nutrition

- Limit marketing of foods and beverages with low nutritional values in schools.
- Encourage restaurants to provide nutrition information on menus (e.g., calories, fat, trans fat, sugars, etc.).
- Invest in community designs that support development of sidewalks, bike lanes, and access to parks and green space.
- Increase 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" in nutrition and physical activity that exemplify 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 a strategic and action-oriented plan to address the obesity problem.

This section provides a summary of the 2006 American Cancer Society Guidelines on Nutrition and Physical Activity 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.
- 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 Society and other nonprofit organizations, such as the American Heart Association and the American Diabetes Association, and government organizations, such as the CDC and state health departments, have formed coalitions and partnerships to develop and facilitate the adoption of public health strategies to address the epidemic of overweight and obesity. The following are some approaches that have been proposed<sup>111,112</sup> (see sidebar, page 16).

### 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).

### 1. Maintain a Healthy Weight Throughout Life 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 and obesity, see sidebar, page 19). 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 lymphoma, and aggressive prostate cancer.<sup>109</sup> The link between body weight and cancer risk is believed to stem from multiple effects on fat and sugar metabolism, immune function, hormone levels (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. Although our knowledge about the relationship between weight loss and cancer risk is still incomplete, individuals who are overweight or obese should be encouraged and supported in their efforts to reduce weight.

### Obesity Trends

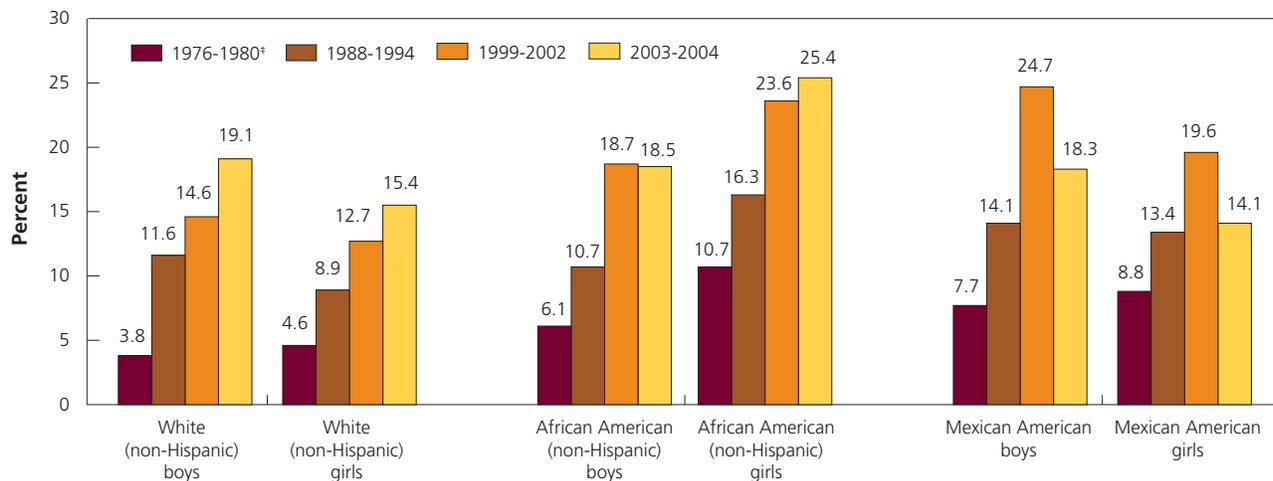
- Approximately two-thirds of Americans are overweight or obese.<sup>113</sup>
- In the past 20 years, overweight prevalence among adolescents aged 12 to 19 more than tripled, from 5% to 17.1%. Across race, ethnicity, and gender, increases in adolescent obesity have occurred; non-Hispanic African American girls have the highest rates of obesity (Figure 2A).
- In 2005, across select states, the percentage of US adolescents who are at risk of becoming overweight ranges from 10.3% to 17.8% (Table 2A provides additional overweight measures in select cities).
- The percentage of obese adults varied little from 1960 to 1980; in contrast, obesity rates doubled between 1976-1980 and 2003-2004, from 15.1% to 33.3% (Figure 2B).



- For the period of 1999 to 2004, obesity trends in men showed an increase from 28.1% to 32% while in women, obesity rates had stabilized at about 34% (Figure 2B).
- In 2005, the prevalence of obesity across states ranged from 17.9% to 30.9% (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.

**Figure 2A. Overweight\* Children and Adolescents, 12-19 Years of Age, by Gender & Race/Ethnicity†, US, 1976-2004**



\*Overweight is defined as body mass index (BMI) at or above the sex- and age-specific 95th percentile BMI cutoff points from the 2000 CDC Growth Charts: United States. †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.

**Source:** National Health and Nutrition Examination Survey, Hispanic Health and Nutrition Examination Survey (1982-84). Centers for Disease Control and Prevention, National Center for Health Statistics, Health, United States, 2004, with Chartbook on Trends in the Health of Americans. Hyattsville, Maryland: 2004. Ogden CL, et al. Prevalence of Overweight and Obesity in the United States, 1999-2004. *JAMA* 2006;295(13):1549-55.

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### Achieving and Maintaining a Healthy Weight

The definition of healthy weight depends on a person's height, so weight recommendations are often determined by a formula known as a body mass index (BMI) (see sidebar). Exact cutoffs are somewhat arbitrary but a BMI within the range of 18.5 to 25.0 kg/m<sup>2</sup> is generally considered healthy, whereas a BMI between 25.0 and 29.9 is overweight, and a BMI of 30.0 or higher is obese.

The best way to achieve and maintain a healthy body weight is to balance caloric intake with physical activity. 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 (see sidebar, page 21). High-calorie and low nutrient foods should be replaced with vegetables and fruits, whole grains, beans, and lower-calorie beverages. Monitoring food intake and physical activity has been shown to be effective in weight management.

### Defining Body Mass Index

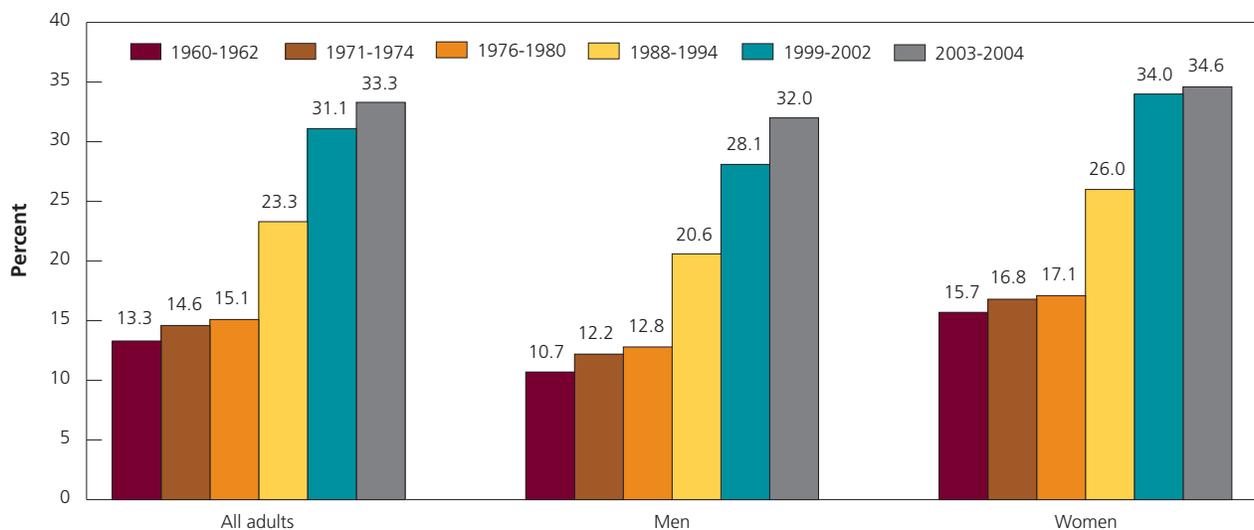
This sidebar relates BMI to pounds and inches. For example, a 5'4" woman is considered overweight if she weighs between 145 and 173 pounds. She is obese if she weighs 174 pounds or more. A 5'10" man is considered overweight if he weighs between 174 and 206 pounds and obese if he weighs 207 pounds or more.

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

\*Overweight defined as Body Mass Index of 25-29.9 kg/m<sup>2</sup>.

†Obesity defined as Body Mass Index of 30 kg/m<sup>2</sup> or greater.

**Figure 2B. Adult Obesity\*, by Gender, Ages 20-74, US, 1960-2004†**



\*Body mass index of 30 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). Centers for Disease Control and Prevention, National Center for Health Statistics, Health, United States, 2004, With Chartbook on Trends in the Health of Americans. Hyattsville, Maryland: 2004. 2003-2004: National Health and Nutrition Examination Survey Public Use Data Files, 2003-2004, National Center for Health Statistics, Centers for Disease Control and Prevention, 2006.

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**Table 2A. Overweight and Related Factors, High School Students, by State and City/County, US, 2005**

	% At risk for becoming overweight*	% Overweight†	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>	15.7	13.1		37.2	35.8	33.0	56.0	20.1
<b>State</b>								
Alabama	17.8	14.8	35	38.4	31.8	45.1	55.9	14.7
Arizona	13.6	11.9	18	32.8	32.3	26.2	47.1	15.2
Arkansas	16.7	15.4	38	39.1	30.9	27.2	50.8	13.9
Colorado	10.3	9.8	6	26.8	37.2	16.6	61.2	19.2
Connecticut	14.7	11.2	13	33.5	N/A	12.9	N/A	21.8
Delaware	15.1	14.1	32	44.6	N/A	30.1	56.0	16.3
Florida	14.4	10.9	10	40.9	30.6	25.3	50.8	21.9
Georgia	14.9	12.4	23	42.4	33.9	35.9	55.9	18.1
Hawaii	14.2	13.5	28	36.9	30.2	12.1	N/A	19.1
Idaho	13.7	7.2	2	21.7	39.2	28.8	62.1	18.1
Indiana	14.3	15.0	36	31.9	32.2	28.2	58.8	15.5
Iowa	14.8	12.2	22	28.6	34.1	10.3	66.9	16.6
Kansas	13.3	11.9	19	28.8	41.3	27.8	64.4	20.6
Kentucky	17.0	15.6	39	35.5	29.6	17.3	52.6	17.1
Maine	14.4	10.9	11	26.8	N/A	6.7	59.8	18.9
Maryland	16.1	12.6	24	40.7	32.4	19.1	52.3	19.9
Massachusetts	15.6	11.2	14	32.8	N/A	17.9	54.5	N/A
Michigan	13.5	12.1	21	35.8	N/A	29.8	N/A	16.7
Missouri	15.9	13.9	30	33.9	36.0	31.1	56.9	16.7
Montana	12.8	9.3	4	26.3	31.2	34.0	61.7	17.0
Nebraska	13.8	11.0	12	26.5	36.5	34.3	63.3	13.5
Nevada	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
New Hampshire	13.2	11.4	16	24.5	42.8	N/A	57.6	N/A
New Jersey	15.4	11.4	17	35.8	34.0	60.7	61.8	16.8
New Mexico	14.6	12.0	20	28.6	N/A	24.3	45.1	17.8
New York	17.1	10.5	9	41.9	29.6	17.4	64.4	21.7
North Carolina	15.7	13.5	29	36.3	45.9	34.4	N/A	N/A
North Dakota	12.8	11.2	15	24.4	N/A	37.0	61.3	13.8
Ohio	14.7	12.7	25	36.4	N/A	N/A	58.1	N/A
Oklahoma	15.9	15.2	37	38.8	38.2	31.3	56.6	15.9
Rhode Island	15.2	12.9	27	36.0	32.2	19.8	53.6	25.4
South Carolina	13.7	12.7	26	41.4	29.8	21.8	52.0	16.2
South Dakota	14.0	10.4	8	24.1	32.3	21.5	59.1	16.8
Tennessee	17.5	14.6	34	41.4	33.7	29.7	50.8	18.0
Texas	15.0	13.9	31	40.5	36.0	35.7	57.6	19.4
Utah	11.1	5.6	1	19.0	35.6	22.6	59.6	20.0
Vermont	13.8	9.5	5	N/A	N/A	12.8	N/A	23.8
West Virginia	16.0	14.5	33	38.5	37.3	31.7	51.9	22.1
Wisconsin	13.7	9.9	7	26.1	35.0	60.2	N/A	N/A
Wyoming	12.3	8.4	3	22.3	36.0	21.5	59.5	16.8
<b>City/County</b>								
Baltimore, MD	19.4	17.6	19	60.3	25.1	18.7	44.3	21.6
Boston, MA	18.7	15.4	12	45.4	N/A	9.0	46.2	N/A
Broward County, FL	16.2	11.9	8	45.7	28.3	22.9	47.9	22.9
Charlotte-Mecklenburg, NC	14.6	10.6	3	40.6	38.5	4.0	N/A	N/A
Chicago, IL	18.5	15.7	13	47.6	25.1	45.9	50.2	22.1
Dallas, TX	16.9	21.5	21	58.1	N/A	29.3	N/A	16.4
DeKalb County, GA	17.3	12.4	10	52.0	30.8	30.9	56.3	19.1
Detroit, MI	19.4	18.9	20	70.5	N/A	31.9	N/A	20.0
District of Columbia	20.7	10.6	4	61.9	18.2	16.3	44.8	19.6
Hillsborough County, FL	16.5	11.1	5	39.2	29.2	22.3	50.8	16.9
Los Angeles, CA	17.7	16.4	16	48.3	31.8	50.6	50.8	28.4
Memphis, TN	18.0	16.1	15	61.3	26.4	27.7	45.9	17.9
Miami-Dade County, FL	16.6	12.1	9	50.8	26.9	17.9	45.7	23.0
Milwaukee, WI	18.0	17.2	18	52.3	24.4	46.6	N/A	N/A
New Orleans, LA	17.6	15.9	14	55.0	19.2	26.5	57.5	19.9
New York City, NY	16.4	11.6	6	54.6	27.1	43.0	N/A	18.8
Orange County, FL	14.9	11.8	7	42.9	30.0	24.5	46.1	21.6
Palm Beach County, FL	14.2	10.4	1	40.3	27.4	27.0	48.1	26.4
San Bernardino, CA	19.7	16.4	17	46.4	30.3	47.5	48.7	19.5
San Diego, CA	14.3	12.7	11	40.8	N/A	40.5	53.3	18.7
San Francisco, CA	13.3	10.5	2	41.5	24.5	36.4	42.8	19.9

\*Body mass index at or above the 85th percentile but below the 95th percentile of growth chart for age and sex. †Body mass index at or above the 95th percentile of growth chart for age and sex. ‡Rank is based on % overweight. §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, 2005, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention. *MMWR Morb Mortal Wkly Rep.* 2006;55(SS-5).

## What Counts as a Serving

**Fruits:** 1 medium apple, banana, or orange; 1/2 cup of chopped, cooked, or canned fruit

**Vegetables:** 1 cup of raw leafy vegetables; 1/2 cup of other cooked or raw vegetables, chopped; 1/2 cup of 100% vegetable juice

**Grains:** 1 slice of bread, 1 ounce of ready-to-eat cereal; 1/2 cup of cooked cereal, rice or pasta

**Beans and nuts:** 1/2 cup of cooked dry beans; 2 tablespoons of peanut butter; 1/3 cup of nuts

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

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

It should also be noted that healthy behaviors are ingrained early in childhood. Excess weight gain, unhealthy dietary patterns, and physical inactivity during childhood and adolescence can result in increased risk of developing cancer, cardiovascular disease, diabetes, hypertension, and osteoporosis later in life. 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>115</sup>

## 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 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

### Benefits of Physical Activity

Evidence suggests that 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>116</sup>

### Types of Activity and Recommendations

Usual physical activity during one's daily routine is typically of low intensity and short duration. Intentional activities associated with fitness or transportation (e.g., bike ride, brisk walking) generally require more effort and engage large muscle groups to cause a noticeable increase in heart rate, breathing depth and frequency,

and sweating. For selected examples of moderate and vigorous activities (see sidebar, page 23).

Although the optimal intensity, duration, and frequency of physical activity needed to reduce cancer risk are unknown, evidence suggests that 45-60 minutes on 5 or more days of the week is optimal for reducing the risk of colon and breast cancer.<sup>109</sup> Other studies have shown that 1 hour of exercise on 5 or more days each week helps to prevent weight gain and obesity.<sup>114,117</sup> By helping to maintaining a healthy weight, physical activity therefore may also have an indirect effect on reducing the risk of developing obesity-related cancers.

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 5 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.

**Table 2B. Overweight, Obesity, and Related Factors, Adults 18 and Older, by State, US, 2005**

	% Clinical overweight (25.0-29.9 kg/m <sup>2</sup> )	% Clinical obese (30.0 kg/m <sup>2</sup> or greater)	% Overweight (25.0 kg/m <sup>2</sup> or greater)	State Rank*	% No leisure-time physical activity	% Vigorous physical activity†	% Moderate physical activity‡	% Eating five fruit and vegetable servings a day	% Eating three or more vegetable servings a day	% Eating two or more fruit servings a day
Alabama	35.6	28.9	64.6	46	29.7	20.3	42.8	20.1	13.7	7.9
Alaska	36.8	27.3	64.2	44	21.5	36.0	59.2	24.6	8.1	18.5
Arizona	35.1	21.0	56.1	5	22.6	29.1	53.6	23.7	8.9	14.9
Arkansas	36.8	28.0	64.8	48	30.6	24.8	46.4	20.9	14.7	11.3
California	37.9	22.7	60.6	19	23.9	36.2	53.4	28.9	10.3	26.7
Colorado	36.7	17.9	54.6	2	17.3	32.6	54.4	24.3	9.0	19.7
Connecticut	38.0	20.1	58.2	9	21.2	31.1	51.4	27.5	10.0	17.6
Delaware	39.5	23.5	63.0	38	23.4	25.0	45.3	21.2	9.4	10.9
Dist. of Columbia	33.4	21.7	55.1	3	22.4	31.3	53.0	32.2	13.7	19.5
Florida	37.9	22.8	60.7	20	26.9	24.7	45.2	26.1	8.0	16.9
Georgia	36.4	26.6	63.1	39	27.2	23.7	42.0	23.2	15.0	12.6
Hawaii	33.3	19.7	53.0	1	19.4	30.4	52.2	24.4	8.4	13.9
Idaho	36.9	24.5	61.4	26	21.7	31.2	54.1	23.3	8.8	16.5
Illinois	35.7	25.2	60.9	22	25.7	25.7	47.1	24.0	7.3	17.8
Indiana	35.1	27.3	62.4	31	27.0	27.1	47.7	22.0	9.6	14.8
Iowa	37.0	25.4	62.4	32	24.7	22.9	46.2	19.5	6.8	13.4
Kansas	37.0	23.9	60.9	21	24.3	25.0	48.6	19.9	8.7	10.4
Kentucky	36.3	28.6	64.8	49	31.5	16.8	34.7	16.8	13.8	3.2
Louisiana	33.8	30.8	64.7	47	33.4	20.7	38.4	20.2	11.8	7.9
Maine	37.0	22.7	59.6	14	22.4	30.8	54.1	28.6	12.9	16.2
Maryland	36.6	24.6	61.2	24	22.9	29.6	49.2	28.8	13.0	18.1
Massachusetts	35.3	20.8	56.1	6	23.4	29.6	52.7	28.5	10.9	18.5
Michigan	36.3	26.2	62.6	34	22.4	28.1	49.6	22.8	7.4	17.5
Minnesota	37.2	23.7	60.9	23	16.2	28.3	51.0	24.5	6.9	21.0
Mississippi	36.4	30.9	67.3	51	32.5	20.9	40.0	16.5	10.9	8.7
Missouri	37.0	26.9	63.9	41	25.4	25.4	46.4	22.6	9.3	16.1
Montana	36.1	21.3	57.4	8	22.4	33.1	56.4	24.5	8.4	14.8
Nebraska	37.2	26.0	63.3	40	23.8	24.7	47.3	20.2	7.7	13.5
Nevada	37.6	21.2	58.8	10	26.8	32.6	50.6	22.5	4.3	17.9
New Hampshire	36.9	23.3	60.1	17	21.6	32.9	56.0	29.1	12.9	18.7
New Jersey	37.0	22.2	59.2	11	29.2	25.5	46.0	25.8	8.0	16.6
New Mexico	38.6	21.8	60.3	18	23.3	28.9	50.9	21.5	9.0	13.9
New York	37.7	22.2	59.9	16	27.2	27.4	48.1	25.9	8.1	19.6
North Carolina	36.8	26.0	62.8	35	25.6	22.2	42.1	22.5	15.9	7.7
North Dakota	38.8	25.4	64.2	43	23.1	27.6	48.4	21.9	7.3	15.7
Ohio	38.2	24.2	62.5	33	25.6	27.3	49.3	22.6	8.1	14.7
Oklahoma	36.1	26.8	62.9	36	30.6	22.6	42.3	15.7	7.5	7.8
Oregon	35.9	23.8	59.7	15	18.6	30.7	56.4	25.9	10.1	20.7
Pennsylvania	36.6	25.4	61.9	29	25.9	27.5	48.7	23.9	8.6	17.9
Rhode Island	38.3	21.1	59.4	13	25.9	29.8	51.1	26.7	9.2	17.0
South Carolina	35.4	29.2	64.5	45	26.3	24.6	45.2	21.0	11.0	11.8
South Dakota	37.4	25.5	62.9	37	22.4	23.5	47.6	20.6	5.1	14.4
Tennessee	34.8	27.5	62.3	30	33.1	17.4	36.2	26.6	18.4	5.9
Texas	37.0	27.2	64.2	42	27.4	25.3	46.7	22.6	11.1	13.8
Utah	35.0	21.2	56.2	7	18.5	34.2	55.0	22.1	8.6	18.8
Vermont	35.6	20.3	55.8	4	19.2	33.0	57.8	30.6	11.7	21.2
Virginia	36.1	25.2	61.3	25	21.4	30.4	50.8	26.2	13.2	18.8
Washington	36.1	23.3	59.4	12	17.4	30.6	54.7	25.2	9.8	20.2
West Virginia	34.9	30.6	65.5	50	28.6	17.6	39.4	20.0	13.4	6.9
Wisconsin	37.2	24.4	61.6	27	18.6	32.9	56.6	22.1	6.7	18.7
Wyoming	37.4	24.2	61.7	28	22.0	33.1	56.2	21.8	7.4	14.5
United States§	36.8	24.5	61.3		25.2	27.6	48.3	24.3	10.0	16.7
Range	33.3-39.5	17.9-30.9	53.0-67.3		16.2-33.4	16.8-36.2	34.7-59.2	15.7-32.2	4.3-18.4	3.2-26.7

\*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 2005, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 2006.

American Cancer Society, Surveillance Research

## 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)

### Current Physical Activity Level in Adolescents

- In 2005, 35.8% of US youth were physically active for at least 60 minutes on more than 5 days per week and 33% attended physical education classes daily (Table 2A).
- In 2005, 37.2% of US high school students reported watching 3 or more hours of television (Table 2A).

### Current Physical Activity Level in Adults

- In 2005, 25.2% of adults reported no leisure-time physical activity; across states and the District of Columbia, the percentage of adults reporting no leisure-time physical activity ranged from 33.4% in Louisiana to 16.2% in Minnesota (Table 2B).
- In 2005, 48.3% of adults reported engaging in moderate levels of activity and 27.6% 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 5 or more days per week.<sup>112,118</sup> The availability of routine, high-quality physical education programs is a critically important and recognized way of increasing physical activity among youth. As such, 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 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 5 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 one'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.

### **Portion Control 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. Consuming a varied diet that emphasizes plant foods may help to displace these calorie-dense foods. Limiting portion sizes, especially of calorie-dense foods, will also reduce total caloric intake.

It should be noted that simply replacing dietary 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 nutrient 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. Greater consumption of vegetables and fruits is associated with decreased risk of lung, esophageal, stomach, and colorectal cancers.<sup>119</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.

For these reasons, consumption of low-calorie whole vegetables and fruits has been encouraged by a number of health organizations.<sup>114,120</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 5 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 of these foods, depending on calorie needs, as stated in the US Department of Health and Human Services' *Dietary Guidelines for Americans*.<sup>114</sup>

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

- About 1 in 5 (20.1%) US high school students ate vegetables and fruits 5 or more times per day in 2005 (Table 2A).
- Only 24.3% of adults reported eating 5 or more servings of vegetables and fruit daily in 2005. Across states, prevalence of consuming 5 or more servings of vegetables and fruit ranged from 15.7% in Oklahoma to 32.2% in the District of Columbia (Table 2B).

- In general, across states the proportion of adults consuming 3 or more vegetables servings daily is lower than the proportion of adults consuming 2 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>114</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 are therefore recommended for the benefit of overall health.<sup>114</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. Meat also contains several constituents that could increase the risk of cancer, such as mutagens and carcinogens, iron, nitrates/nitrites, and salt.

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.

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

People who drink alcohol should limit their intake to no more than 2 drinks per day for men and one drink a day for women.<sup>114</sup> 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, 5 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>110,121</sup> For each of these cancers, risk increases substantially with intake of more than 2 drinks per day.<sup>110,121</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 cancers.<sup>110</sup> Reducing alcohol consumption may be an important way for many women to reduce their risk of breast cancer.

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>122</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, as 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.

## Impact of Diet and Physical Activity on Specific Cancers

### Breast Cancer

Breast cancer is the most common cancer diagnosed among American women and is second only to lung cancer as a cause of cancer deaths in women. There is consistent evidence that increased body weight and weight gain during adulthood are associated with increased risk for breast cancer among postmenopausal (but not premenopausal) women. Alcohol intake is also associated with an increase in risk, particularly for women whose intake of folate is low. Moderate to vigorous physical activity has been shown to be associated with decreased breast cancer risk among both premenopausal and postmenopausal women.<sup>109</sup> Although reduction of fat intake to very low levels may reduce breast cancer risk, results from a recent trial found that lowering fat intake to 29% of calories had only a very small effect on risk among postmenopausal women.

## Recommendations

At the present time, the best nutritional advice to reduce the risk of breast cancer is to engage in moderate to vigorous physical activity 45 to 60 minutes on 5 or more days per week, minimize lifetime weight gain through the combination of caloric restriction and regular physical activity, and avoid or limit intake of alcoholic beverages.

## Colorectal Cancer

Colorectal cancer is the second leading cause of cancer death among American men and women combined. The risk of colorectal cancer is increased in people with a family history of the disease, as well as in those with long-term tobacco use and possibly excessive alcohol consumption. Studies demonstrate a lower risk of colon cancer among those who are moderately active on a regular basis and increasing evidence suggests that more vigorous activity may have an even greater benefit in reducing the risk of colon cancer. Obesity increases the risk of colon cancer among both men and women but the association seems to be stronger in men.<sup>109</sup> Diets high in vegetables and fruits have been associated with decreased risk, and diets high in processed and/or red meat have been associated with increased risk of colon cancer.<sup>119</sup> A growing number of studies also support a protective role of calcium and vitamin D. However, because of a potential increase in the risk of prostate cancer, it would be prudent to limit calcium intake in men to less than 1,500 mg/day until further studies are conducted.

## Recommendations

The best nutritional advice to reduce the risk of colon cancer is to increase the intensity and duration of physical activity, limit intake of red and processed meat, consume recommended levels of calcium, eat more vegetables and fruits, avoid obesity, and avoid excess alcohol consumption (e.g., no more than 1 drink/day in women, 2 drinks/day in men). In addition, it is very important to follow the American Cancer Society guidelines for regular colorectal screening, as identifying and removing precursor polyps in the colon can prevent colorectal cancer.<sup>123</sup>

## Endometrial Cancer

Endometrial cancer is the most common female reproductive cancer in the United States, ranking 4th among all cancers in women. There is strong evidence of a relationship between obesity and endometrial cancer; other known risk factors include postmenopausal

estrogen therapy, sequential oral contraceptive formulations, and a history of polycystic ovarian syndrome.<sup>109</sup> In premenopausal women, increased risk has been attributed to insulin resistance, elevation in ovarian androgens, anovulation, and chronic progesterone deficiency associated with overweight. In postmenopausal women, increased risk has been attributed to higher estrogen concentrations.<sup>109</sup> Studies suggest a high level of physical activity (which has been shown to affect hormone levels) may decrease endometrial cancer risk.<sup>109</sup> Vegetable and fiber intakes may also decrease risk, whereas red meat, saturated fat, and animal fat may increase risk.

## Recommendations

At the present time, the best advice to reduce the risk of endometrial cancer is to maintain a healthy weight through diet and regular physical activity, and eat a predominantly plant-based diet rich in vegetables, whole grains, and beans.

## Kidney Cancer

In the US, kidney cancer accounts for 3% of cancer cases and deaths in men (2% in women), and the incidence has been steadily rising by nearly 2% annually since 1975. Although the specific cause(s) is unknown, established risk factors include obesity and tobacco smoking.<sup>109</sup>

## Recommendations

At the present time, the best advice to reduce the risk of kidney cancer is to maintain a healthful weight and avoid tobacco use.

## Prostate Cancer

Prostate cancer is the most common cancer among American men. Although the impact of nutritional factors remains uncertain, studies suggest that specific antioxidant nutrients, such as vitamin E, selenium, beta carotene, and lycopene may reduce prostate cancer risk. Other studies have observed that greater consumption of red meat or dairy products may be associated with increased risk of prostate cancer. Being overweight may be associated with worse prognosis and evidence suggests that vigorous exercise may impart some benefit for prostate cancer risk.<sup>109</sup>

## Recommendations

At the present time, the best advice to reduce the risk of prostate cancer is to eat 5 or more servings of a wide variety of vegetables and fruits each day, limit intake of red meats and dairy products, and maintain an active lifestyle and healthy weight.

# UV Radiation and Skin Cancer

The vast majority of skin cancers are due to exposure to unprotected or excessive ultraviolet (UV) radiation, primarily from the sun.<sup>124</sup> While UV exposure is associated with a small percentage of all cancer deaths,<sup>124,125</sup> the American Cancer Society estimates that UV radiation is associated with more than 1 million cases of basal and squamous skin cancers and 59,940 cases of malignant melanoma in 2007. Most skin cancer deaths are due to melanoma which is among the fastest rising cancers in the US.<sup>126</sup> It is widely thought that the increase in skin cancer over the last few decades is the consequence of changes in behavior that have resulted in increased exposure to solar UV radiation.

Everyone is exposed to naturally occurring solar UV radiation. The extent of an individual's exposure to sunlight is determined by personal behaviors, particularly intentional exposure aimed at getting a tan (i.e., sunbathing). Also, environmental factors such as time of day, season, geographic location, altitude, and other weather conditions can affect the amount of solar radiation received by individuals.<sup>127</sup> A second source of exposure is UV radiation emitted by devices (tanning lamps or booths) that are increasingly available for cosmetic use and heavily promoted by the indoor tanning industry.<sup>128</sup> Although recent studies suggest that use of indoor devices is a risk factor for skin cancer,<sup>129,130</sup> the evidence is not yet conclusive. The use of indoor tanning lamps or booths is prevalent among young adults and women who perceive a tanned appearance as healthy and attractive.<sup>128</sup>

The negative effects of UV radiation are cumulative during life. The immediate adverse effects of excessive UV exposure are sunburn, eye damage, and suppression of the immune system; longer-term effects include premature aging of the skin, wrinkles, and skin cancer.<sup>131</sup> On the other hand, a moderate degree of solar UV exposure is necessary for the body's production of vitamin D, which is essential for bone health. There are two other ways to obtain vitamin D – dietary sources (particularly fortified milk, some cereals, oily fish, and eggs) and supplementation. The current national recommended intake of vitamin D is 200 IU to 600 IU.<sup>132</sup> Evidence is emerging that low vitamin D levels may be associated with an increased risk of cancers of the colon, prostate, and breast.<sup>133,134</sup> More information on achieving a balanced approach to



maintaining optimum vitamin D levels through diet, supplementation, and limited sun exposure is available online at [http://www.cancer.org/docroot/NWS/content/NWS\\_1\\_1x\\_A\\_Call\\_for\\_More\\_Vitamin\\_D\\_Research.asp](http://www.cancer.org/docroot/NWS/content/NWS_1_1x_A_Call_for_More_Vitamin_D_Research.asp)

## Sunburns

Sunburns typically occur as a result of excessive sun exposure on unprotected or poorly protected skin.<sup>125,127</sup> Sunburns are characterized by skin redness (erythema) which occurs 3 to 5 hours after UV exposure; depending on the extent of UV 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>135-137</sup> In general, individuals with light skin pigmentation that does not tan easily are more susceptible to sunburns than those with darker skin; however, everyone is at risk for other UV related health effects.<sup>125,138</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 showed that:

- More than two-thirds (68.7%) of youth reported getting sunburned during summer months.
- Sunburn rates were higher in youth whose skin does not tan easily but burns when exposed to the sun (84.5%), white youth (76.3%), and girls (71.5%).

According to the Behavioral Risk Factor Surveillance System:

- 41.2% of white adults aged 18 and older were sunburned in the past year; African American adults had the lowest prevalence of sunburns (5.7%), and 21% of Hispanics and 24% of adults of other races reported a sunburn.

**Table 3A. Prevalence of Sunburns in US Adolescents and Adults, 2004**

Adolescents	%
<b>Age (years)</b>	
11-13	67.3
14-15	69.6
16-18	70.0
<b>Gender</b>	
Boys	66.0
Girls	71.5
<b>Race/ethnicity</b>	
White	76.3
Nonwhite	43.0
<b>Sun sensitivity index*</b>	
Low	52.2
Medium	73.4
High	84.5
<b>Total</b>	<b>68.7</b>
Adults†	%
<b>Age</b>	
18-29	64.2
30-39	57.3
40-49	48.9
50-64	30.7
≥65	9.3
<b>Gender</b>	
Male	46.4
Female	36.3
<b>Education</b>	
<High school	27.5
High school grad	36.5
Some college	43.2
College grad	46.5
<b>Total</b>	<b>41.2</b>

\*Sun sensitivity: A validated measure based on 4 phenotypic characteristics (skin reaction after 1 hour of exposure to summer sun (sensitivity to sunburn), skin reaction after repeated exposure to the summer sun (ease of skin's tanning ability), the natural color of the skin, and the natural color of the hair). †Analysis for adults is restricted to Non-Hispanic Whites. Sunburn is more common among NH Whites (41.2%), compared to NH Black (5.7%), Hispanic (21.2%) and other race/ethnicity (24.6%).

**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. Adults: Behavioral Risk Factor Surveillance System Public Use Data Tape 2005, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 2006.

- The prevalence of sunburns was lower (9.3%) among adults aged 65 and older.
- Adult men were more likely to get sunburns than women, as were adults with higher versus lower educational attainment (Table 3A).

Susceptibility to UV damage is higher among individuals with fair skin, a family history of skin cancer, the presence of moles and freckles, or a history of severe sunburns early in life (see side bar, page 29).<sup>125,138</sup> To minimize the harmful effects of excessive and unprotected sun exposure, protection behaviors should be a life long practice.

Studies show that many adults and adolescents in the US do not regularly protect themselves when outdoors on sunny days.<sup>140-142</sup> For example, in a 2004 survey about one-third of youth reported using sunscreen in 2004 during the past summer and only 20% protected themselves by seeking the shade; even fewer (<10%) used protective clothing (long sleeves or pants). A survey of adults' intention to engage in sun protection practices showed approximately 30% intended to apply sunscreen, another 27% intended to seek the shade, and 23% intended to wear protective clothing to minimize sun exposure.<sup>143</sup> No recent data are available on actual adoption of these practices but it is likely that adherence to sun protection behaviors is lower, particularly among the subgroups of adults with high reported rates of sunburns (Table 3A).

UV damage of unprotected skin should be minimized by the use of sunscreens, limiting the amount of UV exposure or timing outdoor activities when the UV rays are less intense, and use of protective clothing. While sunscreen products protect from sunburns, skin can still be damaged by prolonged stays in the sun.<sup>127</sup> It is important that users of sunscreen (particularly those at high risk) learn about proper selection of sunscreen types and application techniques. "Broad spectrum" sunscreens are best because they contain active ingredients that absorb at least 85% of both UVA and UVB rays of the sun. Adequate amounts of sunscreen should be applied 30 minutes to 1 hour prior to outdoor activities and re-applied after sweating or bathing.<sup>127</sup>

There has been little improvement in sun protection practices among adults and youth during the past decades despite efforts in educating the public about the harms from excessive sun exposure and the benefits of

sun protection.<sup>142,144</sup> While education is important, more systematic efforts are needed to effect broader changes in behavior practices to improve and enable skin cancer preventive practices.<sup>144-147</sup> As children and adolescents are an important target group for skin cancer prevention, to improve their sun protection practices the CDC recommends developing comprehensive programs that include school intervention components.<sup>139,145,148,149</sup> However, current data from the CDC School Health Policies and Program Study indicate that 35 states have no policies for sun safety program in elementary, junior/middle, or senior high schools. In states where UV exposure is high year-round, parents should work with schools to develop sun protection programs at all grade levels and establish proper protection practices for their own children. Established skin cancer prevention programs such as the SunWise Program can provide useful resources to teach the public to protect themselves from overexposure to the sun through the use of components based in the classroom, school, and community (more information is available at <http://www.epa.gov/sunwise/>). Health care professionals and pediatricians can also play an important role in educating their patients about the importance of skin cancer prevention.<sup>150</sup>

### Early Detection of Skin Cancer

The early signs of skin cancer include changes in the surface of a mole or new appearance of skin spots.<sup>123</sup> 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>123</sup> For more information about skin cancer prevention and early detection go to [http://www.cancer.org/docroot/PED/content/ped\\_7\\_1\\_Skin\\_Cancer\\_Detection\\_What\\_You\\_Can\\_Do.asp?sitearea=&level=#exam](http://www.cancer.org/docroot/PED/content/ped_7_1_Skin_Cancer_Detection_What_You_Can_Do.asp?sitearea=&level=#exam).



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

#### Risk factors for melanoma<sup>125</sup>

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

#### Risk factors for basal and squamous cell cancers<sup>125</sup>

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

#### Measures to prevent skin cancer<sup>138,139</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 with a sun protection factor (SPF) of 15 or higher.
- Avoid tanning beds and sun lamps, which provide an additional source of UV radiation.

# 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 for these cancers can detect cancers at an earlier stage when treatment is more effective. Also, screening for colorectal or cervical cancers can identify precancerous abnormalities which, when treated, can lead to preventing cancer altogether.<sup>151</sup> Following the recommendations from the American Cancer Society or US Preventive Services Task Force for cancer screening is an important complement to measures that prevent the occurrence of cancer.

The American Cancer Society Screening guidelines recommend that all people aged 50 years and older be screened periodically for colon and rectum cancer, and that all 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. The Society and other organizations recommend that men aged 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. Separate guidelines for people at intermediate or high risk of disease recommend more frequent screening that may begin at an earlier age and/or use special tests.<sup>151</sup> The American Cancer Society screening guidelines for asymptomatic individuals are shown on page 31.

The American Cancer Society works through multiple avenues to promote the accessibility and the widespread use of cancer screening; it supports 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 suffering and death due to cancer.

## Breast Cancer Screening

Breast cancer screening has been shown to reduce breast cancer mortality.<sup>152-154</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> 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.<sup>155</sup> Currently, 61% of breast cancers are diagnosed at a localized stage, for which the 5-year survival rate is 98.1%.<sup>156</sup>

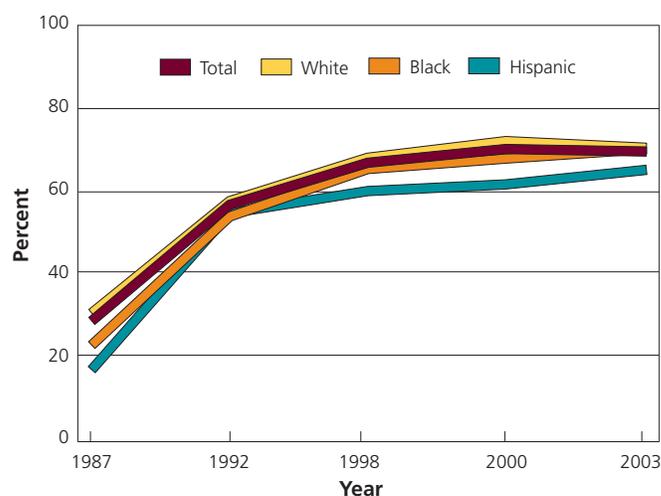


## Prevalence of Mammography Screening in the US

National breast cancer screening data are available from two different sources: the National Health Interview Survey (NHIS) and the Behavioral Risk Factor Surveillance System (BRFSS), both of which measure 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 had a mammogram within the past two years increased from 29% in 1987 to 70% in 2000 and has remained stable through 2003 (Figure 4A).<sup>157</sup>
- In 2003, the reported percentage of mammography screening in US women aged 40 and older was 69.7% (Table 4A).

**Figure 4A. Mammography within the Past Two Years\*, Women 40 and Older, by Race/Ethnicity, US, 1987-2003**



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

Source: National Center for Health Statistics, Health, United States, 2005. With Chartbook on Trends in the Health of Americans. Hyattsville, MD: 2005.

American Cancer Society, Surveillance Research

# Screening Guidelines

## For the Early Detection of Cancer in Asymptomatic People

Site	Recommendation
<b>Breast</b>	<ul style="list-style-type: none"> <li>Yearly mammograms are recommended starting at age 40. The age at which screening should be stopped should be individualized by considering the potential risks and benefits of screening in the context of overall health status and longevity.</li> <li>Clinical breast exam should be part of a periodic health exam about every 3 years for women in their 20s and 30s, and every year for women 40 and older.</li> <li>Women should know how their breasts normally feel and report any breast change promptly to their health care providers. Breast self-exam is an option for women starting in their 20s.</li> <li>Women at increased risk (e.g., family history, genetic tendency, past breast cancer) should talk with their doctors about the benefits and limitations of starting mammography screening earlier, having additional tests (i.e., breast ultrasound and MRI), or having more frequent exams.</li> </ul>
<b>Colon &amp; rectum</b>	<p>Beginning at age 50, men and women should begin screening with 1 of the examination schedules below:</p> <ul style="list-style-type: none"> <li>A fecal occult blood test (FOBT) or fecal immunochemical test (FIT) every year</li> <li>A flexible sigmoidoscopy (FSIG) every 5 years</li> <li>Annual FOBT or FIT and flexible sigmoidoscopy every 5 years*</li> <li>A double-contrast barium enema every 5 years</li> <li>A colonoscopy every 10 years</li> </ul> <p><i>*Combined testing is preferred over either annual FOBT or FIT, or FSIG every 5 years, alone. People who are at moderate or high risk for colorectal cancer should talk with a doctor about a different testing schedule.</i></p>
<b>Prostate</b>	<p>The PSA test and the digital rectal examination should be offered annually, beginning at age 50, to men who have a life expectancy of at least 10 years. Men at high risk (African American men and men with a strong family history of 1 or more first-degree relatives diagnosed with prostate cancer at an early age) should begin testing at age 45. For both men at average risk and high risk, information should be provided about what is known and what is uncertain about the benefits and limitations of early detection and treatment of prostate cancer so that they can make an informed decision about testing.</p>
<b>Uterus</b>	<p><b>Cervix:</b> Screening should begin approximately 3 years after a woman begins having vaginal intercourse, but no later than 21 years of age. Screening should be done every year with regular Pap tests or every 2 years using liquid-based tests. At or after age 30, women who have had 3 normal test results in a row may get screened every 2 to 3 years. Alternatively, cervical cancer screening with HPV DNA testing and conventional or liquid-based cytology could be performed every 3 years. However, doctors may suggest a woman get screened more often if she has certain risk factors, such as HIV infection or a weak immune system. Women aged 70 years and older who have had 3 or more consecutive normal Pap tests in the last 10 years may choose to stop cervical cancer screening. Screening after total hysterectomy (with removal of the cervix) is not necessary unless the surgery was done as a treatment for cervical cancer.</p> <p><b>Endometrium:</b> The American Cancer Society recommends that at the time of menopause all women should be informed about the risks and symptoms of endometrial cancer, and strongly encouraged to report any unexpected bleeding or spotting to their physicians. Annual screening for endometrial cancer with endometrial biopsy beginning at age 35 should be offered to women with or at risk for hereditary nonpolyposis colon cancer (HNPCC).</p>
<b>Cancer-related checkup</b>	<p>For individuals undergoing periodic health examinations, a cancer-related checkup should include health counseling and, depending on a person's age and gender, might include examinations for cancers of the thyroid, oral cavity, skin, lymph nodes, testes, and ovaries, as well as for some nonmalignant diseases.</p>

American Cancer Society guidelines for early cancer detection are assessed annually in order to identify whether there is new scientific evidence sufficient to warrant a reevaluation of current recommendations. If evidence is sufficiently compelling to consider a change or clarification in a current guideline or the development of a new guideline, a formal procedure is initiated. Guidelines are formally evaluated every 5 years regardless of whether new evidence suggests a change in the existing recommendations. There are 9 steps in this procedure and these "guidelines for guideline development" were formally established to provide a specific methodology for science and expert judgment to form the underpinnings of specific statements and recommendations from the Society. These procedures constitute a deliberate process to ensure that all Society recommendations have the same methodological and evidence-based process at their core. This process also employs a system for rating strength and consistency of evidence that is similar to that employed by the Agency for Health Care Research and Quality (AHCRO) and the US Preventive Services Task Force (USPSTF).

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- White and African American women aged 40 and older had the same prevalence of mammography use in the past 2 years (70.4%); other racial/ethnic subgroups of women were less likely to have had a mammogram in the past 2 years.
- The lowest prevalence of mammography use in the past two years occurred among women who lack health insurance (40.2 %), followed by immigrant women who have lived in the US for less than 10 years (52.3%) (Table 4A).
- Only 54.9% of women reported having a mammogram within the past year (Table 4A). The American Cancer Society recommends yearly mammograms for women starting at age 40.

### State-level Mammography Screening

- According to data collected in 2004 from the BRFSS, the percentage of women aged 40 and older who reported having a mammogram in the last year ranged from 47.7% in Idaho to 69.7% in Delaware (Table 4B).
- Utah is the only state that has not taken steps to improve private insurance coverage for mammography screening; Utah has the second lowest prevalence of women who had a recent mammogram (48.9%).<sup>158</sup>
- Screening participation rates are 3.8 to 11 percentage points lower when measuring the percentage of women who had a mammogram *and* clinical breast exam, ranging from 42.9% in Utah to 63.9% in Delaware.
- 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).

In the US, mammography screening continues to be underutilized among low-income women who lack health insurance coverage.<sup>159,160</sup> Consequently, these women are more likely to have their breast cancers detected at an advanced stage when treatment is likely to be less effective.<sup>161</sup> Programs and policies that enable access to mammography screening to all eligible low-income and uninsured women need to be enhanced and supported.<sup>162</sup>

### Cervical Cancer Screening

Cervical cancer incidence and mortality rates have decreased 67% over the past 3 decades with most of the

**Table 4A. Mammography, Women 40 and Older, US, 2003**

Characteristic	% Mammogram within the past 2 years*	% Mammogram within the past year*
<b>Race/ethnicity</b>		
White (non-Hispanic)	70.4	55.5
African American (non-Hispanic)	70.4	54.2
Hispanic/Latina	66.1	52.6
American Indian/Alaskan Native†	68.6	54.8
Asian‡	58.8	48.0
<b>Education (years)</b>		
11 or fewer	57.9	43.7
12	67.5	52.2
13 to 15	72.0	57.7
16 or more	80.1	65.4
<b>Health insurance coverage</b>		
Yes	73.1	58.0
No	40.2	28.9
<b>Immigration§</b>		
Born in US	70.5	55.4
Born in US territory	67.1	58.7
In US less than 10 yrs	52.3	40.6
In US 10 years or more	66.5	53.0
<b>Total</b>	<b>69.7</b>	<b>54.9</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.

**Note:** Preliminary estimates subject to adjustment based on official statistics released by NCHS.

**Source:** National Health Interview Survey Public Use Data File 2003, National Center for Health Statistics, Centers for Disease Control and Prevention, 2005.

American Cancer Society, Surveillance Research

reduction attributed to the Pap test, which detects cervical cancer and precancerous lesions.<sup>163</sup> Between 60% and 80% of women who are found to have advanced cervical cancer have not had a Pap test in the past 5 years.<sup>164</sup> For women whose precancerous lesions have been detected through Pap tests, the likelihood of survival is nearly 100% with appropriate evaluation, treatment, and followup.<sup>155</sup> Historically, the Society played a critical role in developing and promoting the use of the Pap test. Cervical cancer is now one of the most successfully treated cancers<sup>163</sup> and with the recent approval of vaccine immunization against HPV among young girls, there is a great potential for further reducing the occurrence of cervical cancer in the US.

**Table 4B. Mammography and Clinical Breast Exam, Women 40 and Older, by State, US, 2004**

	% 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	60.3	58.6	64.1	36.4	34.2	52.7	53.7	50.4	29.9	27.4
Alaska	50.7	50.4	52.8	30.4	28.6	46.9	47.1	46.0	24.5	25.8
Arizona	56.7	52.4	65.4	27.3	35.9	48.9	46.8	53.3	19.9	30.2
Arkansas	51.0	50.6	51.9	27.3	29.0	44.4	44.8	43.4	21.4	25.4
California	57.8	55.0	64.5	34.4	34.9	46.8	46.4	47.8	22.2	31.2
Colorado	56.1	53.5	63.8	30.1	28.5	50.0	50.2	49.5	26.7	26.1
Connecticut	66.7	67.7	64.6	43.3	47.7	59.7	62.1	54.5	40.4	44.0
Delaware	69.7	68.8	71.8	33.4	46.4	63.9	64.9	61.8	28.1	40.3
Dist. of Columbia	63.0	62.6	63.9	39.9	41.3	56.3	58.3	51.9	30.6	36.0
Florida	60.5	56.0	68.3	28.9	27.7	53.6	52.0	56.3	25.7	23.2
Georgia	59.2	58.7	60.6	30.8	38.8	52.7	53.8	49.6	25.6	31.0
Hawaii	¶	¶	¶	¶	¶	¶	¶	¶	¶	¶
Idaho	47.7	45.4	53.1	22.3	21.7	43.0	42.6	44.1	18.4	20.2
Illinois	60.0	60.1	59.9	38.1	39.4	53.1	54.6	49.6	30.6	30.3
Indiana	52.8	52.4	53.6	25.6	30.0	45.2	47.1	40.9	21.4	28.1
Iowa	60.7	61.0	60.1	34.6	36.9	55.2	57.3	51.1	32.9	36.4
Kansas	63.1	62.3	64.7	33.1	30.5	57.1	58.2	54.7	29.7	28.3
Kentucky	59.8	61.4	56.0	36.7	32.3	52.6	55.1	46.3	31.4	29.7
Louisiana	60.0	59.5	61.5	38.4	39.2	51.8	52.8	48.9	33.2	33.5
Maine	64.1	63.8	64.8	32.6	40.9	58.8	59.2	57.8	26.4	34.1
Maryland	63.3	60.9	69.9	50.1	40.1	57.4	56.7	59.3	43.2	30.1
Massachusetts	68.4	69.5	66.3	33.3	51.8	61.4	64.4	55.2	29.7	47.4
Michigan	62.8	61.9	64.9	29.8	32.8	55.9	56.3	55.0	25.3	26.1
Minnesota	64.8	63.4	68.2	36.1	32.7	59.5	59.2	60.2	32.8	29.5
Mississippi	50.3	49.9	51.0	27.9	30.2	44.3	45.7	41.0	22.6	27.8
Missouri	52.3	50.3	56.5	21.3	21.2	45.4	45.9	44.2	16.2	15.9
Montana	56.4	53.0	64.2	28.4	32.7	50.1	48.5	53.7	23.5	29.3
Nebraska	62.2	62.3	62.0	39.1	41.8	55.5	58.1	50.2	34.8	35.8
Nevada	52.0	50.3	56.4	31.4	31.9	45.2	45.6	44.1	26.6	27.6
New Hampshire	64.8	63.7	67.4	28.5	33.7	58.5	60.0	54.8	23.8	30.9
New Jersey	60.2	60.3	60.0	31.4	35.7	53.2	55.5	48.3	27.7	32.7
New Mexico	53.0	51.8	56.2	25.1	25.3	46.0	46.2	45.6	21.9	22.4
New York	58.9	58.3	60.1	30.1	34.8	52.0	53.1	49.6	22.6	29.3
North Carolina	62.5	62.2	63.1	35.3	36.8	56.5	57.2	54.8	28.8	32.0
North Dakota	57.1	55.7	59.7	24.3	22.4	50.3	50.8	49.4	19.8	20.2
Ohio	58.5	55.3	65.3	28.5	33.7	51.3	49.8	54.8	25.8	31.1
Oklahoma	51.3	49.1	56.1	25.1	23.9	44.3	43.8	45.5	22.2	21.8
Oregon	57.3	55.9	60.4	22.8	25.4	49.0	49.8	47.2	18.8	22.9
Pennsylvania	55.5	56.0	54.5	23.3	34.8	47.7	50.2	42.9	17.6	23.5
Rhode Island	66.4	64.4	70.2	34.1	39.8	58.0	58.5	57.0	29.5	28.6
South Carolina	56.1	55.8	56.9	32.9	37.4	49.2	50.4	46.5	26.3	30.3
South Dakota	61.8	59.3	66.5	38.5	28.7	55.3	55.7	54.5	35.0	24.6
Tennessee	63.2	62.7	64.4	30.6	34.1	57.6	58.1	56.5	28.1	28.7
Texas	49.8	47.5	55.7	23.1	29.3	43.1	42.5	44.6	18.8	23.8
Utah	48.9	46.7	54.7	26.8	25.9	42.9	41.7	46.2	22.8	23.6
Vermont	59.2	59.6	58.4	26.9	40.2	51.8	53.6	47.3	22.6	34.0
Virginia	59.5	58.0	63.4	32.0	36.5	53.0	52.8	53.6	25.5	28.7
Washington	55.4	53.3	60.8	24.2	22.1	48.5	48.3	48.9	21.1	18.5
West Virginia	58.1	57.6	59.2	30.4	31.7	51.1	52.0	49.1	25.2	28.6
Wisconsin	59.4	55.9	66.7	34.4	42.1	54.4	53.4	56.7	29.1	40.3
Wyoming	51.6	48.8	58.8	27.5	25.9	45.3	45.5	44.9	22.8	22.0
United States#	58.3	56.8	61.7	30.7	32.9	51.1	51.4	50.3	24.7	28.0
Range	47.7-69.7	45.4-69.5	51.0-71.8	21.3-50.1	21.2-51.8	42.9-63.9	41.7-64.9	40.9-61.8	16.2-43.2	15.9-47.4

\*A mammogram within the past year. †Both a mammogram and clinical breast exam within the past year. ‡Women aged 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. ¶Estimate not available as state did not participate in the 2004 survey. #See Statistical Notes for definition.

**Source:** Behavioral Risk Factor Surveillance System Public Use Data Tape 2004, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 2005.

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

Human papillomavirus (HPV) is the most common sexually transmitted infection in the US, with approximately 6.2 million people becoming newly infected annually.<sup>165,166</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>167</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>166-168</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>165,166</sup>

In June 2006, a vaccine called 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. On June 29, 2006, the CDC's Advisory Committee on Immunization Practices (ACIP) recommended the use of this vaccine in females aged 9-26 years.<sup>165</sup> The vaccine is delivered



### Summary of American Cancer Society Recommendations for HPV Vaccine Use to Prevent Cervical Cancer and its Precursors<sup>169</sup>

- Routine HPV vaccination is recommended for females aged 11-12.
- Females as young as 9 years may receive HPV vaccination.
- HPV vaccination is also recommended for females aged 13-18 years to catch up missed vaccine or complete the vaccination series.
- There are currently insufficient data\* to recommend for or against universal vaccination of females aged 19-26 years in the general population. A decision about whether a woman aged 19-26 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 increasing number of lifetime sexual partners.
- HPV vaccination is not currently recommended for women over age 26 years or for men.
- Screening for cervical intraepithelial neoplasia (CIN) and cancer should continue in both vaccinated and unvaccinated women according to current American Cancer Society early detection guidelines.
- Insufficient evidence of benefit in women aged 19-26 years refers to (1) clinical trial data in women with an average of 2, but not more than 4, 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 4 lifetime sexual partners, and (3) the lack of cost-effectiveness analyses for vaccination in this age group.

through a series of three intramuscular injections over a 6-month period. The second and third doses should be given 2 and 6 months after the first dose. Side effects from Gardasil are mild and may include pain or tenderness at the injection site.<sup>165</sup>

The ACIP develops written recommendations for the routine administration of vaccines with the goals of reducing the incidence of vaccine-preventable diseases and increasing the safe usage of vaccines. ACIP recommendations include the appropriate periodicity, dosage, and contraindications applicable to vaccines. The ACIP full report on the HPV vaccine is available at <http://www.cdc.gov/mmwr/pdf/rr/rr56e312.pdf>. In January 2007, the American Cancer Society published its own recommendations for HPV vaccine use<sup>169</sup> (see sidebar, page 34); these guidelines are generally consistent with those of the ACIP. More information about the Society's HPV vaccine recommendation can be found at <http://caonline.amcancersoc.org>.

The HPV vaccine will supplement rather than replace the Pap test for several reasons. First, the vaccine will not provide protection against all types of HPV that cause cervical cancer. Second, women may not receive the full benefits of the vaccine if they do not complete the vaccine series. Third, women may not receive the full benefits of the vaccine if they receive the vaccine after they have been infected with one or more HPV types.

Thus, women of all ages should continue to receive regular cervical cancer screening.<sup>169</sup>

The promise of prophylactic 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 most problematic, particularly immigrants, those living in rural areas, low-income and uninsured females, and others who have limited access to health care services.<sup>169</sup> Hence, the Society has begun to advocate for widest possible vaccination coverage with the guidelines for the vaccine. Since the announcement of the ACIP's recommendation, New Hampshire became the first state to offer the vaccine to girls at no cost<sup>170</sup> and legislation has

**Table 4C. Pap Test\*, Women 18 and Older, US, 2003**

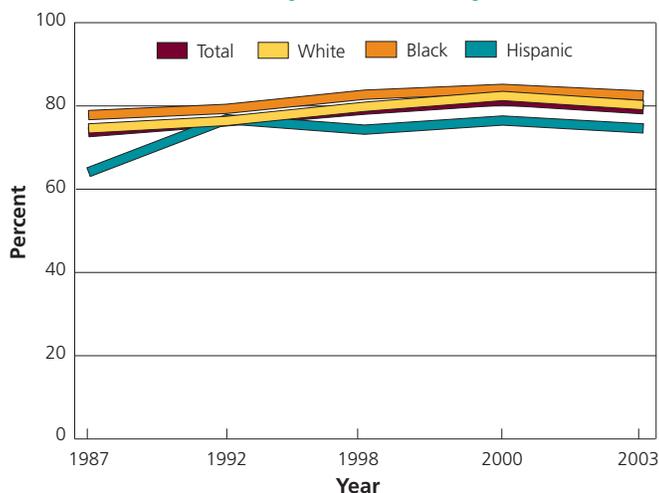
Characteristic	% <sup>†</sup>
<b>Age (years)</b>	
18 to 20	63.7
21 to 29	83.9
30 to 39	87.3
40 to 49	86.1
50 to 59	81.1
60 to 64	75.7
65 to 85	61.0
<b>Race/ethnicity</b>	
White (non-Hispanic)	80.2
African American (non-Hispanic)	82.5
Hispanic/Latina	74.7
American Indian/Alaskan Native	86.0
Asian <sup>‡</sup>	68.4
<b>Education (years)<sup>§</sup></b>	
11 or fewer	67.7
12	77.5
13-15	82.7
16 or more	87.3
<b>Health insurance coverage</b>	
Yes	82.2
No	61.0
<b>Immigration<sup>¶</sup></b>	
Born in US	80.8
Born in US Territory	74.7
In US less than 10 yrs	63.7
In US 10+ years	73.3
<b>Total</b>	<b>79.3</b>

\*A Pap test within the past three years for all women over 18, irrespective of hysterectomy status. †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, 2003, National Center for Health Statistics, Centers for Disease Control and Prevention, 2005.

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**Figure 4B. Pap Test within the Past Three Years\*, Women 18 and Older, by Race/Ethnicity, US, 1987-2003**



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

**Source:** National Center for Health Statistics, Health, United States, 2005. With Chartbook on Trends in the Health of Americans. Hyattsville, MD: 2005.

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**Table 4D. Pap Test, Women 18 and Older, by State, US, 2004**

% Recent Pap Test\*

	18 years and older	18 to 64 years	65 years and older	No usual source of medical care†	No health insurance‡
Alabama	87.2	89.3	72.7	79.6	85.2
Alaska	88.7	89.5	75.6	74.5	79.1
Arizona	84.7	86.0	75.4	76.5	71.9
Arkansas	81.4	84.2	65.3	70.0	71.8
California	84.4	85.7	73.1	75.4	78.4
Colorado	87.8	89.7	69.6	81.9	76.4
Connecticut	87.7	90.5	72.8	81.4	86.3
Delaware	85.6	90.0	77.0	49.4	§
Dist. of Columbia	88.2	90.3	73.0	74.1	68.9
Florida	83.8	85.8	74.4	71.1	73.1
Georgia	87.5	89.4	68.9	80.7	78.5
Hawaii	¶	¶	¶	¶	¶
Idaho	78.1	80.3	58.4	70.3	72.1
Illinois	87.2	89.2	74.1	71.2	83.5
Indiana	82.1	85.2	62.0	71.0	73.6
Iowa	85.7	88.6	70.3	70.4	72.1
Kansas	86.1	88.9	70.0	76.2	75.4
Kentucky	84.4	87.1	66.8	75.3	77.0
Louisiana	85.0	86.9	66.6	73.5	78.2
Maine	88.6	90.8	75.4	68.2	77.5
Maryland	88.8	89.9	78.7	79.2	72.4
Massachusetts	89.1	91.5	76.3	71.3	78.5
Michigan	86.3	88.0	74.5	67.4	80.5
Minnesota	87.4	89.7	73.8	71.9	73.4
Mississippi	83.9	86.8	61.4	76.4	79.2
Missouri	84.3	87.7	64.4	69.2	75.1
Montana	86.0	87.4	76.9	79.7	79.2
Nebraska	85.7	88.4	68.2	77.2	81.1
Nevada	84.9	86.5	68.9	79.9	79.2
New Hampshire	89.8	91.9	74.8	81.2	78.9
New Jersey	84.3	87.5	66.6	77.3	77.2
New Mexico	84.3	86.1	70.8	70.4	73.3
New York	85.3	88.2	69.1	72.8	76.2
North Carolina	88.2	89.7	76.9	76.9	79.4
North Dakota	82.8	85.5	68.4	70.9	74.5
Ohio	86.1	88.4	73.3	77.6	78.2
Oklahoma	82.5	84.9	64.4	73.5	74.6
Oregon	83.4	85.7	67.4	71.8	70.4
Pennsylvania	84.1	87.3	67.5	71.4	73.2
Rhode Island	88.9	91.4	76.1	72.9	74.7
South Carolina	86.9	89.1	71.0	77.5	84.1
South Dakota	86.8	89.7	71.7	74.1	77.4
Tennessee	86.9	89.3	69.5	72.9	76.6
Texas	81.8	82.9	71.8	73.4	76.4
Utah	77.4	78.2	68.2	61.5	65.3
Vermont	87.4	91.0	66.0	74.6	78.3
Virginia	87.1	88.5	76.5	77.7	81.8
Washington	85.1	87.1	67.8	71.9	74.5
West Virginia	82.2	85.6	64.6	73.8	76.9
Wisconsin	85.5	88.1	69.4	73.0	75.1
Wyoming	85.4	87.8	68.0	76.1	78.3
United States#	85.2	87.3	71.2	74.2	76.9
Range	77.4-89.8	78.2-91.9	58.4-78.7	49.4-81.9	65.3-86.3

\*A Pap test within the preceding 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 years 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. §Sample size is insufficient to provide a stable estimate. ¶Estimate not available as state did not participate in 2004 survey. #See Statistical Notes for definition.

**Source:** Behavioral Risk Factor Surveillance System Public Use Data Tape 2004, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 2005.

American Cancer Society, Surveillance Research

been introduced in Michigan that would add the HPV vaccine to the list of required immunizations for girls.<sup>171</sup> Other states are considering similar measures.<sup>171,172</sup> It is critical that the vaccine be made available, especially to the medically underserved populations.

### Prevalence of Pap Test Screening in the US

According to data from the National Health Interview surveys:<sup>157</sup>

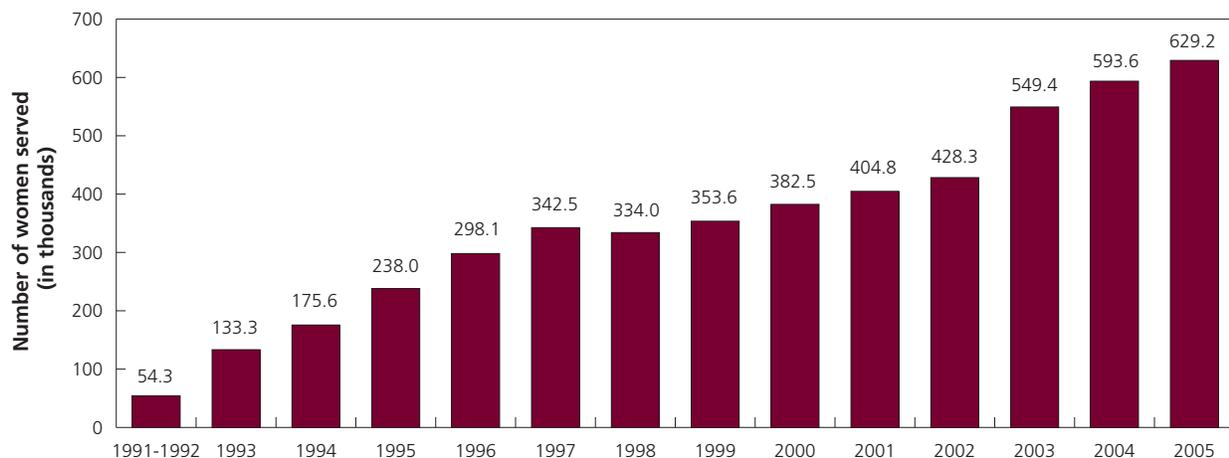
- Among women 18 years and older, 79% reported having a Pap test within the past three years in 2003, up from 74% in 1987. Increases in Pap test use have occurred among women of all racial and ethnic groups (Figure 4B).
- In 2003, the prevalence of cervical cancer screening varied by race and ethnicity: Asian (68.4%), Hispanic (74.7%), non-Hispanic white (80.2%), non-Hispanic African American (82.5%), and American Indian/Alaska Native (86%) (Table 4C).
- In 2003, the prevalence of recent Pap test use was lowest in recent immigrants (63.7%), women with no health insurance (61%), and older women (61%) (Table 4C).

### State-level Cervical Cancer Screening

- Across the states surveyed by the Behavioral Risk Factor Surveillance System in 2004 (Table 4D), the recent Pap test percentage among women aged 18 and older with an intact uterus was 85.2%, ranging from 77.4% in Utah to 89.8% in New Hampshire.

In the US and other developed countries, HPV testing may be used in addition to Pap testing for cervical cancer screening (see American Cancer Society Guidelines on Cancer Screening, page 31). The extent to which US women are opting for this screening strategy is not available as this information is not collected in population surveys.

**Figure 4C. Number of Women Served\* in the National Breast and Cervical Cancer Early Detection Program (NBCCEDP), 1991-2005†**



\*Served is defined as receiving at least one Program Pap test, mammogram, or clinical breast exam in the fiscal year. †In Fiscal Years.

Source: National Breast and Cervical Cancer Early Detection Program, Centers for Disease Control and Prevention.

American Cancer Society, Surveillance Research

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

The CDC's National Breast and Cervical Cancer Early Detection Program (NBCCEDP) helps low-income, uninsured, and underserved women gain access to timely, high-quality screening exams for early detection of breast and cervical cancers and diagnostic services.<sup>173</sup> The program is currently implemented in all 50 states, the District of Columbia, 4 US territories, and 13 American Indian/Alaska Native organizations.<sup>174</sup> About 50% of the women screened have been from racial/ethnic minority groups. Since 1991, the NBCCEDP has served more than 2.7 million women, provided more than 6.5 million screening examinations, and diagnosed more than 26,000 breast cancers, 88,000 precancerous cervical lesions, and 1,700 cases of invasive cervical cancer.<sup>173</sup>

From 1991 to 2004, there has been a steady growth in the numbers of low-income women served by the NBCCEDP (Figure 4C); since 2001, the program has consistently served more than 400,000 women annually. However, the CDC estimates that this program is currently reaching approximately 13% of the estimated 4 million US women aged 40 to 64 years who are low-income and/or are uninsured.<sup>162</sup> In light of this, the Society continues to advocate for additional funding from Congress for the NBCCEDP. The Society also is partnering with state health departments and other key organizations to implement best practices that will strengthen the NBCCEDP.

The passage of the Breast and Cervical Cancer Prevention and Treatment Act, effective October 1, 2000, gave states the option to provide Medicaid coverage of medical assistance, follow-up, and treatment for women diagnosed with cancer through the NBCCEDP. Today, all 50 states and the District of Columbia have elected to provide this coverage.<sup>174</sup> Currently, the Society is working to ensure that state Medicaid dollars supporting the treatment program are protected. Furthermore, the Society has begun collecting stories about women's real-life experiences with this program through its National Cancer Information Center. By better understanding the needs of women in the community, the Society can remove remaining barriers and help ensure that the promise of this program is being fulfilled.

### Colon and Rectum Cancer Screening

Colorectal cancer is the second leading cause of cancer death in the US, behind lung cancer for men and women combined. Promoting colorectal cancer screening is a major priority for the American Cancer Society because it can reduce death from colorectal cancer by preventing the disease, as well as detecting it at early, more treatable stages. Relative 5-year survival is 90% for patients diagnosed at the earliest, most treatable stage.<sup>1</sup> However, only 39% of cases are diagnosed at an early stage.<sup>1</sup> Colorectal cancer is one of the few cancers that can be prevented through screening because precancerous polyps, from which colon cancers often develop, can be identified and removed.<sup>151,175</sup> Of the 52,180 people



expected to die of colon and rectal cancers in 2007, appropriate testing could save more than half.<sup>176</sup>

Several available screening tests (i.e., the fecal occult blood home-test kit [FOBT], endoscopy procedures such as the flexible sigmoidoscopy or colonoscopy, and radiological imaging with double-contrast barium enema) can be effective in detecting colorectal cancer and adenomatous polyps.<sup>151,175</sup> Despite the availability of these screening tests and their life-saving potential, colorectal cancer screening is underutilized; about 2 in 5 adults aged 50 and older report not having been screened.<sup>177-179</sup>

### Prevalence of Colorectal Cancer Screening in the US

Use of colorectal cancer screening tests continues to lag behind use of mammography and Pap testing,<sup>180</sup> although utilization is improving.<sup>159,181,182</sup>

- Between 2000 and 2003, the use of colorectal cancer screening (either a FOBT within the last year or a colorectal endoscopic procedures within the last 5 years) among US adults aged 50 years and older increased from 39.4% to 42.2% (Figure 4D).
- Adults aged 50 years and older with 16 or more years of education were more likely (54%) to report having a

recent test for colorectal cancer than those with lower educational attainment in 2003 (Figure 4D).

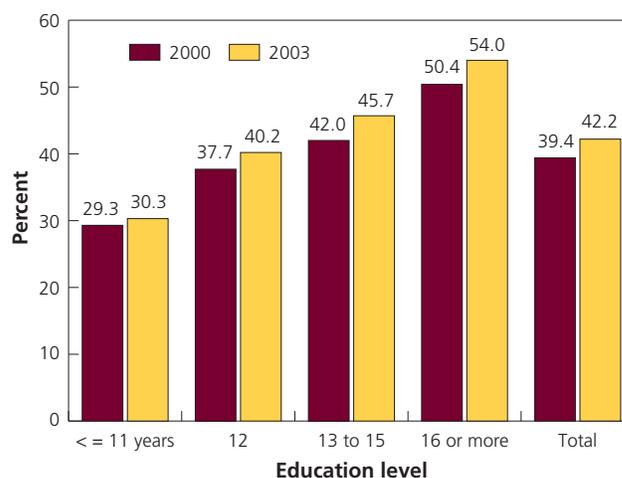
- Adults aged 65 years and over are more likely to have had a recent test for colorectal cancer than those aged 50-64 years (Table 4F).
- The widest disparity in colorectal cancer screening is by health insurance status: 17% among the uninsured compared to 44% among the insured (Table 4E).
- In 2003, the prevalence in the use of specific tests for colorectal cancer screening varied by gender, race/ethnicity, and immigration status (Table 4E).

### State-level Colorectal Cancer Screening

- Across the states surveyed in 2004, the recent fecal occult blood test percentages for adults aged 50 years and older ranged from 10.1% in Alaska to 28.5% in North Carolina (Table 4F).
- Recent (within the past 5 years) test use with sigmoidoscopy or colonoscopy ranged from 35.7% in Oklahoma to 56.9% in Minnesota (Table 4F).

The recent increases in colorectal cancer screening may be attributed to multiple efforts to increase awareness of colorectal cancer screening's importance as well as progressive expansions in health care coverage for

**Figure 4D. Colorectal Cancer Screening\*†, Adults Aged 50 and Older, by Education Level, US, 2000-2003**



\*Either a fecal occult blood test in the past year or an endoscopy (colonoscopy or sigmoidoscopy) within the past 5 years. †Estimates are age-adjusted to the 2000 US standard population.

Source: National Health Interview Survey Public Use Data Files, 2000, 2003. National Center for Health Statistics, Centers for Disease Control and Prevention, 2001, 2004.

American Cancer Society, Surveillance Research

colorectal cancer screening (in states and Medicare since 2001) and the establishment of screening programs in certain states.<sup>183-186</sup> Further efforts to increase utilization are needed, especially for persons with lower socioeconomic status.<sup>159,179,182,186,187</sup>

### How the Society Promotes Screening for Colorectal Cancer

As part of the goal to lower cancer incidence and mortality among minority and other medically underserved populations, the Society promoted federal legislation that authorized the Centers for Disease Control and Prevention's pilot programs for colorectal cancer screening and treatment in medically underserved communities. The first 5 pilot sites were recently selected.<sup>188</sup> Grantees have the flexibility to explore new ways of delivering screening and treatment that meet the needs of their communities. Such programs for the underserved are also being explored at the state level. New York and Maryland have already implemented colorectal cancer screening programs for the uninsured and underserved that are improving access to needed services.<sup>188</sup>

Lack of insurance coverage of the full range of colorectal cancer screening tests may contribute to low utilization of these tests.<sup>159,179,182,186,187</sup> It is difficult to evaluate coverage systematically because private insurers often consider such information proprietary. There can also be confusion about whether coverage applies to screening or only diagnostic procedures, and whether the full range of tests is available to those at average risk. The limited available data suggest that many plans do not cover the full range of screening tests and many do not cover screening colonoscopy for those at average risk.<sup>189</sup>

Improving insurance coverage for the full range of colorectal cancer screening tests is a high priority for the

**Table 4E. Colon and Rectum Cancer Screening, Adults 50 and Older, US, 2003**

Characteristic	% Fecal Occult Blood Test*§	% Endoscopy†§	% Combined Endoscopy/FOBT*§
<b>Gender</b>			
Male	16.6	39.1	45.2
Female	15.5	33.2	39.9
<b>Race/ethnicity</b>			
White (non-Hispanic)	16.3	37.5	44.2
African American (non-Hispanic)	16.4	32.6	38.9
Hispanic/Latino	11.9	25.1	29.9
American Indian/Alaskan Native¶	14.4	24.7	30.0
Asian#	14.4	24.8	29.7
<b>Education (years)</b>			
11 or fewer	11.3	25.2	30.3
12	15.1	33.5	40.2
13 to 15	17.9	38.6	45.7
16 or more	20.3	47.1	54.0
<b>Health insurance coverage</b>			
Yes	16.7	37.3	44.0
No	5.1	13.9	17.1
<b>Immigration**</b>			
Born in US	16.4	36.6	43.3
Born in US Territory	14.6	35.4	38.9
In US less than 10 years	10.3	19.8	26.3
In US 10 years or more	12.7	30.9	35.4
<b>Total</b>	<b>15.9</b>	<b>35.8</b>	<b>42.2</b>

\*A fecal occult blood test within the past year. †An endoscopy (tests include sigmoidoscopy, colonoscopy, or proctoscopy) within the past five years. ‡Either a fecal occult blood test within the past year or an endoscopy within the past five 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 samples 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.

**Note:** Preliminary estimates subject to adjustment based on official statistics released by NCHS.

**Source:** National Health Interview Survey Public Use Data File, 2003, National Center for Health Statistics, Centers for Disease Control and Prevention, 2005.

American Cancer Society, Surveillance Research

Society, which has advocated at both state and federal levels for legislation to ensure that private health insurance plans cover the full range of screening methods available that can be done for little or no additional cost to health plans.<sup>190</sup> To date, these efforts succeeded in 19 states and the District of Columbia (Figure 4E). Unfortunately, there have been efforts to pass legislation that will allow insurers to circumvent these laws; the Society is working to oppose these efforts.

The Society also is collaborating with the Centers for Medicare & Medicaid Services (CMS) to help CMS improve colorectal cancer screening among the 42 million Medicare beneficiaries. As a result of the Society's efforts, CMS has designated colorectal cancer screening

**Table 4F. Colon and Rectum Cancer Screening, Adults 50 and Older, by State, US, 2004**

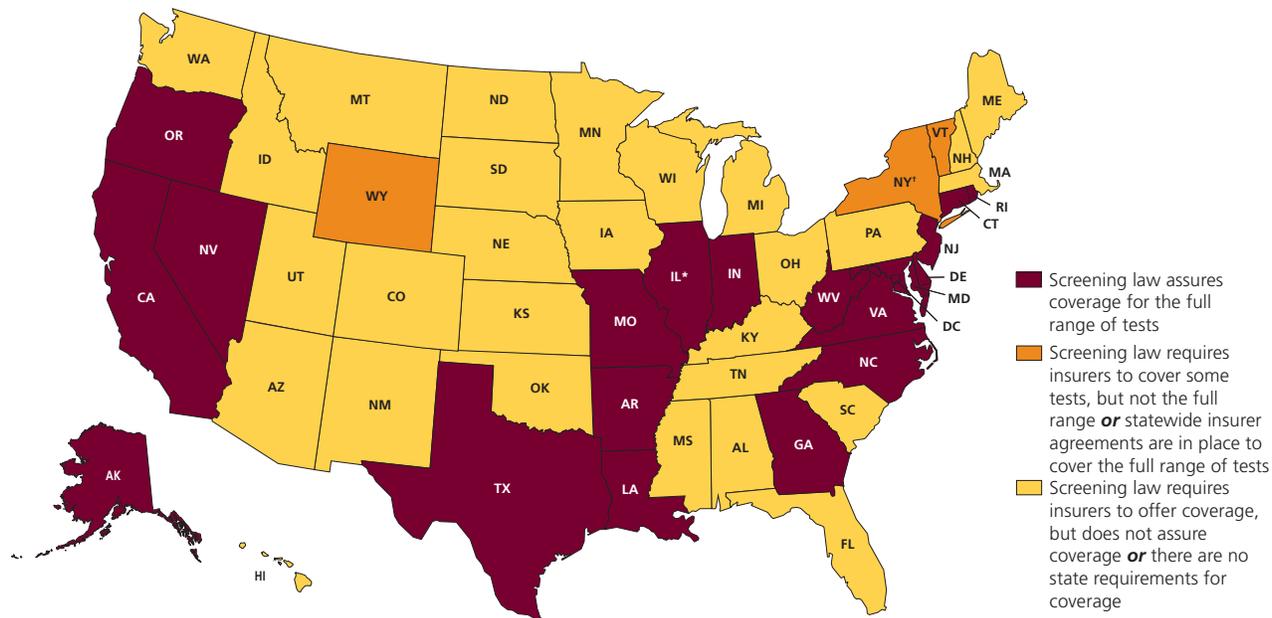
	% Recent Fecal Occult Blood Stool Test*					% Recent Sigmoidoscopy or Colonoscopy†					2004 Combined FOBT/Endoscopy**
	50 years and older	50 to 64 years	65 years and older	No usual source of medical care‡	No health insurance§	50 years and older	50 to 64 years	65 years and older	No usual source of medical care‡	No health insurance§	
Alabama	17.4	16.5	18.5	9.6	10.5	42.3	36.4	49.8	23.5	23.1	48.4
Alaska	10.1	9.1	13.1	6.4	2.8	40.9	36.0	55.6	25.1	15.2	44.3
Arizona	22.0	18.3	26.4	10.7	13.5	42.2	33.1	53.1	17.5	23.5	51.4
Arkansas	16.5	11.9	22.1	9.4	8.5	37.4	28.9	47.8	15.4	18.6	44.1
California	14.7	10.5	20.4	4.8	1.8	43.0	36.8	51.6	19.3	11.4	48.3
Colorado	22.7	17.8	31.0	5.4	13.2	41.3	36.1	50.0	16.2	12.0	50.8
Connecticut	21.8	18.6	25.8	6.3	7.5	55.7	50.4	62.4	26.2	27.7	61.5
Delaware	18.2	14.7	22.7	9.2	12.7	53.7	47.4	62.0	24.8	22.2	58.6
Dist. of Columbia	27.3	26.8	28.0	18.0	15.2	54.8	49.3	62.3	32.5	17.4	60.8
Florida	22.3	17.6	26.9	9.4	15.1	49.3	39.9	58.7	19.9	23.6	56.5
Georgia	18.2	17.5	19.3	13.1	13.5	43.9	40.6	49.4	17.0	32.1	50.5
Hawaii	¶	¶	¶	¶	¶	¶	¶	¶	¶	¶	¶
Idaho	13.3	12.4	14.5	2.8	10.8	37.8	30.9	47.9	14.4	10.1	43.3
Illinois	17.3	15.3	19.9	2.6	9.3	39.2	35.1	44.5	9.8	18.2	46.5
Indiana	16.3	14.8	18.3	3.7	7.9	39.9	34.6	47.1	13.6	15.6	46.8
Iowa	21.2	18.7	24.1	7.1	3.0	44.0	38.5	50.6	19.4	12.2	53.1
Kansas	21.8	18.7	25.5	10.0	11.0	41.6	38.1	46.0	19.4	24.9	51.0
Kentucky	17.7	15.7	20.6	9.6	13.2	40.3	35.7	46.8	18.1	15.8	46.9
Louisiana	20.5	18.4	24.0	15.0	10.8	38.4	32.6	47.6	21.3	18.1	47.5
Maine	28.3	23.5	34.6	21.0	17.1	50.6	44.6	58.5	20.9	19.9	61.8
Maryland	21.7	17.6	28.6	6.2	7.9	54.5	49.4	63.1	19.5	18.2	60.3
Massachusetts	23.7	21.5	26.5	8.7	13.7	54.1	51.4	57.5	15.0	28.2	61.4
Michigan	20.2	17.6	23.7	7.0	5.2	50.5	44.6	58.3	18.5	22.6	57.0
Minnesota	17.0	14.1	21.0	6.9	8.2	56.9	52.0	63.5	30.2	19.1	61.2
Mississippi	14.1	13.2	15.3	9.7	12.6	37.2	33.9	41.7	17.5	16.8	42.5
Missouri	15.1	11.8	19.4	8.5	7.5	43.1	38.4	49.0	17.5	23.0	49.6
Montana	18.8	16.3	22.2	10.8	10.7	41.8	33.4	53.3	19.1	16.4	49.5
Nebraska	20.3	16.4	25.1	11.1	14.6	37.1	32.8	42.3	21.4	25.0	46.7
Nevada	16.5	12.7	21.9	2.7	1.5	36.7	31.1	44.6	17.2	22.3	44.4
New Hampshire	24.6	22.6	27.6	10.8	9.8	53.2	49.9	58.0	22.6	26.4	61.9
New Jersey	17.4	15.5	19.8	8.1	10.2	49.1	45.1	54.2	23.3	26.8	53.9
New Mexico	18.3	16.1	21.5	8.9	6.9	41.3	36.7	47.7	17.7	19.0	49.1
New York	18.0	15.7	20.9	8.6	11.6	47.6	42.2	54.7	17.3	19.7	53.6
North Carolina	28.5	26.1	31.8	14.7	12.7	48.7	43.0	56.5	23.0	20.1	57.7
North Dakota	12.9	12.1	13.8	4.7	5.5	43.2	35.0	52.3	17.1	20.4	47.4
Ohio	16.5	15.6	17.6	5.5	13.6	45.1	38.3	53.8	22.4	12.9	50.3
Oklahoma	17.2	14.3	21.0	7.1	6.8	35.7	29.8	43.4	15.5	11.2	43.2
Oregon	19.9	17.4	23.4	4.8	5.5	44.4	38.9	52.0	14.5	15.7	51.4
Pennsylvania	16.6	12.6	20.9	7.4	7.7	44.4	39.7	49.7	15.1	13.8	51.0
Rhode Island	22.6	17.9	28.2	14.1	13.1	56.0	52.4	60.3	18.7	24.1	64.6
South Carolina	17.0	14.7	20.2	6.9	12.5	46.8	43.0	52.2	17.5	18.9	52.3
South Dakota	18.4	16.2	21.0	12.1	8.6	42.8	33.7	53.6	22.1	14.6	50.6
Tennessee	20.7	18.5	23.8	9.1	8.1	44.9	38.0	54.6	20.2	18.7	52.3
Texas	15.4	12.4	20.1	6.7	5.4	38.9	34.0	46.4	19.6	13.5	45.1
Utah	15.1	12.0	20.0	7.4	8.7	44.5	39.3	52.6	18.9	18.7	50.1
Vermont	19.3	16.7	23.0	5.6	9.3	49.6	46.6	54.0	15.8	22.8	57.4
Virginia	18.3	17.0	20.2	6.8	14.0	51.5	48.0	56.9	25.3	32.9	57.3
Washington	22.5	19.9	26.5	7.4	10.3	47.1	41.1	56.4	17.9	23.2	54.5
West Virginia	19.8	18.7	21.2	8.9	12.2	37.3	34.6	40.7	16.2	18.9	46.6
Wisconsin	19.5	13.3	27.1	9.7	12.2	50.3	42.2	60.3	20.5	30.8	56.1
Wyoming	12.5	11.3	14.4	5.5	8.6	37.1	30.9	47.0	16.6	17.9	43.1
United States#	18.5	15.7	22.4	7.7	9.1	45.1	39.5	52.6	19.1	18.6	51.8
Range	10.1-28.5	9.1-26.8	13.1-34.6	2.6-21.0	1.5-17.1	35.7-56.9	28.9-52.4	40.7-63.5	9.8-32.5	10.1-32.9	42.5-64.6

\*A fecal occult blood test within the last year. †A sigmoidoscopy or colonoscopy within the preceding five years. ‡Adults aged 50 years and older who reported that they did not have a personal doctor or health care provider. §Adults aged 50 to 64 years 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. ¶Estimate not available as state did not participate in 2004 survey. #See Statistical Notes for definition. \*\*A fecal occult blood test within the last year or a sigmoidoscopy or colonoscopy within the preceding five years. Note: The colorectal cancer screening prevalence estimates do not distinguish between examinations for screening or diagnosis.

Source: Behavioral Risk Factor Surveillance System Public Use Data Tape 2004, National Center for Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 2005.

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**Figure 4E. Colon and Rectum Cancer Screening Coverage Legislation, by State, US, 2006**



\*In 2003, Illinois expanded its 1998 law to cover the full range. †The New York Health Plan Association, which serves 6 million New Yorkers, covers the full range of colorectal cancer screening tests, as a part of a voluntary collaborative with the American Cancer Society.

**Sources:** Health Policy Tracking Service & Individual state bill tracking services. Provided by National Government Relations Department, American Cancer Society, May 2006.

as a “breakthrough priority.” CMS has leveraged resources across the agency to promote a wide range of interventions, including communicating with beneficiaries who are due for screening, informing physicians about Medicare colorectal cancer screening coverage, and considering colorectal cancer screening quality measures. Since 2001, Medicare has covered all Society-recommended colorectal cancer screening options and beginning in 2007, these screenings will no longer be subject to a deductible. Furthermore, since January 1, 2005, Medicare has covered an initial preventive physical exam for all new Medicare beneficiaries within 6 months of enrolling in Medicare. The “Welcome to Medicare” visit, in addition to measurements of height, weight, and blood pressure, also includes referrals for prevention and early detection services already covered under Medicare, such as colorectal cancer screening.

### Initiatives

- The CDC’s *Screen for Life* awareness campaign helps educate the public and health care providers about the importance of colon cancer screening.<sup>191</sup> In addition to working with its national partners (including the Society) to raise colorectal cancer awareness, the CDC conducts research on the nationwide capacity for colorectal cancer screening and strategies to increase use of colorectal cancer screening tests.

- The National Colorectal Cancer Roundtable (NCCRT) is a national coalition of public, private, and voluntary organizations co-founded by the American Cancer Society and the CDC whose mission is to advance colorectal cancer control efforts by improving communication, coordination, and collaboration among health agencies, medical-professional organizations, and the public. The roundtable has been conducting research to provide answers to key policy questions surrounding colorectal cancer issues which will ultimately help us promote colorectal cancer screening in more effective and strategic ways.

- The American Cancer Society has also 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 advertisements in medical journals, a direct email campaign, and working with health plans to reach their contracted providers. More information on health professional tools is available at [http://www.cancer.org/docroot/PRO/PRO\\_4\\_ColonMD.asp](http://www.cancer.org/docroot/PRO/PRO_4_ColonMD.asp).

- The American Cancer Society has ongoing advertising campaigns to raise awareness and encourage consumers to talk with their doctors about colorectal cancer testing. In addition, the Society has developed a

information resource kit to help empower consumer to discuss with their physicians the various colorectal cancer screening options and decide what is best for them. More information on activities of the American Cancer Society to foster greater participation in colorectal cancer screening can be found in the recently released *Colorectal Cancer Facts & Figures, Special Edition 2005* (available at [http://www.cancer.org/docroot/STT/content/STT\\_1x\\_Colorectal\\_Cancer\\_Facts\\_and\\_Figures\\_-\\_Special\\_Edition\\_2005.asp](http://www.cancer.org/docroot/STT/content/STT_1x_Colorectal_Cancer_Facts_and_Figures_-_Special_Edition_2005.asp)). To find out more about how colorectal cancer testing saves lives, go to [http://www.cancer.org/docroot/COM/content/div\\_OH/COM\\_1\\_1x\\_2006\\_Getting\\_Testing\\_for\\_Colorectal\\_Cancer\\_Saves\\_Lives.asp?sitearea=COM](http://www.cancer.org/docroot/COM/content/div_OH/COM_1_1x_2006_Getting_Testing_for_Colorectal_Cancer_Saves_Lives.asp?sitearea=COM).

## Prostate Cancer Screening

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) or digital rectal exam (DRE) may be beneficial, most experts agree that the current evidence is insufficient to recommend for or against screening for prostate cancer.<sup>151</sup> The US Preventive Services Task Force, the American Cancer Society, the American Academy of Family Physicians, the American College of Physicians-American Society of Internal Medicine, the American Medical Association, and the American Urological Association recommend that for men aged 50 years and older and men at higher risk of prostate cancer, clinicians discuss with patients the potential benefits and possible harm of PSA screening, consider patient preferences, and individualize the decision to screen.<sup>151,192,193</sup> The American Cancer Society recommends that men aged 50 years and older be informed about the benefits and limitations of testing for early prostate cancer detection so that they can make an



**Table 4G. Prostate Cancer Screening, Men 50 and Older, US, 2003**

Characteristic	% PSA in the past year**†
<b>Race/ethnicity</b>	
White (non-Hispanic)	58.0
African American (non-Hispanic)	55.6
Hispanic/Latino	52.7
American Indian/Alaskan Native‡	78.2
Asian§	51.3
<b>Education (years)</b>	
11 or fewer	49.6
12	54.5
13 to 15	59.4
16 or more	63.5
<b>Health insurance coverage</b>	
Yes	58.7
No	33.7
<b>Immigration**</b>	
Born in US	57.6
Born in US Territory‡	68.7
In US less than 10 yrs‡	55.3
In US 10+ years	56.4
<b>Total</b>	<b>57.6</b>

\*Percentages are age-adjusted to 2000 U.S. standard population. See Statistical Notes for more information. †A prostate-specific antigen test within the last year for men aged 50 years and older who did not report that they had ever been diagnosed with prostate cancer. ‡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.

**Note:** Preliminary estimates subject to adjustment based on official statistics released by NCHS.

**Source:** National Health Interview Survey Public Use Data File 2003, National Center for Health Statistics, Centers for Disease Control and Prevention, 2005.

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informed decision. Men at high risk, including men of African descent and men with a first-degree relative diagnosed with prostate cancer at a young age, should begin screening at age 45 and should also be informed about benefits and limitations of testing before being tested.

### Prevalence of Prostate Cancer Testing in the US

- The prevalence of PSA screening in men aged 50 years and older within the past year was 57.6% in 2003 (Table 4G), compared to 41% in 2000.<sup>159</sup>
- In 2003, the least likely to have this test were men who had no health insurance (33.7%) followed by men with less than a high school education (49.6%).

- Among screened men in 2000, 66.5% of elderly men (aged 75 years and older) and 67% of men aged 50 to 74 years reported having a discussion about the advantages and disadvantages of the test with their doctor before PSA testing.<sup>194</sup> The same questions concerning informed decision making on PSA testing are not available on the Behavioral Risk Factor Surveillance System.

### State-level Prostate Cancer Testing

- Across states (Table 4H), the recent PSA test percentages in 2004 for men aged 50 years and older ranged from 42.8% in Oregon to 61.2% in Florida.
- The recent DRE percentages in 2004 for men aged 50 years and older ranged from 33.5% in Wyoming to 62.9% in Connecticut. Unlike the PSA percentages, there was little variation in these proportions by age.
- Across all states, men aged 50 years and older who lack a usual source of care, uninsured men, and men aged 50-64 years were significantly less likely to have had a recent PSA or a DRE.

### Cancer Screening Obstacles and Opportunities for Improvement

People who lack health insurance have less access to preventive care and are less likely to get timely cancer screening examinations.<sup>195</sup> In persons aged 65 years and older, health insurance coverage is nearly universal because of the Medicare program.<sup>187,196</sup> However, among adults under age 65 in 2004, 21% had no health insurance coverage, only 7% had Medicaid coverage, and 69% had employer-sponsored coverage.<sup>197</sup> The uninsured were more likely to be at or below the poverty level, Hispanic or African American, and report lower education.<sup>195,197</sup> Changes in employment status can also affect health care coverage.<sup>196</sup> Despite recent efforts to expand coverage, the number of uninsured Americans grew to nearly 46 million in 2004, an increase of 4.9 million since 2001.<sup>197-199</sup> Millions more face shrinking coverage, higher deductibles, and periods without insurance.<sup>197,199</sup> According to a recent report, 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 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>87,200,201</sup>

**Table 4H. Prostate Cancer Screening, Men 50 and Older, by State, US, 2004**

	% 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	50.9	50.4	51.7	25.3	¶	45.6	44.1	48.3	19.0	¶
Alaska	45.2	44.8	46.4	28.2	9.6	45.4	42.7	54.7	31.4	27.6
Arizona	49.6	42.0	60.6	18.5	10.2	48.0	44.9	52.5	20.4	15.0
Arkansas	48.2	44.4	54.3	21.7	23.9	41.9	36.0	51.9	17.7	19.1
California	49.9	42.9	62.4	19.4	18.2	43.2	38.2	52.3	15.6	13.4
Colorado	52.0	46.3	64.8	18.3	21.2	52.4	47.1	64.2	18.8	26.1
Connecticut	57.5	51.3	67.7	31.6	32.5	62.9	58.1	70.8	33.3	27.4
Delaware	59.5	52.2	71.0	12.3	¶	53.1	48.1	60.9	15.7	¶
Dist. of Columbia	52.8	50.7	56.7	18.6	¶	53.6	52.7	55.2	21.9	¶
Florida	61.2	53.1	71.0	23.2	36.2	55.2	48.9	62.6	22.1	20.6
Georgia	57.3	55.0	62.6	30.8	45.1	53.5	53.1	54.4	33.7	37.4
Hawaii	#	#	#	#	#	#	#	#	#	#
Idaho	44.5	38.2	55.9	18.6	18.9	40.8	36.9	47.7	16.2	19.0
Illinois	51.4	46.6	59.7	18.4	¶	48.4	44.7	54.5	7.2	¶
Indiana	48.0	42.6	58.0	14.7	22.2	44.5	39.3	54.0	14.6	21.6
Iowa	56.2	48.7	67.5	24.4	¶	50.9	46.7	57.4	24.1	¶
Kansas	53.7	48.2	62.5	20.1	25.6	49.4	45.1	56.2	18.7	25.7
Kentucky	52.2	44.5	66.5	22.2	35.4	47.5	40.7	60.1	22.3	32.0
Louisiana	53.9	48.1	65.0	23.0	26.3	46.2	41.5	55.3	21.5	20.5
Maine	46.8	41.9	55.0	22.9	13.1	60.0	57.8	63.6	26.7	30.8
Maryland	54.4	51.0	61.4	29.1	¶	57.1	54.3	62.8	24.4	¶
Massachusetts	54.3	50.7	60.5	14.5	34.5	62.3	59.8	66.4	21.9	35.4
Michigan	56.5	51.9	64.8	21.6	¶	53.5	52.1	56.1	22.4	¶
Minnesota	45.0	38.1	57.3	19.6	¶	48.6	43.7	57.2	27.6	¶
Mississippi	49.2	43.1	60.1	28.8	28.5	42.1	40.2	45.4	25.6	24.7
Missouri	47.1	38.6	61.1	13.0	26.8	40.3	34.7	49.8	10.9	24.9
Montana	56.2	51.5	64.6	37.2	35.9	53.5	48.4	62.5	28.3	34.1
Nebraska	51.4	45.3	61.6	24.4	35.1	44.6	41.0	50.7	17.6	26.0
Nevada	48.9	43.3	58.5	18.0	16.6	38.4	33.6	46.7	10.1	12.9
New Hampshire	52.0	48.0	59.8	16.4	21.2	59.2	56.5	64.5	16.7	19.0
New Jersey	57.4	52.6	65.4	26.6	23.5	53.1	49.9	58.6	23.7	17.8
New Mexico	49.6	43.5	60.1	17.2	21.9	51.4	45.9	60.8	15.0	20.4
New York	52.8	48.0	61.1	26.3	30.0	50.3	47.4	55.3	19.2	26.5
North Carolina	57.4	51.7	67.7	29.2	24.4	54.5	50.7	61.5	25.6	23.3
North Dakota	44.2	38.9	52.1	15.0	¶	43.5	40.7	47.9	14.5	¶
Ohio	52.7	45.6	64.2	21.2	29.5	52.1	47.8	59.3	22.7	25.0
Oklahoma	48.8	42.7	60.0	19.2	14.5	43.9	40.2	50.6	17.7	16.7
Oregon	42.8	38.2	50.8	11.8	15.5	43.3	36.7	55.0	16.5	20.2
Pennsylvania	50.3	42.7	61.4	16.3	21.1	46.0	41.1	53.3	16.6	18.0
Rhode Island	56.5	52.0	63.5	21.2	¶	62.1	61.1	63.6	16.1	44.3
South Carolina	52.8	49.5	59.1	28.4	27.7	51.2	51.3	51.0	28.4	32.9
South Dakota	53.0	45.6	64.1	24.6	24.2	49.6	43.4	58.8	21.6	24.8
Tennessee	53.1	47.6	63.3	34.1	¶	51.7	48.4	57.7	19.9	¶
Texas	51.1	46.1	60.7	20.3	13.3	45.1	41.7	51.7	17.3	15.2
Utah	49.3	42.0	63.3	29.5	43.1	44.6	41.6	50.4	26.2	34.6
Vermont	43.8	38.2	54.2	11.2	26.3	48.8	44.6	56.6	13.0	27.5
Virginia	54.3	50.9	60.7	20.7	40.1	56.3	53.6	61.4	31.1	46.4
Washington	45.3	41.1	53.6	20.2	25.4	50.0	47.5	55.1	22.1	29.2
West Virginia	53.3	49.2	60.3	23.4	¶	49.6	44.6	58.1	19.9	¶
Wisconsin	45.6	40.7	54.0	11.9	¶	51.2	48.2	56.4	25.4	¶
Wyoming	55.3	53.2	59.5	42.9	33.6	33.5	30.6	39.6	20.7	18.7
United States**	52.3	46.7	62.1	21.7	24.9	49.5	45.6	56.2	20.0	22.2
Range	42.8-61.2	38.1-55.0	46.4-71.0	11.2-42.9	9.6-45.1	33.5-62.9	30.6-61.1	39.6-70.8	7.2-33.7	12.9-46.4

\*A prostate-specific antigen test within the last year for men aged 50 years 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 last year for men aged 50 years and older who reported they were not told by a doctor, nurse, or other health professional they had prostate cancer. ‡Men aged 50 years and older who reported that they did not have a personal doctor or health care provider. §Men aged 50 to 64 years 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. #Estimate not available as state did not participate in 2004 survey.\*\*See Statistical Notes for definition.

**Source:** Behavioral Risk Factor Surveillance System Public Use Data Tape 2004, National Center for Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 2005.

American Cancer Society, Surveillance Research

Clinicians and 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>87,202</sup> For example, 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>87</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- or risk-eligible patients about screening, and organizational support systems to help manage referrals and follow-up of cancer screening tests.<sup>87,203,204</sup> In addition, multiple interventions directed at patients (i.e., strategies to raise awareness about the importance of cancer screening), physicians (i.e., strategies to assist them in their cancer screening counseling and follow-up), and health care systems (i.e., strategies to ensure the delivery of high-quality and timely cancer screening) may provide the best approaches to improving rates of cancer screening.<sup>205,206</sup> In addition, multi-partner efforts between the American Cancer Society and government agencies are under way to implement interventions, integrate screening into routine care, and address health disparities. Visit <http://www.cdc.gov/nccdphp/publications/aag/reach.htm> for more information.

On June 29, 2005, President George W. Bush signed into law the Patient Navigator, Outreach, and Chronic Disease Prevention Act of 2005 (HR 1812/S 898). The American Cancer Society was the lead organization working with members of Congress and 20 national organizations for more than 3 years on this critical piece of legislation. The bill provides \$25 million in grants to set up navigator programs to help alleviate the barriers to quality health care that millions of medically underserved individuals often face. This law will improve access to prevention services, such as breast and cervical cancer screening, diagnosis, and treatment, and will encourage increased screening participation of women who lack a usual source of care or who otherwise have difficulty navigating the health care system. Currently,



the Society is working to secure the funding for implementation of these patient navigator programs.

The American Cancer Society continues 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 screenings and treatment for the uninsured, the American Cancer Society 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. Hence, 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 below.)

**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 BRFSS data targets adults aged 18 years and older and the YRBSS data targets students in grades 9 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 the US, a state, or a city.

**Sample:** A smaller group of people chosen from the population defined by the survey. The sample is chosen based on the age, race, ethnic, and gender demographics of the city, state, or nationwide. 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, 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, 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 9 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 3 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 2.5%. The narrowest confidence interval is around the percentage for Washington (17.6%±0.7%) or (16.9, 18.3), and the percentage for Alaska has the widest range of possible values (24.9%±2.4%) or (22.6, 27.5).

**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 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 NHIS.

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

Table	Description	95% CI Range
1A	Current cigarette smoking, high school students, total	± 1.6% to 7.6%
2A	At risk for becoming overweight, high school students, total	± 1.2% to 2.9%
	Overweight, high school students, total	± 1.0% to 2.9%
	Met currently recommended levels of physical activity, high school students, total	± 1.6% to 4.9%
	Ate fruits and vegetables five or more times a day, high school students, total	± 1.3% to 4.5%
1B	Current cigarette smoking, adults aged 18 years and older	± 0.7% to 2.5%
	Current cigarette smoking, men aged 18 years and older	± 1.1% to 3.9%
	Current cigarette smoking, women aged 18 years and older	± 0.8% to 3.2%
2C	Clinical Overweight, adults aged 18 years and older	± 0.9% to 2.7%
	Clinical Obese, adults aged 18 years and older	± 0.7% to 2.5%
	No leisure time physical activity, adults aged 18 years and older	± 0.7% to 2.5%
	Moderate physical activity, adults aged 18 years and older	± 0.9% to 2.9%
	Vigorous physical activity, adults aged 18 years and older	± 0.8% to 2.8%
	Eating five or more fruits and vegetables a day, adults aged 18 years and older	± 0.7% to 2.3%
3B	Recent mammogram, women aged 40 years and older	± 1.4% to 4.7%
	Recent mammogram, women aged 65 years and older	± 2.4% to 10.4%
3D	Recent Pap test, women aged 18 years and older	± 1.3% to 3.4%
	Recent Pap test, women aged 65 years and older	± 3.0% to 13.0%
3F	Recent fecal occult blood test, adults aged 50 years and older	± 1.1% to 3.1%
	Recent sigmoidoscopy or colonoscopy, adults aged 50 years and older	± 1.3% to 4.4%
3G	Recent prostate-specific antigen test, men aged 50 years and older	± 2.2% to 6.9%
	Recent digital rectal examination, men aged 50 years and older	± 2.2% to 6.7%

# 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 Centers 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://www.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 to 1994; the most recent and third cycle (NHANES III) was conducted from 1988 to 1994. Beginning in 1999, NHANES was implemented as a

continuous, annual survey. For more information, visit the NHANES Web site at <http://www.cdc.gov/nchs/nhanes.htm>.

**National Health Interview Survey (NHIS).** The NHIS is a survey of the 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://www.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 6 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 46) 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 9 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://www.cdc.gov/HealthyYouth/yrbs/index.htm>.

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# List of Tables and Figures

## Tables

1A. Tobacco Use, High School Students, by State and City/County, US, 2005	4
1B. Current Cigarette Use, Adults 18 and Older, US, 2005	7
1C. Current Cigarette Smoking, Adults 18 and Older, by State, US, 2005	8
1D. Comprehensive Tobacco Control Measures, by State, US, 2001, 2007	10
2A. Overweight and Related Factors, High School Students, by State and City/County, US, 2005	20
2B. Overweight, Obesity, and Related Factors, Adults 18 and Older, by State, US, 2005	22
3A. Prevalence of Sunburns in US Adolescents and Adults, 2004	28
4A. Mammography, Women 40 and Older, US, 2003	32
4B. Mammography and Clinical Breast Exam, Women 40 and Older, by State, US, 2004	33
4C. Pap Test, Women 18 and Older, US, 2003	35
4D. Pap Test, Women 18 and Older, by State, US, 2004	36
4E. Colon and Rectum Cancer Screening, Adults 50 and Older, US, 2003	39
4F. Colon and Rectum Cancer Screening, Adults 50 and Older, by State, US, 2004	40
4G. Prostate Cancer Screening, Men 50 and Older, US, 2003	43
4H. Prostate Cancer Screening, Men 50 and Older, by State, US, 2004	44

## Figures

1A. Current Cigarette Smoking Among 12th Graders, by Race/Ethnicity, US, 1977-2006	3
1B. Annual Number of Cancer Deaths Attributable to Smoking, Males and Females, by Site, US, 1997-2001	5
1C. Current Cigarette Smoking by Education, Adults 25 and Older, US, 1974-2005	6
1D. Cigarette Excise Tax, by State, US, 2007	11
1E. Insurance Coverage of Smoking Cessation Treatments, Medicaid Recipients, US, 2003	13
1F. Tobacco Industry Expenditures on Cigarette Marketing vs. Tobacco Prevention Funding, US, 2000-2003	14
1G. Funding for Tobacco Prevention, by State, US, 2007	15
2A. Overweight Children and Adolescents, 12-19 Years of Age, by Gender & Race/Ethnicity, US, 1976- 2004	18
2B. Adult Obesity, by Gender, Ages 20-74 US, 1960- 2004	19
4A. Mammography Within the Past Two Years, Women 40 and older, by Race/Ethnicity, US, 1987- 2003	30
4B. Pap Test Within the Past 3 Years, Women 18 and Older, by Race/Ethnicity, US, 1987- 2003	35
4C. Number of Women Served in the National Breast and Cervical Cancer Early Detection Program (NBCCEDP), 1991–2005	37
4D. Colorectal Cancer Screening, Adults Aged 50 and Older, by Education Level, US, 2000-2003	38
4E. Colon and Rectum Cancer Screening Coverage Legislation, by State, US, 2006	41

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