

Contents

Preface	1
Tobacco Use	3
Youth Tobacco Use	3
Adult Tobacco Use	6
Comprehensive Tobacco Control Programs	10
Overweight and Obesity, Physical Activity, and Nutrition	18
Individual Choices	18
Community Action	27
Ultraviolet Radiation and Skin Cancer	31
Solar Ultraviolet Exposure	31
UVR Exposure Behaviors	32
Artificial Ultraviolet Radiation Exposure (Indoor Tanning)	32
Prevention Strategies in Skin Cancer	33
Early Detection of Skin Cancer	35
Cancer Screening	36
Breast Cancer Screening	36
Cervical Cancer Screening	40
Programs to Increase the Rate of Breast and Cervical Cancer Screening	43
Colorectal Cancer Screening	45
Prostate Cancer Screening	49
Lung Cancer Screening	51
Cancer Screening Obstacles and Opportunities to Improve Cancer Screening Utilization	52
Statistical Notes	54
Survey Sources	56
References	57
List of Tables and Figures	65
Acknowledgments	65



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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, reduce obesity, and expand the use of established screening tests. The American Cancer Society estimates that in 2013 about 174,100 cancer deaths will be caused by tobacco

use alone. In addition, approximately one-quarter to one-third of the 1,660,290 cancer cases expected to occur in 2013 can be attributed to poor nutrition, physical inactivity, overweight, and obesity.¹⁻³ Regular use of some established screening tests can prevent the development of cancer through identification and removal or treatment of premalignant abnormalities; screening tests can also improve survival and decrease mortality by detecting cancer at an early stage when treatment is more effective.

Highlights, CPED 2013

Tobacco Use

- Cigarette smoking prevalence in US adults declined between 2005 and 2011 from 20.9% to 19.0%, with significant declines in both men (23.9% to 21.6%) and women (18.1% to 16.5%) as well as in young adults and certain race/ethnic groups (Hispanics and Asians). In addition, heavy smoking declined significantly during this time, reflecting long-term historical trends toward lower cigarette consumption in smokers.
- The high school smoking rate was reduced by 18% from a high of 22.0% to 18.1%, a new low, between 2003-2011.
- Apart from cigarettes, the most commonly used tobacco products among high school students in 2011 were cigars (13.1%) and smokeless tobacco (7.7%).
- Raising cigarette prices by increasing excise taxes reduces tobacco consumption. At present, the average state cigarette excise tax rate is \$1.48, with wide variation between states ranging from 17 cents per pack in Missouri to \$4.35 per pack in New York.
- During 2011-2012, states have spent less on tobacco prevention (<2% of tobacco-related revenue) than in any period since the Master Settlement Agreement in 1998, despite record high revenues from the settlement and tobacco taxes.
- In addition to increasing funding for tobacco prevention programs, states must step up the pace in enacting tobacco tax increases and smoke-free workplace laws, which has slowed in recent years.

Overweight and Obesity, Physical Activity, and Nutrition

- Updated in 2012, the American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Prevention highlight the importance of individual nutritional and physical activity choices for cancer prevention and community efforts to facilitate such choices.
- Currently, an estimated 18.4% of adolescents and 35.7% of adults are obese. Increasing rates of obesity observed since the early 1980s appear to have slowed in the past decade, particularly among women and girls. Obesity prevalence has increased among men in the past decade and has converged with the rate among women.

- The percentage of US high school students who were obese in 2011 varied widely across states; Colorado had the lowest proportion of obese adolescents (7.3%) and Alabama the highest (17.0%).
- In 2011, the prevalence of obesity exceeded 20% in all states; the state with the highest obesity prevalence was Mississippi (35.0%).

Ultraviolet Radiation and Skin Cancer

- Many states (33) are taking action on skin cancer prevention by enacting policies to control the indoor tanning industry. Of these states, seven have stronger policies in place that restrict minors' (< 18 years olds) access to indoor tanning facilities. This strategy along with school-based sun-safe programs could help reduce future risks of developing skin cancers.

HPV Vaccination for Cervical Cancer Prevention

- To prevent cervical cancer, vaccination against certain types of human papillomavirus (HPV) is recommended for adolescent girls. The initiation of the HPV vaccination series among US females 13 to 17 years of age increased from 25.0% in 2007 to 53.0% in 2011, with 70.7% of those who initiated completing the entire series. Despite these improvements in the past 6 years, the HPV vaccine coverage among adolescent females lags behind other recommended vaccines.

Cancer Screening

- Mammography usage has not increased since 2000. In 2010, 66.5% of women 40 years of age and older reported getting a mammogram in the past two years. Women who lack health insurance have the lowest use of mammograms (31.5%) within the past two years.
- In 2010, 83.0% of adult women (21-65 years of age) had received a Pap test in the past three years. However, there is persistent underuse of the Pap test among women who are uninsured, recent immigrants, and those with low education.
- In 2010, 59.1% of adults 50 years of age and older reported use of either a fecal occult blood test (FOBT) or an endoscopy within recommended time intervals. However, rates remain substantially lower in uninsured individuals and those with lower socioeconomic status. To date, 28 states and the District of Columbia have passed legislation ensuring coverage for the full range of colorectal cancer screening tests.

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

Cancer prevention and early detection are central to the American Cancer Society's mission and its 2015 goals. The mission of the Society is to save lives from cancer by helping people stay well and get well, by finding cures, and by fighting back against the disease. In 1999, the American Cancer Society set challenge goals for the US that, if met, would substantially lower cancer incidence and mortality rates and would 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, and the availability of insurance coverage for screening tests and treatment for tobacco addiction all influence individual choices. These issues not only affect a person's cancer risk, but also the risk of other major diseases. The Society has joined forces with the American Heart Association and the American Diabetes Association to identify strategies that will improve prevention and early detection efforts for all of the major chronic diseases in the US.

American Cancer Society Challenge Goals and Objectives

2015 Challenge Goals*

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

2015 Nationwide Objectives

Adult Tobacco Use

- Reduce to 12% the proportion of adults (18 and older) who are current cigarette smokers.
- Reduce to 0.4% the proportion of adults (18 and older) who are current users of smokeless tobacco.

Youth Tobacco Use

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

Nutrition & Physical Activity

- The trend of increasing prevalence of overweight and obesity among US adults and youth will have been reversed, and the prevalence of overweight and obesity will be no higher than it was in 2005.
- Increase to 70% the proportion of adults and youth who follow American Cancer Society guidelines with respect to the appropriate level of physical activity, as published in the American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Prevention.

- Increase to 75% the proportion of people 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, which may help 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; properly apply sunscreen with an SPF of 15 or higher; and avoid artificial sources of ultraviolet light (e.g., sunlamps, tanning booths).

Breast Cancer Early Detection

- Increase to 90% the proportion of women 40 years of age and older who have breast cancer screening consistent with American Cancer Society guidelines.

Colorectal Cancer Early Detection

- Increase to 75% the proportion of people 50 years of age 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.

*From 1990-1991 baseline.

Public policy and legislation at the federal, state, and local levels can increase access to preventive health services, including cancer screening. At both the federal and state levels, the American Cancer Society Cancer Action NetworkSM (ACS CAN), the non-profit, nonpartisan advocacy affiliate of the American Cancer 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, ACS CAN has spearheaded campaigns to protect nonsmokers from secondhand smoke in public places. These and other community, policy, and legislative initiatives are highlighted in this publication.

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 443,000 premature deaths, of which about 49,400 are in nonsmokers as a result of exposure to secondhand smoke. Smoking also accounts for \$193 billion in health care expenditures and productivity losses annually.⁴

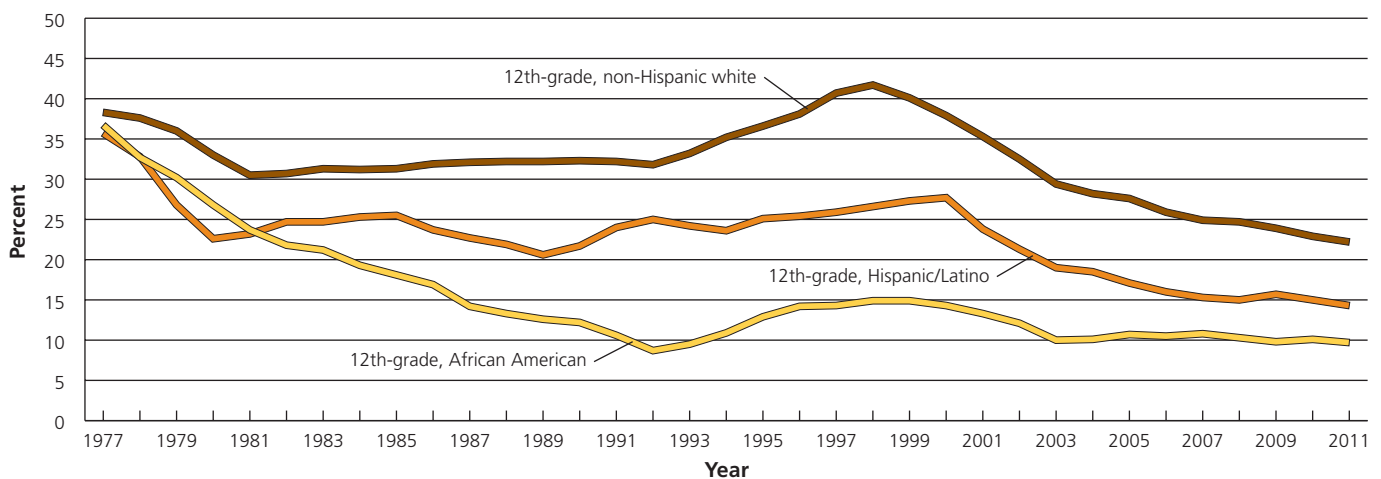
Youth Tobacco Use

A majority of smokers become addicted to tobacco before they are legally old enough to buy cigarettes. Adolescents are more sensitive to nicotine and appear to be more easily addicted.⁵ While there are different trajectories to smoking uptake from adolescence to adulthood, there is evidence that most smokers who become regular and heavy smokers start before 18 years of age.⁵ In addition, because the likelihood of developing smoking-related cancers such as lung cancer increases with the duration of smoking, those who start at younger ages and continue to smoke are at higher risk for tobacco-related illness and death.⁵

Current Patterns and Trends in Cigarette Smoking

- In 2011, data from the Youth Risk Behavior Survey (YRBS) showed that 18.1% of high school students reported current cigarette smoking (smoking on at least one day in the past 30 days) and 6.4% reported frequent smoking (smoking on 20 or more days in the past 30 days) (Table 1A, page 4).
- Trend data from the YRBS showed a sharper drop (40% decline) in cigarette smoking prevalence in high school students between 1997-2003 (from 36.4% to 22.0%). However, between 2003-2011, the percentage decline was about half as much (an 18% drop, from 22.0% to 18.1%).⁶ Similar findings were observed based on the University of Michigan's Monitoring The Future survey results (Figure 1A).⁷
- Cigarette smoking varies by race/ethnicity among 12th graders, with prevalence being highest among non-Hispanic whites, followed by Hispanics/Latinos, and the lowest among African Americans (Figure 1A).

Figure 1A. Cigarette Smoking Trends*, 12th-graders, by Race/Ethnicity, US, 1977-2011†



*Used cigarettes in the past 30 days. †Percentages are two-year moving averages (data for specified year and previous year have been combined).

Source: Monitoring the Future survey, 1975-2011, University of Michigan.

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Table 1A. Tobacco Use, High School Students, by State and City/County, US, 2011

Location	% Current cigarette smoking*	Rank [†]	% Frequent cigarette smoking [‡]	% Current cigar use [§]	% Current smokeless tobacco use [¶]
United States	18.1		6.4	13.1	7.7
State					
Alabama	22.9	41	9.5	15.8	9.8
Alaska	14.1	9	5.2	10.3	8.4
Arizona	17.4	22	5.8	15.8	7.1
Arkansas	18.2	29	7.5	14.4	11.6
Colorado	15.7	17	5.3	N/A	7.0
Connecticut	15.9	18	5.4	N/A	N/A
Delaware	18.3	30	7.6	12.9	6.6
Florida	14.3	10	4.7	N/A	N/A
Georgia	17.0	21	7.5	17.8	9.6
Hawaii	10.1	2	3.9	6.8	3.5
Idaho	14.3	10	5.7	11.0	9.0
Illinois	17.5	24	6.3	13.1	5.8
Indiana	18.1	27	8.1	14.6	8.2
Iowa	18.1	27	6.8	12.8	10.4
Kansas	14.4	12	5.2	10.7	8.8
Kentucky	24.1	43	11.6	17.5	16.9
Louisiana	21.8	38	9.4	17.0	11.4
Maine	15.2	16	6.7	12.6	7.7
Maryland	12.5	4	4.4	12.9	7.2
Massachusetts	14.0	7	5.6	14.3	N/A
Michigan	14.0	7	5.4	12.1	7.6
Mississippi	17.9	26	6.7	14.6	10.2
Missouri	N/A	N/A	N/A	N/A	N/A
Montana	16.5	20	6.4	16.1	13.5
Nebraska	15.0	14	5.8	9.6	6.4
Nevada	N/A	N/A	N/A	N/A	N/A
New Hampshire	19.8	34	9.7	16.4	8.4
New Jersey	16.1	19	4.9	N/A	N/A
New Mexico	19.9	35	5.8	15.1	9.5
New York	12.5	4	5.5	N/A	7.3
North Carolina	17.7	25	6.8	N/A	11.0
North Dakota	19.4	33	8.3	13.5	13.6
Ohio	21.1	36	9.5	13.7	12.2
Oklahoma	22.7	40	8.6	14.1	13.1
Pennsylvania	N/A	N/A	N/A	N/A	N/A
Rhode Island	11.4	3	4.4	13.3	5.7
South Carolina	19.1	31	7.5	18.3	13.0
South Dakota	23.1	42	9.8	N/A	14.7
Tennessee	21.6	37	9.5	15.5	12.6
Texas	17.4	22	4.5	16.0	6.2
Utah	5.9	1	2.1	5.0	3.7
Vermont	13.3	6	5.2	12.8	6.7
Virginia	15.0	14	5.4	12.0	8.2
West Virginia	19.1	31	8.3	11.7	14.4
Wisconsin	14.6	13	5.2	14.8	8.3
Wyoming	22.0	39	10.2	16.6	15.1
City/County					
Boston, MA	10.0		3.7	10.7	4.1
Broward County, FL	11.0		3.1	9.8	4.5
Charlotte-Mecklenburg County, NC	14.2		5.3	N/A	7.5
Chicago, IL	13.6		3.2	13.0	3.5
Clark County, NV	N/A		N/A	N/A	N/A
Dallas, TX	14.7		2.0	15.3	3.0
Detroit, MI	4.8		0.9	9.7	2.2
Duval County, FL	12.4		4.7	15.7	7.5
Los Angeles, CA	9.1		2.2	8.5	3.6
Memphis, TN	7.2		2.3	10.4	1.4
Miami-Dade County, FL	10.8		3.0	8.7	3.7
Milwaukee, WI	10.4		3.2	N/A	N/A
New York City, NY	8.5		2.5	N/A	3.3
Orange County, FL	12.3		3.3	11.7	4.8
Palm Beach County, FL	12.8		4.2	11.5	5.9
Philadelphia, PA	9.6		3.3	6.0	2.8
San Bernardino, CA	13.6		3.0	9.1	3.7
San Diego, CA	14.2		3.7	10.5	3.9
San Francisco, CA	10.7		3.3	7.8	4.1
Seattle, WA	8.5		2.9	9.0	3.8

*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, 2011, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention. *MMWR Morb Mortal Wkly Rep.* Surveillance Summaries 2012;61(SS04).

American Cancer Society, Surveillance Research, 2013

- YRBS trend data indicate that smoking prevalence were stable for all gender and racial/ethnic groups except African American females, who have shown a continuous decline since 1999.⁶
- Of the 43 states and the District of Columbia surveyed in 2011, Utah had the lowest high school student smoking prevalence (5.9%) and Kentucky had the highest rate (24.1%)⁸ (Table 1A).
- The prevalence of current smoking among middle school students overall did not significantly change from 2009 (5.2%) to 2011 (4.3%).⁹

The slowed decline in youth smoking since 2003 may be related to declines in funding for comprehensive tobacco control programs and increases in tobacco industry expenditures on marketing and promotions, including extensive industry price discounting to offset increases in retail cigarette prices. A comprehensive strategy that includes evidence-based tobacco control strategies (e.g., increased cigarette excise taxes, restrictions on smoking in public places, and counter-advertising campaigns) along with effective implementation of the US Food and Drug Administration regulations, including restrictions on certain forms of tobacco advertising and promotions that appeal to youth, is needed to further reduce youth smoking prevalence.

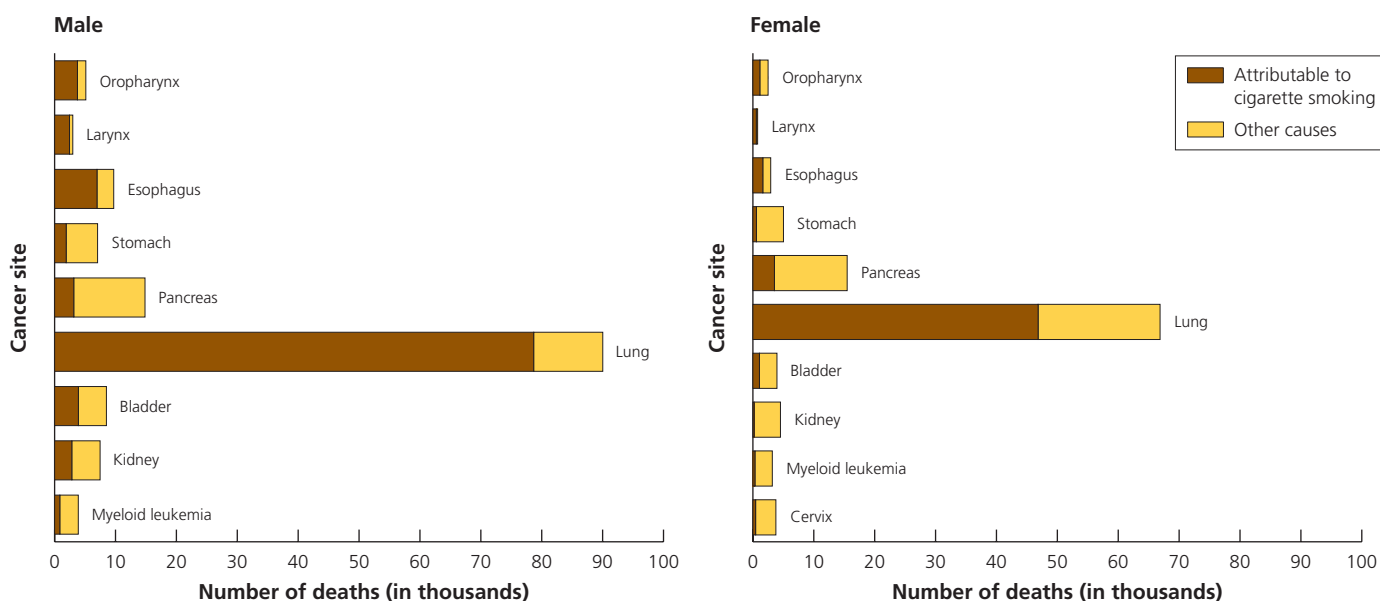
Other Tobacco Products

While cigarettes remain the primary tobacco product used by youth, other forms of tobacco use, including small cigars, smoke-

less tobacco products, and hookahs (tobacco water pipes), have grown in popularity. Table 1A provides data from the YRBS on current cigar and smokeless tobacco use among high school students in states and cities/counties for which these data were available for 2011.

- Apart from cigarettes, the most commonly used tobacco products among high school students were cigars (13.1%) and smokeless tobacco (7.7%). While male and female students were equally likely to smoke cigarettes, males were nearly six times more likely to use smokeless tobacco and more than two times more likely to smoke cigars than females.⁸
- Non-Hispanic white and Hispanic/Latino students have a higher prevalence of cigarette and cigar smoking when compared to non-Hispanic African Americans.⁸
- YRBS data also showed that smokeless tobacco use among high school boys declined significantly from 19.2% in 1993 to 11% in 2003, but has since stalled (2011: 12.8%).^{8,10} Use among high school girls remains low and has changed little in this time period (2011: 2.2%).^{8,10}
- Of the states with data available, cigar use was lowest in Utah (5.0%) and highest in South Carolina (18.3%), whereas smokeless tobacco use was lowest in Hawaii (3.5%) and highest in Kentucky (16.9%) (Table 1A).
- According to the 2011 National Youth Tobacco Survey (NYTS), about 23.2% of high school students reported current use of any tobacco product.⁹

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



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

American Cancer Society, Surveillance Research, 2013

- Apart from cigarettes, cigars, and smokeless tobacco, other tobacco products used included pipes (4.0%), kreteks (1.7%), and bidis (2.0%).⁹
- Among high school students, overall cigar use did not change from 2009 to 2011; however, cigar use among non-Hispanic African Americans increased significantly from 2009 (7.1%) to 2011 (11.7%).⁹
- Between 2009 and 2011, the use of kreteks significantly declined overall for high school students from 2.4% to 1.7%, among female high school students from 1.9% to 0.8%, and among non-Hispanic white high school students from 2.4% to 1.4%.⁹
- An emerging trend among adolescent and young adult smokers is the use of tobacco water pipes or hookahs. There is much variation in reported hookah use estimates: current use estimates range from 7% to 20% among college students and 10% to 17% among adolescents.^{11,12} Trends indicate that hookah use is increasing, primarily among young adults and is likely associated with the growing number of hookah “bars” and with misperceptions regarding the relative health hazard of hookah use compared to cigarette smoking.¹³

Use of tobacco in any form may induce nicotine dependence and will harm health. Prevention and cessation programs should address other tobacco products in addition to cigarettes. The US Surgeon General also concluded that school-based tobacco control programs that include specific components, such as those based on the social influences model with interactive delivery

methods and teaching refusal skills, are effective at reducing youth smoking. More sustained results are possible when such efforts are part of a multicomponent approach, including tobacco control strategies outlined in this publication (page 10).^{5,14}

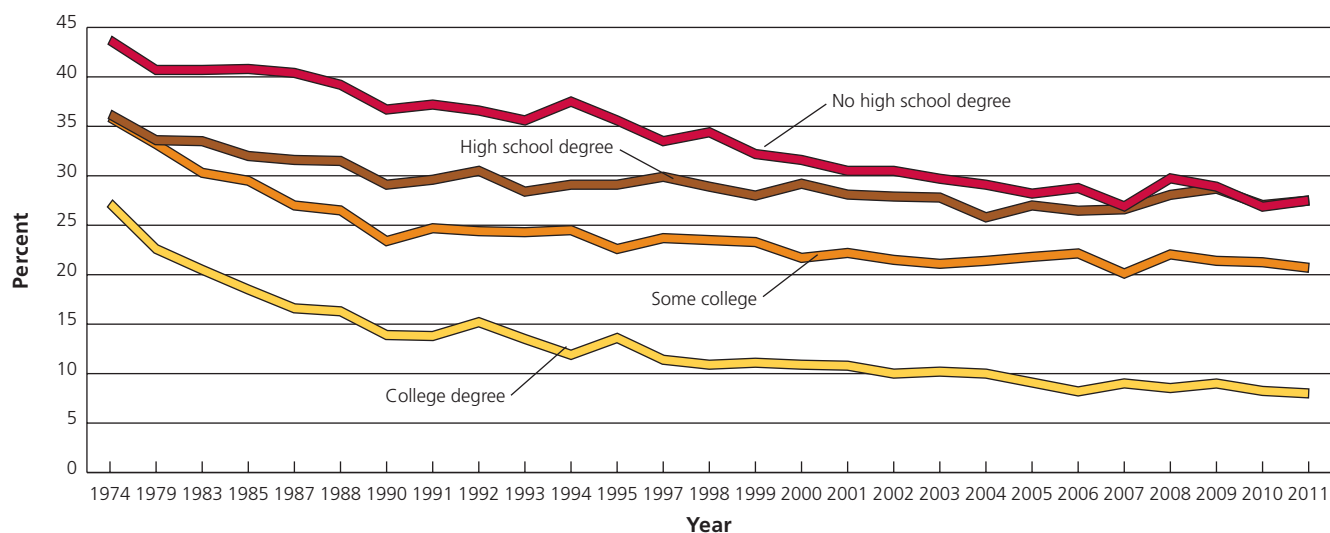
Adult Tobacco Use

Tobacco use increases the risk of cancers of the lung, mouth, nasal cavities, larynx, pharynx, esophagus, stomach, colorectum, liver, pancreas, kidney, bladder, uterine cervix, ovary (mucinous), and myeloid leukemia.^{15,16} Limited but accumulating evidence suggests that long-term, heavy smoking increases the risk of breast cancer, particularly among women who began smoking at an early age.¹⁷ Exposure to secondhand smoke increases the risk of lung cancer.^{18,19} Thirty percent of cancer deaths, including 82% of lung cancer deaths, can be attributed to tobacco^{2,15,19} (Figure 1B, page 5). The overall mortality attributable to smoking varies across states, ranging from 138 per 100,000 population in Utah to 371 per 100,000 population in Kentucky (Table 1C, page 8).

Current Patterns and Trends in Cigarette Smoking

- According to the National Health Interview Survey (NHIS), an estimated 19.0% of adults (men: 21.6%, women: 16.5%) smoked cigarettes in 2011 (Table 1B, page 7). About 77.8% (34.1 million) of current smokers smoked every day, and 22.2% (9.7 million) smoked some days.²⁰

Figure 1C. Cigarette Smoking* Trends†, Adults 25 and Older, by Education, US, 1974-2011



*Adults 25 and older who have smoked 100 cigarettes in their lifetime and are current smokers (every day or some days). †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 over.

Source: 1974-2007: National Center for Health Statistics, Health, United States, 2007. With Chartbook on Trends in the Health of Americans. Hyattsville, Maryland, 2008. 2008-2010: National Health Interview Survey Public Use Data Files, National Center for Health Statistics, Centers for Disease Control and Prevention, 2011.

American Cancer Society, Surveillance Research, 2013

- Between 1997 and 2004, the percentage of adults who smoked decreased from 27.6% to 23.4% in men and from 22.1% to 18.5% in women. Between 2005 and 2011, smoking prevalence declined from 20.9% to 19.0%, with significant declines in both men (23.9% to 21.6%) and women (18.1% to 16.5%).²⁰ Also during this period, significant declines were observed in younger populations (18-24 years of age, from 24.4% to 18.9%), Hispanics (from 16.5% to 12.9%), non-Hispanic Asians (from 13.3% to 9.9%), those at or above the poverty level (from 20.6% to 17.9%), and those living in the Northeast (from 19.2% to 17.3%) and Midwest (from 24.2% to 21.8%).
- Light or intermittent smoking (less than 10 cigarettes per day) in daily smokers increased significantly between 2005 (16.4%) and 2011 (22.0%), whereas heavy smoking declined from 12.6% to 9.1%, reflecting long-term historical trends toward lower cigarette consumption.^{20,21}
- The largest disparities in smoking prevalence are by socioeconomic status (SES), race/ethnicity, and state of residence: Adults without a high school degree are nearly three times more likely to be current smokers than those with a college degree, and smoking in American Indians/Alaska Natives is roughly three times that of Asian American adults (Table 1B). The state with the highest smoking prevalence (Kentucky, 29.0%) is more than twice that of the state with the lowest prevalence (Utah, 11.8%) (Table 1C, page 8).

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. Between 2000 and 2007, while cigarette sales decreased by 18%, sales of other tobacco products (in cigarette-pack equivalents), including small cigars, roll-your-own tobacco, and moist snuff, increased by 115%, 91%, and 33%, respectively.²² This increase in other tobacco product sales offset declines in cigarette sales by approximately 30%.

Cigar Smoking

Cigar smoking increases the risk of cancers of the lung, oral cavity, larynx, esophagus, and probably pancreas. Cigar smokers are four to 10 times more likely to die from laryngeal, oral, or esophageal cancers than nonsmokers.²³

- According to the 2009-2010 National Tobacco Use Survey (NATS), 6.6% of adults – 10.4% of men and 3.1% of women 18 years of age and older – were current cigar smokers (smoked cigars in a lifetime and in the past month used at least 1 day). In addition, this survey also estimated that 2.8% of adults (by gender: 4.1% of men and 1.4% of women) used flavored cigars.
- According to the 2009-2010 NATS, the prevalence of past-month cigar use (at least 1 day among ever users) decreased with age, and it was highest in the following groups: African

Table 1B. Current Cigarette Smoking*, Adults 18 and Older, US, 2011

Characteristic	% Men	% Women	% Total
Age group (years)			
18 to 24	21.3	16.4	18.9
25 to 44	24.5	19.7	22.1
45 to 64	24.4	18.5	21.4
65 or older	8.9	7.1	7.9
Race/ethnicity			
White (non-Hispanic)	22.5	18.8	20.6
African American (non-Hispanic)	24.2	15.5	19.4
Hispanic/Latino	17.0	8.6	12.9
American Indian/Alaska Native†	34.4	29.1	31.5
Asian (non-Hispanic)‡	14.9	5.7	9.9
Education (years)§			
8 or fewer	20.0	9.9	15.0
9 to 11	40.3	29.2	34.6
12 (no diploma)	29.4	20.9	25.1
GED diploma¶	47.0	43.2	45.3
High school graduate	27.9	20.0	23.8
Some college (no degree)	25.2	20.0	22.3
Associate degree	21.4	17.5	19.3
Undergraduate degree	9.8	8.7	9.3
Graduate degree	5.2	4.8	5.0
Health insurance coverage			
Uninsured	35.9	26.2	31.3
Insured	18.3	14.7	16.4
Total	21.6	16.5	19.0

*Persons who reported having smoked at least 100 cigarettes or more and who reported now smoking every day or some days. †Estimates should be interpreted with caution because of the small sample sizes. ‡Does not include Native Hawaiians and other Pacific Islanders. §Persons 25 years of age or older. ¶General Educational Development. Note: N/A: Not available due to insufficient sample size.

Source: National Health Interview Survey, 2011, National Center for Chronic Disease Prevention and Health Promotion, 2012. Centers for Disease Control and Prevention. Vital Signs: Current Cigarette Smoking Among Adults Aged ≥18 Years – United States, 2011. *MMWR Morb Mortal Wkly Rep.* 2012; 61(44):889-894.

American Cancer Society, Surveillance Research, 2013

- Americans (9.2%), those with less than 12 years of education (10.0%), and those in poorer households (income at <\$20,000).²⁴
- According to the 2009-2010 NATS, Mississippi had the highest cigar-smoking prevalence (11.9%) and Utah had the lowest (1.8%) (Table 1C, page 8).
- In 2010, a tobacco industry report estimated that about 13.3 billion cigars (12.3 billion large cigars and cigarillos; 1 billion little cigars) were purchased in the US.²⁵
- Between 1997 and 2007, sales of small cigars (240%) and cigarillos (45%) rose at a much faster rate than sales of large cigars (6%).²⁶

Table 1C. Smoking-attributable Mortality Rate 2000-2004, and Tobacco Use, Adults, by State, US, 2009-2010, 2011

	2000-2004		2011					2009-2010	2011
	Smoking attributable mortality rate* /100,000 population	Rank [‡]	18 and older	Rank [‡]	Men 18 and older	Women 18 and older	Low education [§]	% Current cigar use [¶] (%)	% Current smokeless tobacco use [#] (%)
Alabama	318	44	24.4	42	28.1	21.1	37.5	6.5	6.5
Alaska	270	29	22.9	35	22.8	23.0	44.2	6.0	5.9
Arizona	247	15	19.1	11	21.4	16.8	26.4	3.4	3.1
Arkansas	324	45	26.9	49	29.0	24.9	38.5	6.7	7.1
California	235	6	13.6	2	17.3	10.0	15.0	6.3	1.4
Colorado	238	9	18.3	9	21.4	15.2	30.9	6.3	4.5
Connecticut	238	10	17.2	5	19.1	15.5	21.8	6.0	1.5
Delaware	281	33	21.8	28	25.7	18.2	38.8	6.0	2.2
District of Columbia	250	19	20.8	22	25.1	17.1	42.9	6.5	1.5
Florida	259	20	19.4	16	21.8	17.0	28.7	7.8	3.0
Georgia	299	40	21.3	26	24.4	18.3	34.4	6.2	4.4
Hawaii	168	2	16.8	3	19.7	13.9	25.1	4.3	1.9
Idaho	237	8	17.2	5	19.5	15.0	32.8	4.8	4.8
Illinois	263	25	20.9	23	24.3	17.8	30.7	6.5	3.4
Indiana	309	43	25.7	45	27.6	23.8	43.0	8.1	5.0
Iowa	248	17	20.3	21	22.2	18.6	32.8	3.0	4.2
Kansas	263	24	22.0	31	24.7	19.5	39.7	5.2	5.3
Kentucky	371	51	29.0	51	31.8	26.5	43.9	9.9	6.8
Louisiana	300	41	25.7	45	29.6	22.2	37.6	9.0	4.5
Maine	290	36	22.8	34	25.1	20.7	39.2	6.4	2.8
Maryland	262	23	19.2	14	21.3	17.3	33.5	5.0	2.1
Massachusetts	249	18	18.3	9	19.8	16.9	29.5	7.3	1.7
Michigan	282	34	23.3	41	27.1	19.7	42.3	7.8	4.5
Minnesota	215	3	19.1	11	21.3	17.0	31.8	3.5	4.8
Mississippi	334	48	26.0	47	30.6	21.9	36.5	11.9	8.1
Missouri	308	42	25.1	43	26.6	23.7	40.4	8.4	5.3
Montana	276	32	22.1	32	23.1	21.1	43.9	6.5	7.1
Nebraska	236	7	20.0	19	22.1	18.0	29.6	6.0	5.6
Nevada	344	49	23.0	36	25.6	20.3	36.2	6.0	2.4
New Hampshire	272	30	19.5	17	20.5	18.5	45.8	5.7	3.0
New Jersey	240	12	16.9	4	19.2	14.7	23.0	4.7	1.6
New Mexico	234	5	21.5	27	25.0	18.2	29.8	5.7	4.2
New York	246	14	18.2	8	19.6	16.9	25.1	4.3	2.3
North Carolina	298	38	21.8	28	24.6	19.3	31.2	7.9	5.2
North Dakota	226	4	21.9	30	24.2	19.7	26.5	4.7	7.6
Ohio	299	39	25.1	43	26.1	24.3	40.6	6.2	5.0
Oklahoma	332	47	26.1	48	28.1	24.3	42.1	7.9	7.0
Oregon	263	26	19.8	18	21.2	18.4	38.3	2.9	4.4
Pennsylvania	259	21	22.5	33	23.6	21.6	35.2	4.7	4.4
Rhode Island	267	27	20.1	20	21.4	18.8	29.3	8.3	1.4
South Carolina	293	37	23.2	40	25.8	20.7	36.2	4.9	3.6
South Dakota	239	11	23.1	37	24.4	21.8	29.4	4.2	6.8
Tennessee	325	46	23.1	37	24.9	21.4	31.6	6.5	6.4
Texas	273	31	19.2	14	23.6	15.0	24.2	8.9	3.9
Utah	138	1	11.8	1	14.1	9.5	27.7	1.8	3.0
Vermont	248	16	19.1	11	21.9	16.5	47.3	4.6	2.7
Virginia	267	28	20.9	23	21.3	20.6	32.1	6.8	4.4
Washington	261	22	17.6	7	18.9	16.3	31.3	5.9	3.6
West Virginia	344	50	28.6	50	31.5	26.0	39.6	6.4	7.5
Wisconsin	244	13	20.9	23	22.7	19.1	36.6	4.2	4.0
Wyoming	283	35	23.1	37	24.3	21.8	35.0	5.7	9.8
United States**	263		20.2		22.7	17.8	29.4	6.6	3.7
Range	138-371		11.8-29.0		14.1-31.8	9.5-26.5	15.0-47.3	1.8-11.9	1.4-9.8

*Number of deaths attributable to cigarette smoking (not including burn or secondhand smoke deaths) divided by the population 35 years of age and older, multiplied by 100,000, adjusted to a standardized age distribution to allow comparison across states. †Smoked 100 cigarettes in their entire lifetime and are current smokers (regular and irregular). ‡Rank is based on % 18 years of age and older. §Adults 25 and older with less than a high school education. ¶Among ever users, used a cigar even one time and are current users (some days or every day). #Reported currently using chewing tobacco, snuff, or snus (a small pouch of smokeless tobacco) every day or some days. **See statistical notes for definition; smoking attributable mortality rate: US estimate represents the median rate.

Source: Smoking-attributable mortality rate: Smoking-attributable Mortality, Morbidity, and Economic Costs (SAMMEC). Centers for Disease Control and Prevention, 2011. Current smoking and Smokeless Tobacco Use: Behavioral Risk Factor Surveillance System 2011, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 2012. Cigar use: National Adults Tobacco Survey 2009-2010, Centers for Disease Control and Prevention, 2012.

American Cancer Society, Surveillance Research, 2013

Cigars, including small cigars which are similar in shape and size to cigarettes, are not regulated like cigarettes, resulting in lower prices and, consequently, making them more appealing, especially to youth. For example, while flavored cigarettes are now banned, there are no such restrictions on flavored cigars, cigarillos, and small cigars. It is important to regulate and tax small cigars in line with cigarettes in order to prevent the tobacco industry from taking advantage of existing loopholes in tobacco control legislation.

Smokeless Tobacco

Smokeless tobacco products, including chewing tobacco and snuff, are not safe substitutes for smoking cigarettes or cigars. These products increase the risk of oral, pancreatic, and esophageal cancer, as well as noncancerous oral conditions, and are a major source of carcinogenic nitrosamines.²⁷ Compared to quitting completely, switching to any smokeless tobacco product as a substitute for smoking has also been shown to be harmful.²⁸

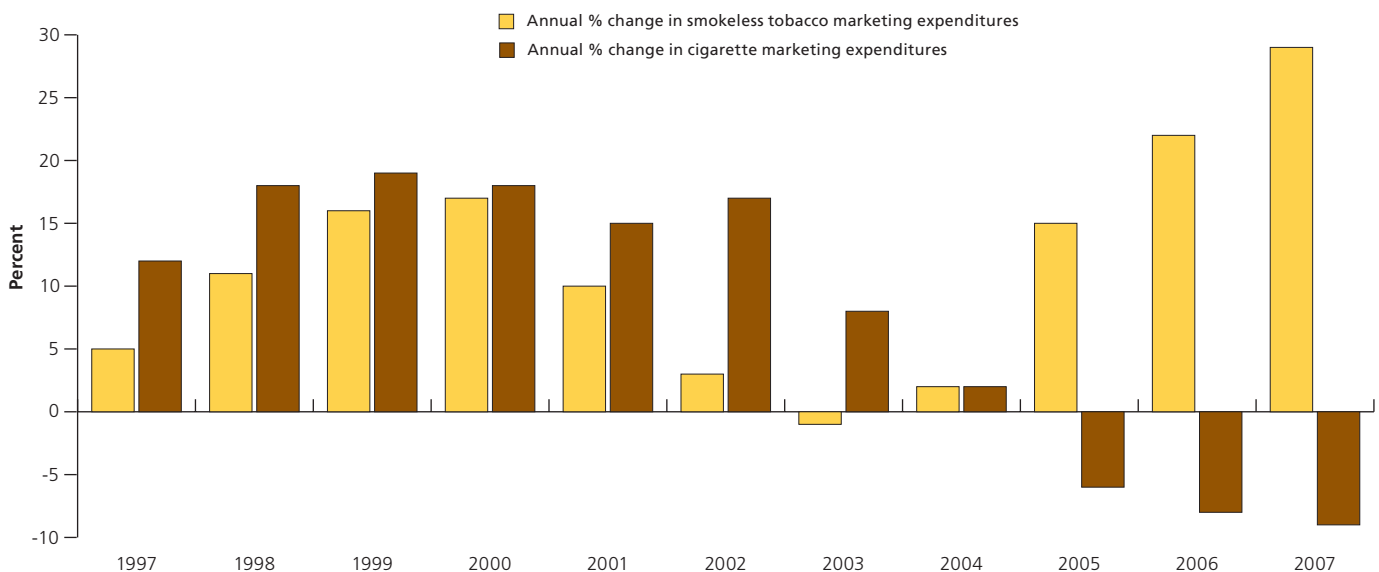
- According to NATS, in 2010, 3.4% of adults 18 and older (6.5% of men, and 0.4% of women) used smokeless products in the past month.
- Young adults (18- to 24-year-olds) were two times more likely to use smokeless products than those 26 years of age or older.²⁹
- Non-Hispanic whites and American Indians/Alaska Natives were three to seven times more likely to use smokeless tobacco than were Hispanics/Latinos, Asians, or African Americans.²⁹

- According to the 2011 BRFSS, smokeless tobacco use (including snus) was highest among South and North Central US states, including Wyoming (9.8%), Mississippi (8.1%) and West Virginia (7.5%), and was lowest in California (1.4%) and Northeastern states, such as Massachusetts (1.7%) and the District of Columbia (1.5%) (Table 1C).
- In 2010, a tobacco industry report estimated that 122.6 million pounds of smokeless tobacco was purchased in the US (up from 121.4 million pounds in 2009).²⁵

The tobacco industry continues to market smokeless products as supplemental sources of nicotine in smoke-free settings or as a lower-risk option for smokers who are unable to quit.³⁰ Marketing expenditures on smokeless tobacco products have increased sharply in recent years, while cigarette marketing expenditures have declined (Figure 1D). Part of these expenditures is directed toward new smokeless products introduced into the market. In addition, cigarette companies have either introduced or are test-marketing dissolvable tobacco products such as lozenges, “orbs,” “strips,” and “sticks.” These products are especially troubling because of their appeal to children – they look and dissolve like candy; the packaging is brightly colored and resembles the size and shape of mint tins or cellphones; and the use and packaging of the products are easily concealed from teachers and parents.

Electronic cigarettes or “e-cigarettes” have also been gaining popularity in recent years. E-cigarettes are battery-operated devices that allow the user to inhale a vapor produced from

Figure 1D. Annual Percentage Change* in Tobacco Industry Marketing Expenditures† for Cigarettes and Smokeless Tobacco, US, 1997-2007



*Annual percentage change is calculated as a percent change between the 3-year moving average of marketing expenditures for specified year (specified year, the previous year, and the following year are combined) and 3-year moving average for previous year (calculated similarly). †Marketing includes advertising and promotional expenditures.

Source: Federal Trade Commission, Federal Trade Commission Cigarette Report for 2007 and 2008, Federal Trade Commission Smokeless Tobacco Report for 2007 and 2008, Washington, DC, 2011.

American Cancer Society, Surveillance Research, 2013

According to the US Surgeon General's report,¹⁴ the goals of comprehensive tobacco control include:

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

cartridges filled with nicotine, flavor, and other chemicals,³¹ and e-cigarette companies promote them as a healthier and more convenient alternative to traditional cigarettes. However, there is little scientific evidence to date to support their health and safety claims.³¹ In December 2010, a federal appeals court ruled that unless manufacturers make health or cessation claims for their products, e-cigarettes are to be regulated as tobacco products.

Although such products likely have lower risk than smoked cigarettes, they may also provide a gateway to smoking among nonsmokers, especially children, and may increase overall tobacco use by encouraging dual use of cigarettes and other tobacco products.^{32,33} The products also may discourage use of evidence-based cessation therapies among those who want to quit. Therefore, the regulatory powers of the US Food and Drug Administration (FDA) will strongly affect the use of these products, but the agency has not yet determined how to regulate dissolvable tobacco products or e-cigarettes. (See page 12.)

Comprehensive Tobacco Control Programs

Comprehensive tobacco control programs aim to reduce tobacco use and the disease, disability, and death associated with it by applying an optimal mix of evidence-based economic, policy, regulatory, educational, social, and clinical strategies.^{14,34} Interventions that effectively reduce tobacco use include increases in excise taxes, restrictions on smoking in public places, prevention and cessation programs, and effective anti-tobacco media campaigns.¹⁴

According to the Centers for Disease Control and Prevention (CDC) Best Practices for Comprehensive Tobacco Control Programs³⁴, effective state-based comprehensive tobacco control programs must include the following components:

- State and community interventions (e.g., support of tobacco prevention and control coalitions; implementation of evidence-based policy interventions to reduce overall tobacco use; funding of community-based organizations; and development of community coalitions to strengthen partnerships between local agencies, grassroots, and voluntary and civic organizations)

- Health communication interventions (e.g., audience research to develop high-impact campaigns, market research to motivate behavior change, and marketing surveillance to counter pro-tobacco messaging)
- Cessation interventions (e.g., increases in services available through population-based cessation programs; public and private insurance coverage of evidence-based tobacco treatments; and elimination of cost barriers for underserved populations, including the uninsured)
- Surveillance and evaluation (e.g., regular monitoring of tobacco-related attitudes, behaviors, and health outcomes; measurement of short-term and intermediate indicators of program effectiveness, including policy changes and changes in social norms; and counter-marketing surveillance)
- Administration and management (e.g., strategic planning to guide program efforts, and award and monitor program contracts)

Evidence for these recommendations stems in part from states that have documented the benefits of implementing comprehensive tobacco control programs.¹⁴ For example, California's longstanding comprehensive tobacco control program is associated with a marked drop in adolescent smoking initiation.³⁵ This program, which included excise tax increases, also resulted in greater reductions in cigarette consumption among daily smokers 35 years of age or older and cessation rates among adult smokers 35 years of age or younger than states without comprehensive tobacco control programs, regardless of cigarette prices.^{36,37} Reflecting trends in smoking behavior, lung cancer incidence is declining faster in the Western states, including California, than in other parts of the country.³⁸ Because of their program and other tobacco control activities prior to and since the release of the 1964 Surgeon General's report on the health hazards of smoking, California's lung cancer mortality rates began to decrease earlier and faster than in other states, and are expected to further contribute to faster declines in the state compared to the rest of the US.³⁹

Federal Initiatives in Tobacco Control

While states have been at the forefront of tobacco control efforts, the importance of the federal government's role was emphasized in 2007 by the Institute of Medicine.⁴⁰ Some recent federal tobacco control initiatives include:

Coverage of clinical cessation services: Provisions in the Affordable Care Act, which was signed into law on March 23, 2010, ensure coverage of evidence-based cessation treatments with no cost-sharing to previously uninsured individuals who were covered by new plans starting on or after September 23, 2010. In a separate decision by the Centers for Medicare and Medicaid Services, Medicare now covers cessation treatments, including counseling, for all beneficiaries, whereas previously

Table 1D. Comprehensive Tobacco Control Measures, by State, US, 2013

	Cigarette tax per pack (\$)*	100% smoke-free laws in workplaces and/or restaurants and/or bars [†]	Fiscal year tobacco control spending (\$ millions)	Tobacco control funding as a % of tobacco revenue [‡]
Alabama	0.425		NA	NA
Alaska	2.00		10.9	10.5
Arizona	2.00	W, R, B	15.2	3.5
Arkansas	1.15		17.8	6.0
California	0.87	R, B	62.1	3.8
Colorado	0.84	R, B	22.6	7.6
Connecticut	3.40	R, B	6.0	1.1
Delaware	1.60	W, R, B	9.0	5.9
District of Columbia	2.50	W, R, B	0.5	0.7
Florida	1.339	W, R	64.3	4.0
Georgia	0.37		0.8	0.2
Hawaii	3.20	W, R, B	8.9	4.8
Idaho	0.57	R	2.2	3.0
Illinois	1.98	W, R, B	11.1	0.9
Indiana	0.995	W, R	9.3	1.6
Iowa	1.36	W, R, B	3.2	1.1
Kansas	0.79	W, R, B	1.0	0.6
Kentucky	0.60		2.1	0.6
Louisiana	0.36	W, R	7.2	2.5
Maine	2.00	W, R, B	7.5	3.8
Maryland	2.00	W, R, B	4.2	0.7
Massachusetts	2.51	W, R, B	4.2	0.5
Michigan	2.00	W, R, B	1.8	0.1
Minnesota	1.230	W, R, B	19.6	3.7
Mississippi	0.68		9.7	3.7
Missouri	0.17		0.1	0.0
Montana	1.70	W, R, B	4.6	3.9
Nebraska	0.64	W, R, B	2.4	2.2
Nevada	0.80	W, R	0.2	0.1
New Hampshire	1.68	R, B	0.0	0.0
New Jersey	2.70	W, R, B	0.0	0.0
New Mexico	1.66	R, B	5.9	4.3
New York	4.35	W, R, B	41.4	1.8
North Carolina	0.45	R, B	0.0	0.0
North Dakota	0.44	W, R, B	8.2	13.7
Ohio	1.25	W, R, B	0.0	0.0
Oklahoma	1.03		19.7	5.4
Oregon	1.18	W, R, B	7.5	2.3
Pennsylvania	1.60	W	14.2	1.0
Rhode Island	3.50	W, R, B	0.4	0.2
South Carolina	0.57		5.0	2.1
South Dakota	1.53	W, R, B	4.0	4.4
Tennessee	0.62		0.2	0.0
Texas	1.41		6.5	0.4
Utah	1.70	W, R, B	7.0	4.6
Vermont	2.62	W, R, B	4.0	3.1
Virginia	0.30		8.4	2.5
Washington	3.025	W, R, B	2.5	0.4
West Virginia	0.55		5.7	2.5
Wisconsin	2.52	W, R, B	5.3	0.7
Wyoming	0.60		5.4	12.0
United States [¶]	1.48		459.5	1.8
Range	0.17-4.35		0.0-64.3	0.0-13.7

Note: W-workplaces, R-restaurants, B-bars. *Taxes in effect or increases passed, reported as of December 2012. †Smoke-free laws passed or implemented, reported as of October 2012. ‡Tobacco revenue is the projected collections from tobacco taxes and payments to states from the Master Settlement Agreement with the tobacco companies. ¶See Statistical Notes for definition of prevalence measures; average value (including District of Columbia) for taxes and tobacco control funding.

Source: Cigarette Taxes: American Cancer Society Cancer Action Network, 2013. Dedicated excise tax: National Cancer Institute. State Cancer Legislative Database Factsheet: Tobacco Product Excise Taxes, 2012. 100% Smoke-free laws: American Nonsmokers' Rights Foundation. Overview List – How Many Smokefree Laws? 2012. Tobacco control Funding: Robert Wood Johnson Foundation, Campaign for Tobacco-Free Kids, American Cancer Society Cancer Action Network, American Heart Association, American Lung Association, and Americans for Nonsmokers' Rights. A Broken Promise to Our Children: The 1998 State Tobacco Settlement 14 Years Later. December 2012.

American Cancer Society, Surveillance Research, 2013

the program only covered treatments for enrollees with tobacco-related illnesses. In addition, the act directed state Medicaid programs to cover cessation therapies without copayment for pregnant women, and starting in 2014, programs can no longer exempt cessation pharmacotherapy from prescription drug coverage.

Regulation of tobacco products: The Family Smoking Prevention and Tobacco Control Act of 2009 granted the US Food and Drug Administration (FDA) the authority to regulate the manufacturing, marketing, and sale of tobacco products for the first time.⁴¹ The new law created the Center for Tobacco Products at the FDA and outlined specific implementation dates for several key provisions. To date, fruit and candy flavorings in cigarettes have been banned, as have the following marketing practices: use of misleading descriptors such as “light,” “low,” and “mild;” tobacco brand-name sponsorships of sports and entertainment events; free tobacco and non-tobacco item giveaways; and sale of cigarettes in packs of less than 20. In addition, the tobacco industry is required to disclose the ingredients of their products to the FDA; new, larger, more effective warning labels are required on smokeless tobacco products; and stores are required to place tobacco products behind counters. In addition, the law grants states and local communities the authority to further restrict tobacco industry marketing and promotions, and to require changes to tobacco products, such as the removal of harmful ingredients and the reduction of nicotine levels to make them less addictive.

The larger graphic warning labels on cigarette packs were to be implemented in September 2012. However, in August 2012, the US Court of Appeals for the DC Circuit struck down the FDA’s authority to require the graphic portion of the labels as well as the requirement for a national quitline phone number on the packs, a decision that the federal government is currently appealing.

In March 2011, the FDA’s Tobacco Products Scientific Advisory Committee (TPSAC) found that menthol cigarettes increase youth experimentation and initiation, increase the overall prevalence of smoking among African Americans, and make it more difficult to quit smoking. The committee also found that the tobacco industry marketed menthol products disproportionately to younger smokers and African Americans. Based on its findings, the committee concluded that the removal of menthol cigarettes from the marketplace would benefit public health in the United States. These findings could provide a scientific basis for the FDA to try to limit, phase out, or even possibly ban menthol in cigarettes, as the agency has already done with all other tobacco flavorings.

In March 2012, the TPSAC completed its assessment of dissolvable tobacco products, as required by the new tobacco law. For the most part, the committee found that insufficient or limited evidence existed to assess the health impacts of these products.

The TPSAC reported to the FDA that no conclusions could be made about the disease burden of these products as compared to cigarettes or the impact on cessation. Limited evidence indicated a potential increase in initiation of tobacco use.

Federal tobacco taxes: The last increase in the federal cigarette excise tax occurred in 2009, with an increase on cigarettes (from \$0.39 to \$1.01 per pack) and other tobacco products (cigars, snuff, and chewing, pipe, and roll-your-own tobacco). Federal tobacco tax increases prevent smoking initiation, reduce consumption, and promote quitting. In addition, such increases can also form an important revenue source for federally funded cessation and other tobacco control programs. However, taxes on tobacco products other than cigarettes continue to lag behind, providing tobacco users an opportunity to switch to these new products and providing youth a less expensive forms of tobacco. Other initiatives that would bolster the national tobacco control infrastructure include the US ratification of the World Health Organization Framework Convention on Tobacco Control (FCTC), a global health treaty developed to curtail the tobacco epidemic,⁴² which has now been ratified by 175 of the United Nations’ 193 member states.

Tobacco Excise Taxes

The price of cigarettes is inversely and predictably related to consumption: A 10% increase in price reduces overall cigarette consumption by 3% to 5%.¹⁴ Young people who smoke are up to three times more responsive to price increases than adults.⁴³ Raising cigarette prices by increasing excise taxes reduces tobacco consumption, especially among children and young adults, and increases cessation among adults.³² Increased excise taxes also raise government revenue, which can be used for tobacco control initiatives.^{14,40,43} In addition, cigarette price increases through taxation could potentially reduce socioeconomic status (SES) disparities, given that low-income smokers and certain lower SES occupational groups are more responsive to tax increases than higher SES groups.⁴³⁻⁴⁵

- Cigarette taxes can be levied at the federal, state, and local levels. The average state cigarette excise tax rate is \$1.48, with wide variation between states ranging from 17 cents per pack in Missouri to \$4.35 per pack in New York (Table 1D, page 11). The federal cigarette excise tax is currently \$1.01.
- Currently, cigarette tax rates are \$3 or more per pack in five states (New York, Rhode Island, Connecticut, Hawaii, and Washington) and Guam; \$2 to \$2.99 in nine states, the District of Columbia, and Puerto Rico; \$1 to \$1.99 in 16 states and the Northern Mariana Islands; and less than \$1 per pack in 20 other states.⁴⁶ States that have tax rates of less than \$1 per pack are mostly concentrated in the Southeast and central US, and include several tobacco-growing states. (See cover; Table 1D, page 11.)

- In 2012, Illinois increased its cigarette excise tax by \$1 per pack and its tax on other tobacco products, but opportunities for significant tax increases through ballot initiatives were missed in California and Missouri.
- Although 47 states and the District of Columbia have increased their cigarette taxes since 2002,⁴⁶ at least seven states (Louisiana, Michigan, New Hampshire, New Jersey, New York, Rhode Island, and Texas) have proposed rollbacks or sunsets on their cigarette or other tobacco product taxes in the past two years. With the exception of New Hampshire, the American Cancer Society and its nonprofit nonpartisan advocacy affiliate, the American Cancer Society Cancer Action Network (ACS CAN), have so far been successful in defeating these proposed cuts.
- With the exception of Pennsylvania, all states tax non-cigarette tobacco products to some extent. Florida does not tax cigars, but taxes other tobacco products.⁴⁷
- Non-cigarette tobacco products are taxed either as a percentage of wholesale/retail price or based on weight. The recommended method of taxation is as a percentage of price supplemented with a minimum tax to ensure that prices do not dip too low even if the product is heavily discounted. The average among states that tax moist snuff as a percentage of price is approximately 37%, with the highest rates in Wisconsin (100%), Washington (95%), Vermont (92%), Massachusetts (90%), Rhode Island (80%), Maine (78%), and Alaska (75%), and the lowest in South Carolina (5%), Tennessee (6.6%), and West Virginia (7%).⁴⁷

Loopholes in tax regulations and tobacco industry tactics can negate the benefits of increases in state cigarette excise tax increases. For example, in 2007-2008, tobacco companies devoted approximately 92% of their marketing expenditures (\$9.2 billion) on strategies to buffer price-sensitive smokers from the shock of price increases, including cigarette-price discounts, promotional allowances to retailers or wholesalers, coupons and retail value-added promotions, and others.⁴⁸ Furthermore, in most states, taxes on cigarettes and other tobacco products are not equivalent, which may lead to young smokers' substituting or trying new tobacco products in lieu of cigarettes. Effective tax regulation should include regulation of industry marketing efforts, commensurate tax structures for cigarettes and other tobacco products, and provision of evidence-based cessation services to low-SES smokers, given that these groups may have fewer opportunities to access cessation services in response to tax increases.⁴⁰

Smoke-free Initiatives to Reduce Exposure to Secondhand Smoke

Exposure to secondhand smoke (SHS) increases the risk of lung disease and cancer, coronary artery disease, and heart attacks.^{18,19,49} As such, smoke-free initiatives (also referred to as clean indoor air laws or ordinances), implemented at the state or local level, are important components of comprehensive tobacco

control programs. Comprehensive smoke-free laws are effective in reducing SHS exposure, modifying smoking behavior, and reducing disease risk.^{49,50} Community 100% smoke-free bans may also promote the adoption of complete home smoking bans in homes with smokers and children.^{51,52}

Nationally, exposure to SHS among nonsmokers, as measured by detectable levels of cotinine (a metabolite of nicotine), declined from 84% in 1988-1994 to 42% in 2001-2002, a likely reflection of widespread implementation of smoke-free laws and reductions in smoking prevalence.^{53,54} Since then, SHS exposure has remained relatively unchanged (2007-2008: 40.1%).⁵⁴ Homes are the primary site of SHS exposure for children; nationally, about 1 in 2 US households with smokers and children allow smoking in homes.⁵²

State and Local Smoke-free Legislation

- Reflecting the current success of smoke-free legislation, nearly half (48.9%) of the US population is covered by a comprehensive law establishing 100% smoke-free laws in all workplaces, restaurants, and bars.⁵⁵
- There are 558 municipalities in the US with 100% smoke-free laws in workplaces, restaurants, and bars.⁵⁵
- Twenty-three states, the District of Columbia, Puerto Rico, and the US Virgin Islands have statewide 100% smoke-free laws that prohibit smoking in all workplaces, restaurants, and bars.⁵⁵ (Table 1D, page 11).
- Preemption laws make it difficult to enact local 100% smoke-free laws by prohibiting local governments from enacting laws that are stronger than state laws. Thirteen states have enacted either partial or complete preemption smoke-free laws.⁵⁶

According to a 2011 report by the Centers for Disease Control and Prevention, if current progress continues, all states could have comprehensive smoke-free laws in place by 2020. However, this will require accelerated progress in parts of the country where there are no comprehensive smoke-free laws.⁵⁷ In particular, despite major legislative advances during the past decade, certain segments of the population, such as hospitality and casino workers, continue to be exposed to SHS. These disparities underscore the need for comprehensive smoke-free legislation that covers all segments of society.⁵⁸

Countering Tobacco Industry Marketing

Exposure to tobacco industry marketing (advertising and promotions) significantly increases the likelihood that adolescents begin and continue to use tobacco, and increases per-capita cigarette consumption in the general population.⁶⁰ Tobacco industry marketing on smoked and smokeless products is targeted toward youth in a variety of ways. (See sidebar, page 14.) Between 2004 and 2009, US middle and high school students reported either declined or unchanged exposure to select marketing tactics (Figure 1E, page 15). Declining reports of frequent

Tobacco Industry's Increasing Expenditures on Smokeless Tobacco Products

Cigarette marketing expenditures peaked at nearly \$15 billion in 2003, increasing from about \$5 billion before the passage of the 1998 Master Settlement Agreement.⁴⁸ More recently, the smokeless tobacco market in high-income countries, including the US, has been consolidated from smaller tobacco companies into the control of the multinational cigarette corporations. This new industry marketing strategy is reflected in the test-marketing and introduction of new smokeless products and increased spending on advertising and promotions of smokeless products. Expenditures on smokeless products rose by nearly 120% from 2005 to 2008 (\$250.8 million to \$324.6 million), while cigarette marketing expenditures declined by 24% during the same period (\$13.1 billion to \$9.4 billion) (Figure 1D, page 9). Price discounts make up the single largest marketing expenditure category for cigarettes and smokeless tobacco; this tactic made up nearly 60% of all smokeless marketing expenditures in 2008, increasing by nearly 225% since 2005.⁵⁹

exposure to tobacco use in movies or on TV are corroborated by other studies measuring smoking incidents in movies.⁶¹ These declines are likely related to increased advocacy and awareness regarding the public health impact of smoking in the movies on youth smoking initiation, and subsequent changes in movie rating schemes and adoption of internal monitoring by movie studios to reduce smoking content in movies.⁶¹ In contrast, reports of declining frequent exposure to ads for tobacco products in newspapers and magazines most likely reflect the documented shift in industry marketing expenditures from traditional advertising venues toward promotional tactics (e.g., point-of-sale advertising) that circumvent tobacco tax increases.⁶⁰

As traditional avenues of tobacco marketing become more restrictive, the industry is moving toward new venues frequented by youth and young adults to promote their products. Retail tobacco marketing, including point-of-sale and retail promotional allowances, is highly prevalent and has been identified as a strong risk factor for youth smoking initiation.⁶² Internet advertising on company Web sites, the World Wide Web, or direct advertising through email, as well as viral or stealth advertising, represents new avenues for tobacco advertising being pursued by the industry. The focus on these venues by the tobacco industry is reflected in reports of frequent exposure to point-of-sale and Internet advertising that did not change between 2004 and 2009. Despite the Master Settlement Agreement restrictions on marketing to youth, evidence indicates that RJ Reynolds' Camel No. 9 brand marketing campaign effectively targeted adolescent females.⁶³ Backlash from the tobacco control community resulted in the discontinuation of advertising of this brand in magazines, but the tobacco company continues to

develop new marketing techniques that entice buyers, such as price discounting. There is a need for comprehensive restrictions on existing and emerging tobacco marketing and effective implementation of FDA restrictions on marketing to youths. (See sidebar.)

Tobacco industry marketing tactics can be countered with sustained implementation of effective mass media campaigns that highlight the negative consequences of tobacco use and expose the industry's deceptive marketing and promotional tactics.⁶⁰ With funding from the Prevention and Public Health Fund, the CDC launched its first federally funded, nationwide paid media tobacco education campaign in March 2012. The campaign, Tips from Former Smokers, is intended to raise awareness of the suffering caused by smoking and to encourage smokers to quit. During the 12-week campaign, calls to the 1-800-QUIT-NOW quitline and visitors to the smokefree.gov Web site, which were promoted in the ads, increased 132% and 428%, respectively. This translates into more than 200,000 additional quitline calls and more than 500,000 additional Web site visitors than would have been expected. Antismoking media campaigns can reduce tobacco use by reducing smoking initiation among youth and promoting adult cessation.⁶⁰ States that have combined mass media campaigns with other tobacco control activities have seen rapid declines in youth and adult smoking prevalence.^{60,64} On the other hand, tobacco industry media campaigns that purport to discourage youth smoking have proved to be ineffective in deterring youth smoking, and in fact may have a counterproductive effect.⁶⁵ In addition, the tobacco industry has challenged the marketing restrictions in the Family Smoking Prevention and Tobacco Control Act of 2009 in court.

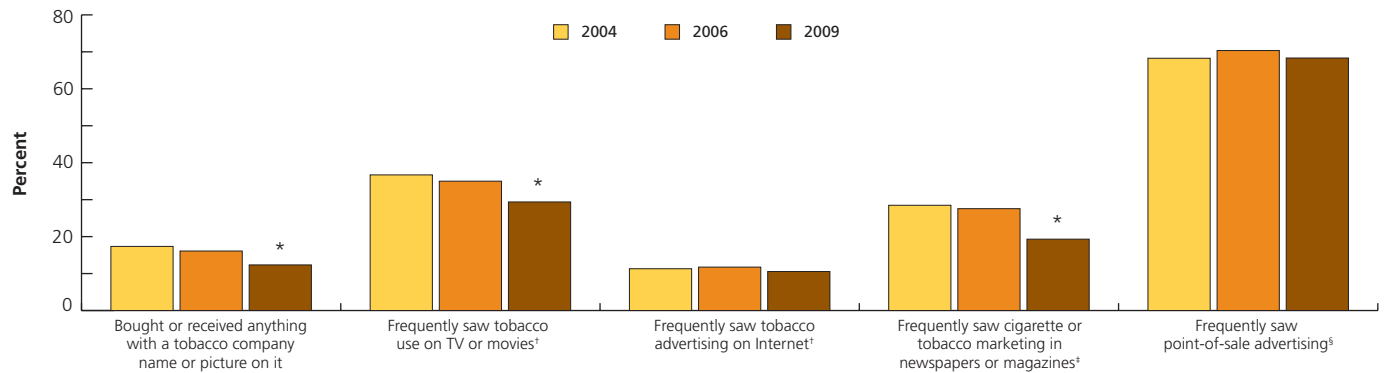
Tobacco Cessation

Youth Tobacco Cessation

The opportunity to prevent diseases caused by smoking is greatest when smokers quit early. Adolescents often underestimate the strength and rapidity of tobacco dependence and generally overestimate their ability to quit smoking.⁶⁶ Most young smokers want to quit smoking and have tried to quit. In 2011, 49.9% of high school smokers made a quit attempt in the past 12 months.⁸

The US Public Health Service (USPHS) updated its clinical practices guideline for tobacco dependence in 2008 and determined that counseling increases tobacco cessation among adolescent smokers.⁶⁷ Although nicotine replacement medications appear to be safe in adolescents, there is little evidence to date that these medications are effective in promoting long-term abstinence among adolescent smokers, and as a result they are not yet recommended as a component of pediatric tobacco use interventions.⁶⁷ In 2011, the National Cancer Institute, as part of its new smoke-free teen initiative, launched SmokefreeTXT, a free text message cessation service that provides 24/7 encouragement, advice, and tips to teens trying to quit smoking. Teens

Figure 1E. Trends in Exposure to Tobacco Marketing, Middle and High School Students, US, 2004-2009



*Estimate for 2009 is significantly different ($p < 0.05$) from estimate for 2006 and 2004. †Respondents who reported “most of the time” seeing actors using tobacco on TV or movies. Respondents who reported “most of the time” seeing ads for tobacco products on the Internet. ‡Respondents who reported “all of the time” or “most of the time” seeing ads or promotions for cigarettes and other tobacco products in newspapers or magazines. §Respondents who reported “all of the time” or “most of the time” seeing ads for cigarettes or other tobacco products that have tobacco company names or pictures on them in convenience stores, supermarkets, or gas stations.

Source: National Youth Tobacco Surveys, 2004, 2006, 2009. Office on Smoking and Health, Centers for Disease Control and Prevention, 2010.

American Cancer Society, Surveillance Research, 2013

can sign up online at teen.smokefree.gov or text QUIT to iQUIT (47848). More research is needed on the effectiveness of tobacco dependence treatments among young smokers. Youth cessation resources can be found at youthtobaccocessation.org/index.html or at cdc.gov/tobacco/quit_smoking/cessation/youth_tobacco_cessation.

Adult Tobacco Cessation

Much of the risk of disease and premature death from smoking could be prevented by smoking cessation. Smokers who quit can expect to live as many as 10 years longer than those who continue to smoke.^{15,68} One study showed that those who quit smoking at age 60, 50, 40, or 30 gained about three, six, nine, or 10 years of life expectancy, respectively.⁶⁸

- According to the 2011 NHIS, approximately, 53% (50 million) of the 94.0 million Americans who have ever smoked 100 cigarettes in their lifetime are now former smokers.⁶⁹ Less-educated smokers have lower rates of cessation, compared to higher-educated smokers.
- According to the 2011 BRFSS, in 50 states and the District of Columbia, of adults who have ever smoked cigarettes, 58.3% have made a quit attempt of one day or longer in the past 12 months.⁷⁰ Of the 45.3 million Americans who smoke, 45.1% reported having attempted to quit for at least one day in the past year.⁶⁹
- In 2010, 48.3% of current smokers and former smokers who had quit in the past year reported being advised by a physician to quit in the past year (significantly lower than in 2005).⁷¹ Thirty-two percent of current smokers and former smokers who had quit in the past 2 years tried to quit using recommended pharmacotherapy and/or counseling, and 4.3% used both.⁷¹

Tobacco dependence is a chronic condition and should be treated with effective treatments that can double or triple smokers’ chances of long-term abstinence.⁶⁷ According to the latest USPHS guideline, these treatments include nicotine replacement treatment (NRT) products, prescription medications, or combinations of these medications and counseling (individual, group, or telephone).⁶⁷ The combined use of counseling and medication can be more effective than the use of any individual treatment.

Even with such interventions, multiple attempts may be necessary before long-term quitting is achieved. Thus, it is critical for health care providers to continue to discuss tobacco cessation with their patients, even those who have tried to quit and failed in the past. Health care providers can be especially effective in delivering cessation services.

The USPHS recommends that clinicians follow the “5 A” model in treating smokers who are willing to quit: *Ask* a patient about their smoking status; *advise* to quit; *assess* for willingness to quit; *assist* in quitting; and *arrange* for a follow-up visit. Even among smokers unwilling to quit, the USPHS recommends brief motivational interventions that can increase attempts to quit.⁶⁷ Other strategies that institutionalize cessation services may promote the use of treatment by patients in health care systems; these may include training health care providers to deliver effective treatments and integrating cessation outcomes into overall health quality standards and ratings.⁶⁷

Nationally, the receipt and use of recommended cessation services remain low. The delivery and use of these services are strongly related to race/ethnicity and SES. Hispanic smokers are significantly less likely to receive cessation services compared to non-Hispanic whites, as are uninsured smokers compared to

The American Cancer Society Quit for Life® Program (1-800-227-2345), currently operated and managed by Alere Wellbeing, has helped more than one million tobacco users make a plan to quit completely. The program reaches 400 employers, health plans, and state agencies, with more than 50 million people having access to the program. Stopping smoking is a continuum, and many smokers require multiple assisted and unassisted attempts before they achieve successful cessation. In order to raise consciousness about the benefits of stopping smoking and for smokers nationwide to give up cigarettes for at least a day in the hope they might stop smoking completely, the Society has designated the third Thursday in November as the American Cancer Society Great American Smokeout® for more than three decades. (For more information, refer to cancer.org/docroot/subsite/greatamericans/content/All_About_Smokeout.asp or call 1-800-227-2345.) In addition, a US Department of Health and Human Services Web site (smokefree.gov) offers online advice and downloadable information on quitting, and a national quitline service (1-800-QUITNOW) also provides quitline counseling services.

Funding for Tobacco Control

Since the Master Settlement Agreement (MSA) with 46 states in 1998, tobacco companies have increased their cigarette advertising and promotional expenditures by 87%, from \$6.7 billion to \$12.49 billion in 2006, and even higher in the intervening years.⁴⁸ By comparison, states spent very little to counter these promotional efforts. Since 2000, the tobacco industry has progressively increased its promotional spending relative to tobacco control spending. In 2008, for every dollar spent in the US on tobacco control efforts, the industry spent about \$15 to promote its products.

Research indicates that increased spending on tobacco control by states is associated with lower youth and adult smoking prevalence.^{78,79} However, several of the most effective comprehensive tobacco control programs in the nation have been jeopardized and even eliminated by severe budget cuts as a result of state budget deficits and other political pressures.⁸⁰ These cuts result in increases in adolescent susceptibility to smoking and intention to smoke, as well as increases in the illegal sales of tobacco products to minors.^{81,82}

One of the recommendations by the Institute of Medicine report in 2007 was support for the creation and sustainability of state-level comprehensive tobacco control programs funded at levels recommended by the Centers for Disease Control and Prevention (CDC) and commensurate with the state's population, demographics, and tobacco use prevalence.⁴⁰ The CDC-recommended funding levels for state tobacco control programs range from \$9.23 to \$18.02 per capita across all 50 states and the District of Columbia.³⁴ Funding all state tobacco control programs at levels recommended by the CDC for five years would result in an estimated 5 million fewer smokers in the US.³⁴



- In fiscal year (FY) 2013, states allocated \$459.5 million for tobacco control programs.⁸⁰ This represents the smallest amount allocated since 1999 and is a drop of 36% from the amount spent in 2008.
- The amount allocated nationwide in FY 2013 constitutes just 12.4% of the CDC recommendation for the minimum level of tobacco control funding. With state and federal funds taken together, only Alaska and North Dakota meet the minimum CDC-recommended funding level. Three additional states (Delaware, Wyoming, and Hawaii) fund tobacco control programs at at least half their minimum recommended levels, while the remaining 45 states and the District of Columbia fund at less than half their minimum recommended amount (Figure 1F).⁸⁰
- In 2013, state revenues from tobacco taxes and the MSA with the tobacco companies are projected to be \$25.7 billion.⁸⁰ However, only 1.8% of this amount has been allocated for tobacco control funding; Missouri, New Hampshire, New Jersey, North Carolina and Ohio (0%) ranked the lowest, and North Dakota (13.7%), Wyoming (12.0%), and Alaska (10.5%) ranked the highest (Table 1D, page 11).

When funded and sustained at recommended levels, state comprehensive tobacco control programs and policies are effective in reducing population tobacco use. The resulting declines in tobacco use would lead to reductions in tobacco-attributable disability and death and substantial economic benefits from reduced health care costs and improved productivity. The American Cancer Society and the American Cancer Society Cancer Action Network (ACS CAN) have worked to ensure the passage of several state- and federal-level tobacco control efforts and will continue to work with their public health partners to reduce the burden of tobacco in the US.

Overweight and Obesity, Physical Activity, and Nutrition

Obesity, physical inactivity, and poor nutrition are major risk factors for cancer, second only to tobacco use.^{2,83,84} The World Cancer Research Fund estimates that about one-quarter to one-third of all cancers in the US can be attributed to diet and physical inactivity habits, including overweight and obesity, while another one-third are caused by the use of tobacco products.³ Although genetic inheritance plays a role in the risk of some individuals developing cancer, non-inherited factors have a larger impact on cancer risk for the population as a whole. Avoiding the use of tobacco products and exposure to second-hand smoke, maintaining a healthy weight, staying physically active throughout life, and consuming a healthy diet can substantially reduce a person's lifetime risk of developing or dying from cancer.^{2,84}

The American Cancer Society periodically publishes guidelines on nutrition and physical activity for cancer prevention based on a comprehensive evidence-based review.⁸⁴ These guidelines

provide recommendations regarding individual choices related to weight control, physical activity, and diet, as well as community action to create a supportive physical and social environment that promotes healthy behaviors.

Individual Choices

The American Cancer Society guidelines for nutrition and physical activity 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, below.)

Following the cancer prevention recommendations for a healthy lifestyle has been shown to reduce the risk of death from cancer, as well as other chronic diseases. A recent study showed that nonsmoking adults who follow all of these lifestyle recommendations reduce their risk of premature death by 40%, compared to people whose lifestyles are less healthy.⁸⁵ Each of the recommendations for healthy body weight, physical activity, a healthy diet pattern, and limiting alcohol is important.⁸⁵ Healthy behaviors related to nutrition and physical activity in the US have changed little over time,⁸⁶ underscoring the need for addressing healthy lifestyle not only at the individual level, but at the community level as well. (See sidebar, below.)

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

Individual choices

Achieve and maintain a healthy weight throughout life.

- Be as lean as possible throughout life without being underweight.
- Avoid excess weight gain at all ages. For those who are currently overweight or obese, losing even a small amount of weight has health benefits and is a good place to start.
- Engage in regular physical activity and limit consumption of high-calorie foods and beverages as key strategies for maintaining a healthy weight.

Adopt a physically active lifestyle.

- Adults should engage in at least 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity physical activity each week, or an equivalent combination, preferably spread throughout the week.
- Children and adolescents should engage in at least 1 hour of moderate- or vigorous-intensity physical activity each day, with vigorous-intensity activity at least 3 days each week.
- Limit sedentary behavior such as sitting, lying down and watching television and other forms of screen-based entertainment.
- Doing any intentional physical activity above usual activities, no matter what one's level of activity, can have many health benefits.

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

- Choose foods and beverages in amounts that help achieve and maintain a healthy weight.
- Limit consumption of processed meat and red meats.
- Eat at least 2½ cups of vegetables and fruits each day.
- Choose whole-grain instead of refined-grain products.

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 collaboratively at national, state, and local levels to implement policy environmental changes that:

- Increase access to affordable, healthy foods in communities, worksites, and schools, and decrease access to and marketing of foods and beverages of low nutritional value, particularly to youth.
- Provide safe, enjoyable, and accessible environments for physical activity in schools and worksites, and for transportation and recreation in communities.

Achieve and maintain a healthy weight.

A healthy weight depends on a person's height. Weight recommendations are often determined by a measure known as body mass index (BMI). (See sidebar, right.) Cutoffs established by the World Health Organization define the healthy range of BMI to be 18.5 to 25.0 kg/m², overweight range to be 25.0 to 29.9, and obese as a BMI of 30.0 or higher.

The best way to achieve and maintain a healthy body weight is to balance energy intake (calories from food and beverages) with energy expenditures (physical activity).^{87,88} Excess body fat can be reduced by decreasing caloric intake and increasing physical activity levels. For those who are overweight, limiting consumption of foods and beverages high in calories, fat, and added sugars can help reduce caloric intake. Eating smaller portion sizes or limiting between-meal snacks will also help. High-calorie and low-nutrient foods should be replaced with vegetables and fruits, whole grains, beans, and lower-calorie beverages. Also, keeping track of food intake and physical activity has been shown effective as weight management strategies.^{84,89}

Unhealthy dietary patterns, physical inactivity, and excessive weight gain that begin during childhood often continue into adulthood and increase the risk of developing diabetes, cardiovascular disease, cancer, hypertension, and osteoporosis later in life. About half of children who are overweight will remain overweight in adulthood; 70% of those who are overweight by adolescence will remain overweight as adults.⁹⁰ Therefore, a focus on obesity prevention for children and adolescents is important because the diet and physical activity habits that they form will set the foundation for their choices and behaviors as adults.^{91,92}

Body Weight and Cancer Risk

In the US, overweight and obesity contribute to 14%-20% of all cancer-related deaths.⁸⁴ (See sidebar, right, for definitions of overweight and obesity.) Overweight and obesity are clearly associated with increased risk for developing many cancers, including cancers of the breast in postmenopausal women, colon and rectum, endometrium, adenocarcinoma of the esophagus, kidney, and pancreas. In addition, obesity likely increases the risk of cancer of the gallbladder and may also be associated with increased risk of cancers of the liver, cervix, and ovary, multiple myeloma, non-Hodgkin lymphoma, and aggressive forms of prostate cancer. The link between body weight and cancer risk is believed to stem from multiple effects on fat and sugar metabolism, immune function, level of hormones (including insulin and estradiol), and cell growth.^{84,93} Although knowledge about the relationship between weight loss and cancer risk is incomplete, recent studies suggest that losing weight may reduce the risk of (post-menopausal) breast cancer. Results from large studies of lifestyle and behavioral weight loss interventions have shown that modest weight loss improves insulin sensitivity and biochemical markers of hormone metabolism,

Defining Body Mass Index

For adults, this sidebar relates body mass index (BMI) to pounds and inches. For example, a 5-foot-4-inch woman is considered overweight if she weighs between 145 and 173 pounds; she is considered obese if she weighs 174 pounds or more. A 5-foot-10-inch man is considered overweight if he weighs between 174 and 206 pounds and obese if he weighs 207 pounds or more.

Height (feet, inches)	Body weight (pounds)		
	Overweight*	Obese†	Extremely Obese‡
6'4"	205	246	328
6'3"	200	240	319
6'2"	194	233	311
6'1"	189	227	302
6'0"	184	221	294
5'11"	179	215	286
5'10"	174	207	278
5'9"	169	203	270
5'8"	164	197	262
5'7"	159	191	255
5'6"	155	186	247
5'5"	150	180	240
5'4"	145	174	232
5'3"	141	169	225
5'2"	136	164	218
5'1"	132	158	211
5'0"	128	153	204
4'11"	124	148	198
4'10"	119	143	191

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

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

‡Extreme obesity is defined as BMI of 40 kg/m² or greater.

For children 2 years of age and older, BMI values are used as a screening tool for determining overweight and obesity and identifying possible weight problems. After a BMI value is calculated for a child based on their weight and height, the BMI number is plotted on the Centers for Disease Control and Prevention's (CDC) BMI for age- and gender-specific growth charts to obtain a percentile ranking.⁹⁷ The percentile indicates the relative position of the child's BMI number among children of the same sex and age. According to the CDC definitions, obesity in children is defined as a BMI at or above the sex- and age-specific 95th percentile BMI cutoff points, and overweight is defined as between 85th to less than the 95th percentile.⁹⁷

which are thought to contribute to the relationship between obesity and certain cancers.⁹⁴

Health care professionals have an important role in helping patients control their body weight. Primary care physicians should track body mass index of their patients at each visit and assist patients who are overweight or obese in managing and

controlling their body weight by counseling them about safe and effective weight loss and weight maintenance programs; and providing patient referrals to a licensed, registered dietitian.^{93,95} The National Heart, Lung and Blood Institute's (NHLBI) guidelines on obesity⁹⁶ offer clinicians an easily adaptable blueprint and tools for incorporating information about weight, nutrition, and physical activity into their discussions with patients, assessing a patient's motivation to lose weight, and enabling patients in developing and implementing strategies for self-management and behavior change.^{93,95}

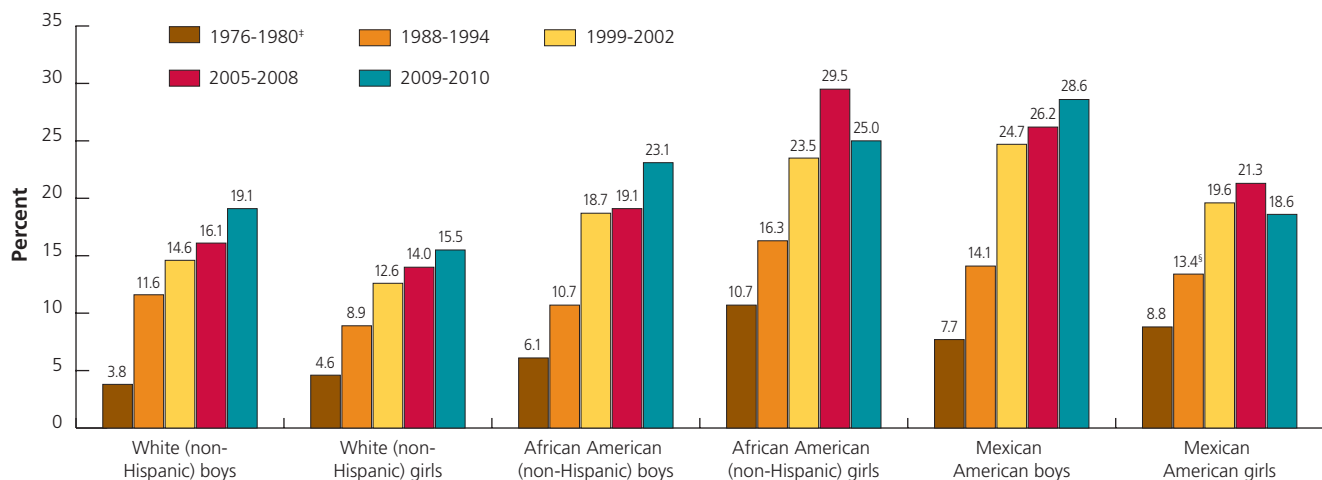
Obesity Trends

- More than two-thirds of Americans are overweight or obese.⁹⁸
- Between 1976-1980 and 1999-2002, the prevalence of obesity among children 6 to 11 years of age more than doubled – going from 6.5% to 15.9%, and in adolescents 12 to 19 years of age it tripled – going from 5% to 16%. Increases occurred across race, ethnicity, and gender groups (Figure 2A).
- Between 1999-2000 and 2009-2010, the prevalence of obesity in children and adolescents 2-19 years of age increased among boys, but not among girls. For the most recent time period (between 2007-2008 and 2009-2010), there was no significant change in boys (18.6%) or girls (15%).^{99,100}
- The percentage of US high school students who were obese in 2011 varied widely across states; Colorado had the lowest proportion of obese adolescents (7.3%), and Alabama the

highest (17.0%). (Table 2A, page 22, provides additional overweight measures in other states and select cities.)

- The percent of obese adults 20 to 74 years of age varied little from 1960-1962 to 1976-1980; in contrast, obesity rates more than doubled between 1976-1980 and 1999-2002 from 15.1% to 31%. Increases occurred across race, ethnicity, and gender groups (Figure 2B).
- In the past decade, obesity rates in men and women have converged because the prevalence has remained stable in women but increased in men. In the most recent time period (between 2007-2008 and 2009-2010), there was no significant change in men (from 32.2% to 35.5%) or women (35.5% to 35.8%).^{99,101,102}
- Non-Hispanic African American and Hispanic women have significantly higher rates of obesity than non-Hispanic white women, but such differences are not observed among men (Figure 2B). These racial and ethnic disparities are generally consistent across states as well; in 2006-2008, obesity rates across states ranged from 23% to 45% among African Americans, from 21% to 37% among Hispanics, and from 9% to 30% among whites.¹⁰³
- The increase in the rate of adults classified as extremely obese (BMI > 40 kg/m²) has significantly contributed to the increase in obesity rates in the past 25 years. Rates of extreme obesity among adults 20 to 74 years of age increased from 1.4% in 1976-1980 to 6.3% in 2009-2010.

Figure 2A. Obesity* Trends, Adolescents 12-19 Years, by Gender and Race/Ethnicity†, US, 1976-2010



*Body mass index at or above the sex- and age-specific 95th percentile BMI cutoff points from the 2000 sex-specific BMI-for-age CDC Growth Charts. †Persons of Mexican origins may be of any race. Data estimates for white (non-Hispanic) and African American (non-Hispanic) races starting in 1999 may not be strictly comparable with estimates for earlier years because of changes in Standards for Federal Data on Race and Ethnicity. ‡Data for Mexican Americans are for 1982-84. §Estimate is considered unreliable.

Source: 1976-2008: 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, 2010, With Special Feature on Death and Dying. Hyattsville, MD: 2011. 2009-2010: National Center for Health Statistics, Centers for Disease Control and Prevention, 2012 (Preliminary estimates subject to change based on official CDC estimates).

American Cancer Society, Surveillance Research, 2013

- In 2011, the prevalence of obesity exceeded 20 percent in all states. However, obesity prevalence varies widely by state, ranging from 20.8 in Colorado to 35.0% in Mississippi (Table 2B, page 24).

Adopt a physically active lifestyle.

Benefits of Physical Activity

Physical activity acts in a variety of ways to reduce the risk of several types of cancer, including cancers of the breast, colon, endometrium, and prostate.⁸⁷ In addition, regular physical activity helps maintain a healthy body weight by balancing caloric intake with energy expenditure. The health benefits of a physically active lifestyle go beyond reducing the risk of cancer, and include reduced risk of mortality and other chronic diseases, such as heart disease, diabetes, osteoporosis, and hypertension.^{84,104,105}

Types of Activity and Recommendations

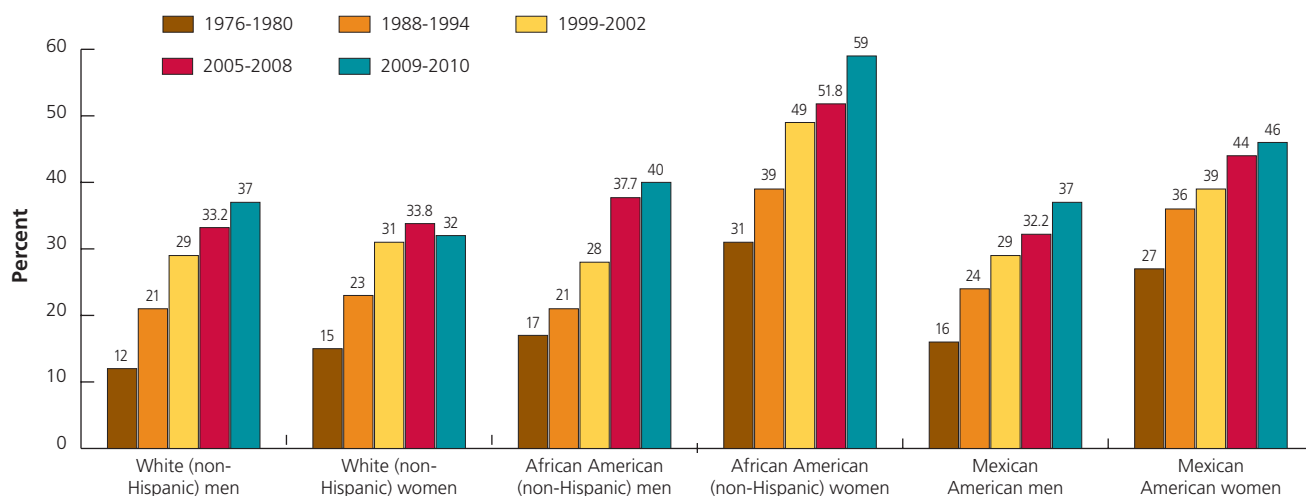
Usual physical activity during a person's daily routine is typically of low intensity and short duration. Intentional physical activities (done in addition to usual activities and planned or done at leisure times) and activities associated with fitness or transportation (e.g., bike riding, brisk walking) generally require more effort, engage large muscle groups, and cause a noticeable increase in heart rate, breathing depth and frequency, and sweating. (For selected examples of moderate and vigorous activities, see sidebar, page 23.)

Recent national surveys indicate that walking is the most commonly reported type of physical activity. In the US, the proportion of adults reporting walking increased from 55.7% in 2005 to 62.0% in 2010, and similar increases were also observed across demographic characteristics (see Figure 2C, page 26).¹⁰⁶ Such increases may reflect improved public health strategies to promote walking as an accessible and inexpensive form of physical activity and an important component of total physical activity for most populations.¹⁰⁶ Walking is an aerobic activity and necessitates use of large skeletal muscles while conferring the multifarious health benefits of physical activity with few adverse effects.¹⁰⁷

Although the optimal intensity, duration, and frequency of physical activity needed to reduce cancer risk are unknown, studies suggest that higher amounts of physical activity (e.g., approaching and exceeding 300 minutes of moderate-intensity activity per week or 150 minutes of vigorous-intensity activity per week) may provide even greater reductions in cancer risk.⁸⁴ Other studies have shown that being active at these high levels of physical activity helps to prevent weight gain and obesity.^{87,88} By helping to maintain weight, this amount of physical activity may have an effect on reducing the risk of developing obesity-related cancers.⁸⁴

For people who are largely inactive or just beginning a physical activity program, engaging in any level of intentional physical activity is likely to be beneficial. A gradual increase in the amount of physical activity performed will provide substantial

Figure 2B. Obesity* Trends, Adults 20-74 Years, by Gender and Race/Ethnicity,† US, 1976-2010



*Body mass index of 30.0 kg/m² or greater (age adjusted to the 2000 US standard population, see Statistical Notes for more information on age adjustment). †Persons of Mexican origin may be of any race. Data estimates for white (non-Hispanic) and African American (non-Hispanic) races starting in 1999 data may not be strictly comparable with estimates for earlier years because of changes in Standards for Federal Data on Race and Ethnicity. ‡Data for Mexican Americans are for 1982-84.

Source: 1976-2008: 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, 2010, With Special Feature on Death and Dying. Hyattsville, MD 2011. 2009-2010: National Health and Nutrition Examination Survey Public Use Data File, 2009-2010: National Center for Health Statistics, Centers for Disease Control and Prevention, 2012 (Preliminary estimates subject to change based on official CDC estimates).

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Table 2A. Overweight, Obesity, and Related Factors, High School Students, by State and City/County, US, 2011

	% Overweight*	% Obese†	Rank‡	% Watched three or more hours per day of television§	% Met currently recommended levels of physical activity¶	% Attended physical education classes daily	% Played on one or more sports teams#	% Consumed 100% fruit juice or fruit two or more times a day**	% Ate vegetables three or more times a day***
United States	15.2	13.0		32.4	49.5	31.5	58.4	34.0	15.3
State									
Alabama	15.7	17.0	44	40.6	45.3	35.2	54.7	29.2	14.2
Alaska	14.5	11.3	17	23.8	45.3	17.4	62.9	32.0	15.1
Arizona	13.8	10.8	10	28.6	47.4	29.6	50.4	N/A	N/A
Arkansas	15.4	15.2	37	31.8	N/A	24.2	55.7	25.8	12.4
Colorado	10.7	7.3	1	21.2	53.1	N/A	63.4	N/A	N/A
Connecticut	14.1	12.5	26	27.1	49.5	N/A	N/A	35.2	11.1
Delaware	16.9	12.2	25	37.3	43.5	25.3	55.3	30.3	N/A
District of Columbia	18.0	14.5	32	38.3	28.4	11.9	53.0	34.7	15.8
Florida	13.6	11.5	18	37.1	N/A	22.7	51.4	30.8	14.9
Georgia	15.8	15.0	36	36.6	42.2	29.7	52.4	25.5	13.3
Hawaii	13.4	13.2	29	31.7	37.9	6.9	54.8	28.8	13.9
Idaho	13.4	9.2	4	21.7	52.9	25.6	59.3	31.5	13.5
Illinois	14.5	11.6	20	29.1	48.5	71.2	58.7	24.6	11.4
Indiana	15.4	14.7	34	27.0	43.5	19.7	55.4	30.9	9.0
Iowa	14.5	13.2	29	23.5	51.5	22.6	64.1	26.1	13.2
Kansas	13.8	10.2	8	25.1	50.7	26.2	59.7	23.0	12.4
Kentucky	15.4	16.5	42	32.0	39.3	20.0	46.3	23.8	12.3
Louisiana	19.5	16.1	41	41.1	37.9	42.5	51.3	30.8	11.7
Maine	14.0	11.5	18	24.1	43.7	6.3	N/A	34.7	N/A
Maryland	15.4	12.0	22	34.2	N/A	19.3	52.8	N/A	15.3
Massachusetts	14.6	9.9	6	28.4	N/A	17.6	59.6	31.2	N/A
Michigan	15.2	12.1	24	29.5	49.4	26.7	N/A	32.3	12.6
Mississippi	16.5	15.8	40	42.9	42.3	29.2	56.2	N/A	16.6
Missouri	N/A	N/A	N/A	N/A	N/A	N/A	N/A	26.9	N/A
Montana	12.9	8.5	2	22.1	54.7	33.1	63.2	26.9	11.9
Nebraska	13.6	11.6	20	25.2	53.7	33.5	62.9	N/A	12.2
Nevada	N/A	N/A	N/A	N/A	N/A	N/A	N/A	33.9	N/A
New Hampshire	14.1	12.0	22	N/A	N/A	N/A	N/A	30.6	15.5
New Jersey	15.3	10.9	12	32.9	N/A	55.2	N/A	31.2	13.1
New Mexico	14.4	12.8	27	29.4	48.5	28.4	N/A	36.8	18.1
New York	14.7	11.0	13	30.6	45.5	18.5	57.7	N/A	N/A
North Carolina	15.9	12.9	28	34.7	47.6	N/A	N/A	30.1	13.3
North Dakota	14.5	11.0	13	24.8	N/A	N/A	N/A	28.7	10.8
Ohio	15.3	14.7	34	30.9	44.9	23.3	55.8	26.7	11.2
Oklahoma	16.3	16.7	43	29.9	50.8	30.9	55.7	28.2	14.1
Pennsylvania	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Rhode Island	14.9	10.8	10	28.0	46.7	23.2	55.1	34.1	14.1
South Carolina	16.3	13.3	31	39.2	43.4	24.2	52.9	25.6	11.7
South Dakota	14.0	9.7	5	23.8	48.6	20.6	N/A	25.9	11.3
Tennessee	17.3	15.2	37	35.1	47.2	23.2	53.8	28.7	13.2
Texas	16.0	15.6	39	37.2	44.5	36.0	57.6	29.9	10.7
Utah	12.2	8.6	3	19.3	48.3	15.7	59.6	31.7	15.3
Vermont	13.0	9.9	6	N/A	47.8	13.4	N/A	36.1	16.9
Virginia	17.2	11.1	15	31.1	45.6	17.7	57.7	30.2	12.0
West Virginia	15.7	14.6	33	31.2	52.4	27.7	56.9	33.0	18.7
Wisconsin	14.9	10.4	9	24.0	51.6	37.6	N/A	32.9	12.7
Wyoming	12.0	11.1	15	20.6	50.1	21.7	62.7	29.8	17.5
City/County									
Boston, MA	18.1	14.2	13	42.0	29.1	9.0	46.2	30.4	11.6
Broward County, FL	13.7	9.5	4	40.6	41.9	20.4	48.7	37.7	15.5
Charlotte-Mecklenburg Co, NC	14.9	12.8	10	36.6	39.9	17.5	49.3	36.5	13.4
Chicago, IL	18.2	15.5	17	40.8	34.2	42.5	53.9	32.5	14.1
Dallas, TX	20.4	15.3	16	43.1	37.0	11.9	47.9	32.3	10.2
Detroit, MI	22.7	18.9	21	44.4	26.7	18.5	N/A	26.6	9.1
Duval County, FL	15.2	11.9	8	41.1	30.7	9.0	47.5	27.7	12.9
Houston, TX	17.8	13.6	12	40.9	30.3	23.0	44.6	31.2	13.5
Los Angeles, CA	16.9	13.3	11	36.4	39.2	33.8	47.7	37.2	12.9
Memphis, TN	16.8	18.4	20	56.4	37.3	29.1	53.3	39.2	14.5
Miami-Dade County, FL	15.0	12.7	9	38.4	37.0	9.8	45.2	36.8	17.3
Milwaukee, WI	18.4	17.0	18	42.8	30.6	23.6	N/A	35.2	N/A
New York City, NY	15.5	11.6	7	38.0	39.0	41.3	42.8	33.9	N/A
Orange County, FL	12.0	10.0	5	33.0	40.9	25.1	52.4	34.6	15.8
Palm Beach County, FL	13.8	9.3	3	37.9	40.6	18.7	51.2	36.6	18.5
Philadelphia, PA	17.7	17.3	19	45.8	37.1	31.0	46.3	28.0	12.3
San Bernardino, CA	18.2	15.2	15	45.4	43.4	50.5	53.1	39.2	16.5
San Diego, CA	16.0	11.4	6	33.0	45.7	40.5	50.5	34.1	13.0
San Francisco, CA	11.6	7.4	1	26.5	32.7	23.7	N/A	34.3	18.4
Seattle, WA	13.3	7.9	2	22.7	38.8	17.5	57.3	34.1	15.6

*Body mass index at or above the 85th percentile but below the 95th percentile of growth chart for age and sex. *Cancer Prevention & Early Detection Facts & Figures (CPED)* reports prior to 2010 used the term "at risk for overweight" to describe youth in this BMI category. †Body mass index at or above the 95th percentile of growth chart for age and sex. Previous *CPED* reports used the term "overweight" to describe youth in this BMI category. ‡Rank is based on % Obese. §During an average school day. ¶Were physically active doing any kind of physical activity that increased their heart rate and made them breathe hard some of the time for a total of at least 60 minutes/day on >5 of the 7 days preceding the survey. #During the 12 months preceding the survey. **Had consumed 100% fruit juice or fruit >3 times/day during the 7 days preceding the survey. *** Had consumed green salad, potatoes (excluding French fries, fried potatoes, or potato chips), carrots, or other vegetables during the 7 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, 2011, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention. *MMWR Morb Mortal Wkly Rep.* 2012;61(SS04).

American Cancer Society, Surveillance Research, 2013

Examples of Moderate and Vigorous Physical Activity

	Moderate-intensity Activities	Vigorous-intensity Activities
Exercise and leisure	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
Sports	Volleyball, golf, softball, baseball, badminton, doubles tennis, downhill skiing	Soccer, field or ice hockey, lacrosse, singles tennis, racquetball, basketball, cross-country skiing
Home activities	Mowing the lawn, general yard and garden maintenance	Digging, carrying, and hauling, masonry, carpentry
Occupational activity	Walking and lifting as part of the job (custodial work, farming, auto or machine repair)	Heavy manual labor (forestry, construction, fire-fighting)

cardiovascular benefits. Most children and young adults can safely engage in moderate physical activity without consulting a physician. However, men older than 40, women older than 50, and people with chronic illnesses and/or established cardiovascular risk factors should consult their physicians before beginning a vigorous physical activity program.

Individuals who are already active at least 150 minutes per week should strive to accumulate 300 minutes of moderate or greater intensity activity per week. In addition, while it is important to engage in intentional physical activity, individuals should also recognize the importance of decreasing sedentary behaviors (e.g., limiting time spent sitting). There is growing evidence that long periods of sitting, independent of levels of physical activity, increase the likelihood of developing obesity, type-2 diabetes, cardiovascular disease, and various types of cancers, and increase overall mortality.¹⁰⁸

Current Physical Activity Level in Adolescents

- In 2011, 49.5% of US youth were physically active for at least 60 minutes on more than five days per week, and 31.5% attended physical education classes daily (Table 2A).
- In 2011, 32.4% of US high school students reported watching three or more hours of television per day (Table 2A).

Current Physical Activity Level in Adults

- In 2011, 25.4% of adults reported no leisure-time physical activity. The percentage of adults reporting no leisure-time physical activity ranged from 16.5% in Colorado to 36.0% in Mississippi (Table 2B, page 24).
- In 2011, 20.6% of adults reported engaging in at least 150 minutes of moderate or 75 minutes of vigorous activity per week (Table 2B, page 24).

Physical activity plays an important role in the health and well-being of children and adolescents, and has important physical, mental, and social benefits. Therefore, children and adolescents

should be encouraged to be physically active at moderate to vigorous intensities for at least 60 minutes per day on five or more days per week.¹⁰⁹ The availability of routine, high-quality physical education programs is a recognized and critically important way of increasing physical activity among youth.¹⁰⁹ Daily physical education and other opportunities for physical activity should be provided for children at school, and sedentary activities (e.g., watching television, playing video games) should be minimized at home.

Consume a healthy diet with emphasis on plant sources.

The scientific study of human diet is highly complex, and the food supply is constantly changing. In addition, cancer takes years to develop, making randomized, controlled trials of diet and cancer expensive and largely impractical. Most of what is known about diet and cancer prevention comes from epidemiological studies of populations coupled with investigations of food components in laboratory animals and cell culture. Continued development of methods to measure usual diet in population studies, coupled with identification of dietary markers in blood and other body tissues, remain research priorities. Despite these challenges, the evidence relating certain dietary factors and dietary patterns to cancer prevention is consistent and provides a strong basis for guidelines. For example, the need to limit foods with excess calories and poor nutritional value to help maintain a healthy body weight is incontrovertible.⁸⁴

Control portion size to achieve and maintain a healthy weight.

Current trends indicate that the largest percentage of calories in the American diet comes from foods high in fat, sugar, and refined carbohydrates, as well as sugar-sweetened beverages. These foods and beverages add little nutritional value to the diet and may contribute to altered amounts and distribution of body fat, insulin resistance, and increased concentrations of growth factors that promote the growth of cancers. Consuming a varied

Table 2B. Overweight, Obesity, and Related Factors, Adults 18 and Older, by State, US, 2011

	% Overweight (25.0 kg/m ² or greater)	% Clinical overweight (25.0-29.9 kg/m ²)	% Clinical obese (30.0 kg/m ² or greater)	Rank*	% No leisure-time physical activity	% Met 2008 Federal Physical Activity Guidelines†	% Ate two or more fruit servings a day	% Ate three or more vegetable servings a day‡
Alabama	66.8	34.7	32.1	48	32.6	15.0	22.2	13.0
Alaska	66.5	39.0	27.5	24	22.0	25.0	31.4	17.9
Arizona	62.5	37.8	24.7	11	24.2	24.0	32.6	19.8
Arkansas	65.0	34.1	30.9	44	30.9	16.8	24.8	13.1
California	60.2	36.4	23.8	6	19.1	23.7	39.3	21.4
Colorado	56.1	35.4	20.8	1	16.5	27.3	33.2	17.2
Connecticut	59.6	35.0	24.6	8	25.3	21.9	38.1	15.9
Delaware	63.9	35.1	28.8	33	27.0	21.5	25.6	12.3
District of Columbia	52.8	29.1	23.7	4	19.8	26.4	38.3	21.5
Florida	63.4	36.6	26.7	20	26.9	21.5	32.0	16.2
Georgia	62.7	34.7	28.0	28	26.8	20.7	26.5	14.5
Hawaii	55.8	33.8	21.9	2	21.3	23.8	30.1	19.3
Idaho	62.3	35.3	27.0	22	21.4	22.4	30.3	15.7
Illinois	64.1	36.9	27.2	23	25.2	22.0	32.7	15.9
Indiana	65.7	34.8	30.9	44	29.3	17.3	29.9	12.8
Iowa	64.8	35.8	29.0	34	25.9	17.3	29.8	11.7
Kansas	64.4	34.8	29.6	38	26.8	16.6	23.8	13.5
Kentucky	66.6	36.2	30.4	41	29.4	17.3	22.8	10.9
Louisiana	67.6	34.1	33.5	50	33.8	15.5	19.0	8.0
Maine	65.0	37.2	27.8	25	23.0	20.6	35.2	16.3
Maryland	64.4	36.0	28.4	30	26.1	19.9	31.5	14.6
Massachusetts	59.4	36.5	22.9	3	23.5	23.3	35.3	15.6
Michigan	65.5	34.2	31.3	47	23.6	19.7	31.8	14.5
Minnesota	62.5	36.7	25.7	16	21.8	20.9	31.1	12.4
Mississippi	68.9	33.9	35.0	51	36.0	14.2	21.1	10.1
Missouri	64.8	34.5	30.3	40	28.5	17.3	25.7	14.4
Montana	60.3	35.6	24.7	11	24.4	21.9	29.2	14.8
Nebraska	64.9	36.5	28.5	31	26.3	19.0	29.4	12.8
Nevada	60.3	35.7	24.6	8	24.1	21.4	31.8	16.0
New Hampshire	61.6	35.4	26.2	17	22.5	22.4	37.2	19.1
New Jersey	61.5	37.7	23.7	4	26.4	23.2	31.9	13.9
New Mexico	62.3	35.9	26.4	18	25.3	22.4	32.0	16.3
New York	60.5	35.8	24.6	8	26.2	21.6	35.2	15.9
North Carolina	65.2	36.0	29.1	35	26.7	18.4	23.9	14.3
North Dakota	63.8	36.0	27.9	27	27.0	18.0	30.4	11.4
Ohio	65.8	36.2	29.7	39	27.0	21.4	28.2	12.9
Oklahoma	65.4	34.4	31.0	46	31.2	16.2	19.5	10.4
Oregon	61.6	34.8	26.8	21	19.7	23.5	35.0	20.8
Pennsylvania	64.5	35.9	28.6	32	26.3	18.8	32.2	13.3
Rhode Island	62.5	37.0	25.5	14	26.2	19.6	35.5	15.7
South Carolina	65.9	35.0	30.8	43	27.2	18.5	24.3	11.0
South Dakota	64.5	36.3	28.1	29	26.9	16.0	26.3	9.4
Tennessee	66.5	37.2	29.3	37	35.2	12.7	19.1	10.5
Texas	65.9	35.4	30.5	42	27.2	19.0	29.2	16.5
Utah	58.9	34.5	24.4	7	18.9	22.5	33.4	16.5
Vermont	59.8	34.3	25.5	14	21.0	21.7	37.6	18.4
Virginia	63.4	34.3	29.2	36	25.0	22.7	30.3	13.9
Washington	61.0	34.4	26.6	19	21.9	21.0	32.4	16.4
West Virginia	69.0	36.5	32.5	49	35.1	12.7	17.5	8.8
Wisconsin	64.1	36.3	27.8	25	22.6	22.3	34.5	12.4
Wyoming	61.2	36.2	25.0	13	25.3	21.3	30.3	15.4
United States [§]	63.3	35.8	27.5		25.4	20.6	30.9	15.4
Range	52.8-69.0	29.1-39.0	20.8-35.0		16.5-36.0	12.7-27.3	17.5-39.3	8.0-21.5

*Rank based on % obese (30kg/m² or greater). †Met both aerobic and muscle strengthening physical activity guidelines. ‡In 2011, vegetables included cooked or canned beans, dark green vegetables, orange colored vegetables or other vegetables. §See Statistical Notes for definition.

Source: Behavioral Risk Factor Surveillance System Public Use Data Tape 2011, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 2012.

American Cancer Society, Surveillance Research, 2013

diet that emphasizes plant foods may help to displace these calorie-dense foods. Limiting portion sizes (see sidebar, right), especially of calorie-dense foods and beverages, will also reduce total caloric intake.

Processed and Red Meats

Numerous 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.). High intakes of red or processed meat have been associated with increased risk of cancers of the colorectum, prostate, and pancreas and with modest but significant increases in overall cancer incidence and mortality, as well as death from other causes.^{83,110} A higher risk of colorectal and pancreatic cancers is particularly associated with a high consumption of red meat cooked at very high temperatures. Substances such as nitrates or nitrites used to preserve processed meats can also contribute to the formation of nitrosamines, which are involved in carcinogenesis.¹¹⁰ 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.

Recommendations are to limit consumption of processed and red meats by choosing lean meats, smaller portions (e.g., served as a side dish rather than the focus of a meal) and alternatively choosing fish or poultry. Legumes, which are rich in nutrients that may protect against cancer, can be a healthier source of protein than red meats.

What Counts as a Serving

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

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

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

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

Dairy food or eggs: 1 cup of milk or yogurt; 1½ ounces of natural cheese; 2 ounces of processed cheese; 1 egg

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

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 non-starchy vegetables and fruits is associated with decreased risk of lung, upper aerodigestive, esophageal, stomach, and colorectal cancer.¹¹¹ Although research is ongoing, limited data are currently available for other types of cancers. 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.⁸⁹

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

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

- Read food labels to become more aware of portion sizes and calories consumed. Be aware that “low fat” or “nonfat” does not necessarily mean “low calorie.”
- Eat smaller portions of high-calorie foods.
- Choose vegetables, whole fruit, and other low-calorie foods instead of calorie-dense foods such as french fries, potato and other chips, ice cream, doughnuts, and other sweets.
- Limit consumption of sugar-sweetened beverages such as soft drinks, sports drinks, and fruit-flavored drinks.
- When you eat away from home, be especially mindful to choose food low in calories, fat, and sugar, and avoid consuming large portion sizes.

Limit consumption of processed and red meats.

- Minimize consumption of processed meats such as bacon, sausage, luncheon meats, and hot dogs.
- Choose fish, poultry, or beans as an alternative to red meat (beef, pork, and lamb).

- If you eat red meat, select lean cuts and eat smaller portions.
- Prepare meat, poultry and fish by baking, broiling, or poaching rather than by frying or charbroiling.

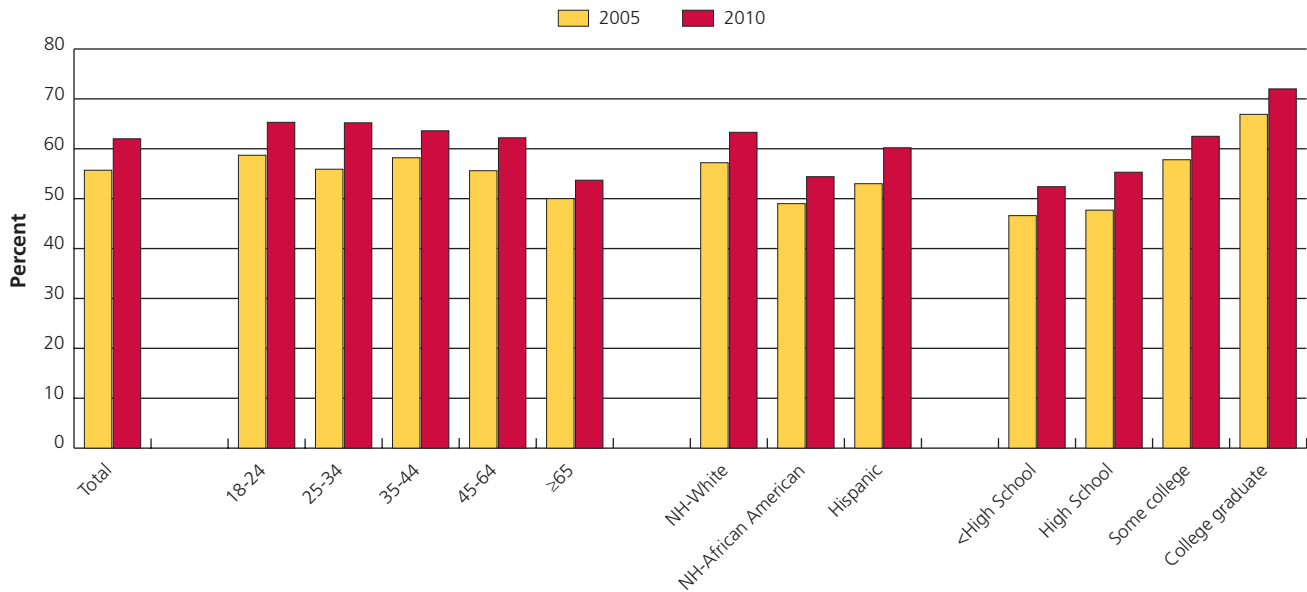
Eat at least 2½ cups of vegetables and fruits each day.

- Include vegetables and fruits at every meal and for snacks.
- Eat a variety of vegetables and fruits each day.
- Emphasize whole fruits and vegetables; choose 100% juice if you drink vegetable or fruit juices.
- Limit consumption of creamy sauces, dressings, and dips with fruits and vegetables.

Choose whole-grain instead of refined-grain products.

- Choose whole-grain foods such as whole-grain breads, pasta and cereals (such as barley and oats), and brown rice instead of white rice, breads, cereals, and pasta made from refined grains.
- Limit consumption of other refined-carbohydrate foods, including pastries, candy, sugar-sweetened cereals, and other high-sugar foods.

Figure 2C. Trends in Walking among US Adults, 2005 and 2010



Percent of respondents who reported walking for transportation or for leisure activity for at least 10 minutes or more in the preceding 7 days.

Source: National Health Interview Surveys, 2005, 2010. Centers for Disease Control and Prevention, *MMWR*; 61(31):595-601, 2012.

American Cancer Society, Surveillance Research, 2013

For these reasons, consumption of low-calorie, whole vegetables and fruits has been encouraged by a number of health organizations.^{88,105} However, among American adults and children, the consumption of these foods remains lower than is recommended,⁸⁹ perhaps due to reasons such as the lack of availability of affordable produce, preparation time and taste preferences, and the abundance of relatively inexpensive and low-nutrient options (e.g., processed snacks, sugared sodas, and fast food) that compete with healthier choices.¹¹²

Recommendations for cancer risk reduction are to consume at least 2½ cups of a variety of vegetables and fruits each day; however, for overall health, the American Cancer Society recommends consuming higher levels, depending on calorie needs, as stated in the Dietary Guidelines for Americans.⁸⁸ Consumers are encouraged to fill half their plate with fruits and vegetables at meals and snacks.

Current Prevalence of Consuming Vegetables and Fruits in Adults and Adolescents

In 2011, about one in three (34.0%) US high school students consumed 100% fruit juice or fruit two or more times a day. Only 15.3% of students ate vegetables 3 or more times per day (Table 2A, page 22).

Only 15.4% of adults reported eating 3 or more servings of vegetables, and 30.9% reported eating 2 or more servings of fruits daily in 2011. Across states, prevalence of consuming 3 or more

servings of vegetables ranged from 8.0% in Louisiana to 21.5% in the District of Columbia. The prevalence of consuming 2 or more servings of fruits ranged from 17.5% in West Virginia to 39.3% in California (Table 2B, page 24).

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.⁸⁸ Although evidence of the association between whole-grain foods and different types of cancer has been limited, recent studies support a role for high intake of whole-grain foods in reducing the risk of colorectal cancer.¹¹³ Furthermore, recent epidemiological studies have shown that diet patterns consisting of more whole grains and fewer refined grains are associated with a lower risk of deaths from several cancers, as well as other chronic diseases (e.g., diabetes, cardiovascular disease), and are associated with better weight control.^{84,88} Based on this evolving evidence, consuming high-fiber foods, such as beans, and whole-grain breads, cereals, and pasta, is highly recommended.^{84,88}

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 1 drink a day for women.⁸⁸ The recommended limit is lower for women because of their smaller

body size and slower metabolism of alcohol. A drink of alcohol is defined as 12 ounces of beer, five ounces of wine, or 1.5 ounces of 80-proof distilled spirits.

Alcohol consumption is an established cause of cancers of the mouth, pharynx, larynx, esophagus, liver, colorectum, and female breast, and there is some evidence for an association with pancreatic cancer.^{83,84,114,115} 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.⁸³ Breast cancer risk appears to increase with increasing intake of alcohol, and studies suggest a modest increased risk at even a few drinks per week.¹¹⁶ Therefore, reducing alcohol consumption is one of the few widely recognized ways that women may 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.¹¹⁷ There is no compelling reason for adults who currently do not consume alcoholic beverages to start consuming alcohol to reduce their risk for heart disease, because cardiovascular risk can be reduced by other means, such as not 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, including children and adolescents, and individuals of any age who cannot restrict their drinking to moderate levels or who have a family history of alcoholism.

Community Action

The dramatic rise in obesity levels in the US in the past several decades has serious implications for public health and the economy.¹⁰⁵ In 2008, the medical costs for overweight and obesity were estimated to be \$147 billion (or 9.1% of US health care expenditures), with half of these costs paid for through the Medicare and Medicaid programs.¹¹⁸ Experience in tobacco control and other public health initiatives has shown that public policies and environmental strategies may be powerful tools to effect structural socio-environmental change to alter population-level behavior.

Policies and programs that support healthy behaviors throughout the life cycle are needed to address the prevailing socio-environmental factors contributing to increased obesity by reducing individuals' opportunities to eat well and be physically active.^{84,105} Such socio-environmental factors include lack of access to full-service grocery stores, relatively high costs of healthy foods compared to processed foods, and lack of access to safe places to play and exercise.¹⁰⁵ Historical changes that likely contributed to the obesity epidemic include changes in leisure time spent on physically active pursuits, shifts from using walking as a mode of transportation to increased reliance on automobiles, shifts to more mechanized or sedentary work,

more meals eaten away from home, increased marketing and availability of cheap but energy-dense processed foods, and increased consumption of larger portion sizes, as well as increased consumption of sugar-sweetened beverages.^{84,89,105,112}

Many experts and governmental and nongovernmental organizations recognize that obesity is a complex problem that requires a broad range of effective approaches.^{84,105} The American Cancer Society believes that while educating the public about healthy behaviors is important to help them stay well, creating environments that make it easier for people to make healthy choices is critical if widespread changes are to be seen at a population level.^{84,119} Thus, the Society's nutrition and physical activity guidelines call attention to community-action strategies that can increase access to healthy food and provide safe, enjoyable, and accessible environments for physical activity in all community settings (e.g., schools, workplaces). (See sidebar, page 28.) Schools and child care facilities, workplaces, and health care facilities are important settings for the implementation of policies and programmatic initiatives. The appeal of setting-based approaches includes the ability to implement effective strategies to target populations (e.g., students, employees, or patients) and also to influence social norms within the setting, with possible transfer to behavior outside of the setting through linkage with community-based prevention programs.¹⁰⁵



Strategies to Promote the Availability and Consumption of Affordable, Healthy Food and Beverages

- Limit the availability, advertising, and marketing of foods and beverages of low nutritional value, particularly in schools.
- Strengthen nutritional standards in schools for foods and beverages served as part of the school meals program and for competitive foods and beverages served outside of the program.
- Increase access to affordable, healthy foods in communities, worksites, and other public facilities.

Strategies to Encourage Physical Activity or Limit Sedentary Activity among Children and Youth

- Invest in community design that supports the development of sidewalks, bike lanes, and access to parks and green space.
- Strengthen and enforce physical education requirements in grades K-12, and create other opportunities for physical activity before, during, and after school.

Strategies to Create Safe Communities That Support Healthy Eating and Physical Activity

- Implement large-scale marketing campaigns targeting consumers and decision makers to increase awareness of the lifestyle/cancer connection and to motivate people to take action to make their worksites, schools, and communities more health friendly.
- Develop and promote communities of excellence that result in policy and environmental changes within worksites, schools, and communities that increase access to healthy foods and opportunities for physical activity.
- Increase federal and state funding so that states and communities can implement comprehensive nutrition and physical activity plans.

Strategies to Encourage Communities to Organize for Change

- Encourage collaboration among government, nonprofit, and private sectors to develop research and intervention programs.
- Increase resources from governmental and nongovernmental sources to facilitate the implementation of a strategic and action-oriented plan to address the obesity problem.

The next section features some recent public policy initiatives as well as efforts by the Society and its nonprofit, nonpartisan advocacy affiliate, the American Cancer Society Action Network (ACS CAN), to foster and support public policy and wellness initiatives that help promote healthy environments for all Americans.

Community Action Strategies

There are multiple ways that public and private organizations at the local, state, and national levels can develop policies and allocate or expand resources to facilitate necessary changes.^{91,92} Schools can ensure that students participate in physical activity programs and promote the availability of healthful food and beverages while reducing access to less healthy foods and beverages. Employers can implement worksite health promotion programs.^{91,92} Health care professionals can advise and assist their patients on effective weight loss and weight management programs.^{93,120} At the state and local level, community leaders, in particular, can promote policy changes that may include regulation of the school food environment, zoning changes, tax incentives that bring food stores that carry fresh fruits and vegetables into poor neighborhoods, and the creation of safe spaces that promote physical activity.⁹² A growing number and variety of policies are being implemented at the local and state levels of government that are intended to promote healthy eating and active living; many of these policies have targeted the food environment and activity requirements in schools.^{92,119} These varied efforts can become an extremely valuable source of useful information about the impact of different policy strategies to the

public's response in terms of consumption of certain products or influence on dietary behaviors and weight management.

The Centers for Disease Control and Prevention (CDC), the Institute of Medicine, the World Health Organization, and others have outlined a variety of evidenced-based approaches in schools, worksites, and communities to halt and ultimately reverse obesity trends.^{83,92,117,119} Some specific approaches are outlined in the sidebar on page 30.^{91,92,119,121}

The Society and ACS CAN support evidence-based cancer prevention strategies that reduce barriers to healthy living through research, education, outreach, health promotion programs, and advocacy. We are actively collaborating with others to advance some of these strategies in states and localities nationwide.

National Policy Actions

Through recent initiatives, the federal government has shown strong support for strategies to improve nutrition and increase physical activity.

The US Department of Agriculture and the US Department of Health and Human Services released the *Dietary Guidelines for Americans 2010*, which updated the 2005 guidelines and formed the basis of federal nutrition policy. The 2010 guidelines recommend for the first time that Americans eat smaller portions in order to achieve and maintain a healthy weight. They also recommend that Americans consume nutrient-dense foods and beverages and increase their consumption of fruits and vegetables, whole grains, low-fat dairy, and varying protein sources,

while decreasing added sugars, refined grains, solid fats, and sodium.⁸⁸ The complementary MyPlate icon has replaced MyPyramid as the visual symbol of what a healthy meal should look like. The 2010 dietary guidelines and MyPlate are largely consistent with the Society's nutrition and physical activity guidelines for cancer prevention.

The Healthy, Hunger-Free Kids Act, which reauthorized the federal child nutrition programs, became law in December 2010 and included a number of provisions focused on improving school nutrition and reducing obesity. ACS CAN has since been engaged in advocating for strong regulations to implement the law. In January 2012, the US Department of Agriculture (USDA) released final updated nutrition standards for schools meals, and as students went back to school in the fall of 2012, they began to see more – and a greater variety of – fruits and vegetables, more whole grains, and only fat-free and low-fat milk in school lunches. Updated nutrition standards for school breakfast will be phased in over the next couple of years. Schools certified as meeting the updated nutrition standards receive increased federal reimbursement. The Healthy, Hunger-Free Kids act will also:

- Set minimum national nutrition standards for all foods and beverages sold during the school day outside of school meal programs, including through vending machines and cafeteria a la carte lines.
- Strengthen and improve accountability in local wellness policies.
- Revamp the nutrition education component of the food stamp program (SNAP-Ed) to allow the funds to be used for a broader range of purposes focused on reducing obesity.
- Support farm-to-school programs, which can help increase the amount of fresh fruits and vegetables in schools.

The Affordable Care Act (ACA), which became law in 2010, provides funding and support for obesity prevention initiatives. The legislation created a National Prevention, Health Promotion, and Public Health Council composed of cabinet members and senior officials from nearly every government agency, which with input from an advisory committee of nongovernment experts – including the chief executive officer of the Society and ACS CAN – developed a National Prevention Strategy. The strategy, which was released in June 2011, provides a comprehensive plan for increasing the number of Americans who are healthy at all stages in life. A National Prevention Council Action Plan, which was released in June 2012, builds from the National Prevention Strategy by identifying commitments shared across federal departments and unique department actions being taken to further each of the strategic directions and priorities of the National Prevention Strategy. Healthy eating and active living are two of the strategy's priority areas, and several recommendations and suggested actions for the federal govern-



ment and other stakeholders to achieve each of these goals are outlined in the report and action plan.

The ACA also created the Prevention and Public Health Fund, a source of annual funding for prevention and public health initiatives. ACS CAN has been active in protecting this important annual source of funding because it has enabled significant support for implementing health-promoting strategies to reduce obesity and tobacco use and strengthen the public health infrastructure. In fiscal year 2012, the fund provided \$226 million for community-based policy and environmental change initiatives focused on reducing obesity, improving nutrition, increasing physical activity, and reducing tobacco use through the Community Transformation Grant program. These funds are in addition to the \$145 million provided for the Community Transformation Grant program in FY 2011. Administered by the Centers for Disease Control and Prevention (CDC), the Community Transformation Grant program has provided grants to more than 100 state and local government agencies, tribes, territories, and nonprofit organizations either to implement proven interventions or to build capacity for future community-based prevention work. The CDC estimates that the Community Transformation Grant program will improve the health of about 130 million Americans nationwide.¹²²

In addition, the ACA included requirements for calorie labeling of standard menu items in chain restaurants and similar venues, and of food and beverage items in vending machines that are part of a chain. Chain restaurants and similar venues will also be required to have additional nutrition information available to consumers upon request. ACS CAN supports providing consumers with information that will help them make healthy food and beverage choices. Enforcement of the calorie-labeling requirements for restaurants and vending machines will begin after the government issues final regulations.

The CDC is also supporting policy and environmental change strategies to promote healthy eating and physical activity in states and communities through a variety of activities. Twenty-five states are currently funded through the CDC's state-based Nutrition, Physical Activity, and Obesity program to coordinate efforts with multiple partners to address obesity. The CDC also funds school- and community-based programs focused on improving nutrition and increasing physical activity in youth and adults, respectively.

The Society and ACS CAN's Initiatives Addressing Obesity/Overweight through the Promotion of Nutrition and Physical Activity

To reduce the risk of cancer and other chronic diseases, the Society works to promote weight control and increase levels of physical activity and consumption of healthy diets, as well as to help facilitate changes in schools, worksites, and communities that make it easier for people to make healthier choices.⁸⁴

To advance federal, state, and local policies that improve access to healthy food and beverage options and increase opportunities for physical activity, the Society and ACS CAN are engaged in many initiatives and collaborate with many organizations, including the National Alliance on Nutrition and Activity, the Campaign to End Obesity, the National Coalition for Promoting Physical Activity, the Safe Routes to School National Partnership, and the Preventive Health Partnership (American Cancer Society, American Heart Association, and American Diabetes Association), among others. ACS CAN has advocated for improved school nutrition standards and physical education requirements in schools on the state and local levels. In collaboration with partner organizations, the Society's advocacy affiliate recently developed a new policy statement on physical education in schools recommending that states and school districts improve the quality and increase the quantity of physical education in schools, supplemented by additional school-based physical activity opportunities.

Accelerating Progress in Obesity Prevention

In May 2012, the Institute of Medicine (IOM) published a report titled *Accelerating Progress in Obesity Prevention: Solving the Weight of the Nation*. It outlines comprehensive strategies for addressing the nation's obesity epidemic and calls on leaders in all sectors to accelerate action to advance those strategies. The report includes the following five key goals for reversing the epidemic:

- Make physical activity an integral and routine part of life.
- Create food and beverage environments that ensure healthy food and beverage options are the routine, easy choice.
- Transform messages about physical activity and nutrition.
- Expand the role of health care providers, insurers, and employers in obesity prevention.
- Make schools a national focal point for obesity prevention.
- Each goal is supported by a specific recommendation and strategies for achieving those recommendations. The recommendations and strategies target all sectors of society, including policy makers at the local, state, and federal level, businesses, schools, doctors, and parents.
- More information about the report can be found at iom.edu/Reports/2012/Accelerating-Progress-in-Obesity-Prevention.aspx.

The Society is also engaged in several environmental and systems change initiatives focused on improving nutrition and physical activity:

- Through its Corporate & Systems Initiative, the Society works with companies throughout the country to improve their wellness offerings to employees, including initiatives that promote physical activity and healthy eating, as well as those that enable employers to create a healthier workplace environment.
- To promote healthy lifestyles among youth, the Society advocates for the creation of a school environment that promotes health and wellness. The Society works with partners to increase the capacity of school systems to address K-12 health education, which includes increasing student knowledge and skills related to good nutrition, lifelong physical activity, and tobacco avoidance. The Society published the National Health Education Standards (NHES) and has been a leader in professional development to advance the implementation of NHES by states and local school districts.

Ultraviolet Radiation and Skin Cancer

The vast majority of skin cancers are caused by unprotected exposure to excessive ultraviolet radiation (UVR), primarily from the sun.^{123,124} Stratospheric ozone depletion has exacerbated these health effects by allowing increased UVR to reach the Earth's surface.¹²⁵ The most serious form of skin cancer is melanoma, which is expected to be diagnosed in about 76,690 persons in 2013. The most common forms of skin cancer, basal cell and squamous cell, are highly curable; in 2006, 3.5 million cases were diagnosed and 2.2 million people were treated for these skin cancers.¹²⁶ Most skin cancer deaths are due to melanoma (9,480 deaths are expected in 2013). Melanoma primarily afflicts whites; rates are 20 times higher in whites than in African Americans. The incidence of melanoma in the US has been increasing for at least 30 years,¹ in part due to changes in behavior that have resulted in increased exposure to solar UVR, and use of indoor tanning booths by young adult white women.^{124,127,128}

Solar Ultraviolet Exposure

Everyone is exposed to naturally occurring solar UVR, although much of this exposure can be controlled. UVR is an invisible kind of radiation that can penetrate and change skin cells. The extent of an individual's exposure to sunlight is determined by personal behaviors (e.g., sunbathing), as well as occupational circumstances. Environmental factors such as time of day, season, geographic location, altitude, temperature, and other weather conditions also affect the amount of solar radiation individuals receive.¹²⁹ The epidemiological evidence suggests that exposure to UVR and the sensitivity of an individual's skin to UVR are risk factors for skin cancer, though the type of exposure (high-intensity and short duration vs. chronic exposure) and the lifetime exposure patterns related to certain outdoor occupations or lifestyle practices may differ among the three main skin cancer types. Individuals whose skin tans poorly or burns easily after UVR exposure are particularly susceptible. The negative effects of UVR are cumulative over a lifetime.¹²⁹ The immediate adverse effects of excessive UVR exposure include sunburn, eye damage, and suppression of the immune system, while the long-term effects include premature aging of the skin, solar keratosis, wrinkles, and skin cancer.¹³⁰

Sunburns typically occur as a result of excessive sun exposure on unprotected or poorly protected skin.^{124,129} They are characterized by skin redness (erythema), which occurs three to five hours after UVR exposure. Depending on the extent of UVR exposure, sunburns can range from mild to blistering and painful. Sunburns during childhood and intense intermittent sun exposure increase the risk of melanoma and other skin cancers

Risk Factors and Prevention Measures for Melanoma and Other Skin Cancers

Risk factors for melanoma^{1,124}

- Personal or family history of skin cancer
- Light skin or sun-sensitive (i.e., sunburns easily and tans poorly) skin types
- Presence of moles and freckles
- History of excessive sun exposure, including severe sunburn
- Exposure to indoor tanning booths

*Risk factors for basal cell and squamous cell cancers*¹²⁴

- Personal or family history of skin cancer
- Light skin color
- Having actinic keratosis (e.g., scaly patches of skin)
- Chronic exposure to the sun
- Exposure to indoor tanning booths

Measures to prevent skin cancer^{137,138}

- Avoid direct exposure to the sun between the hours of 10 a.m. and 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.
- Apply adequate amounts of broad-spectrum sunscreen lotion with a sun protection factor (SPF) of 30 or higher to exposed skin.
- Avoid indoor tanning booths and sunlamps.

later in life.^{131,132} A meta-analysis of 57 studies indicated a two-fold increased risk for melanoma among persons with a history of sunburn, compared to those without sunburn history.¹³³ The susceptibility of the skin to UVR damage, including sunburns, 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.^{124,132} The visible evidence of susceptibility to skin cancer (skin type and precancerous lesions) and of sun-induced skin damage (sunburn and solar keratosis) and the ability of an individual to modify sun exposure provide the basis for implementation of programs for the primary prevention of skin cancer. Individual modifiable strategies to help reduce UVR exposure include using protective clothing, seeking shade, and using broad-spectrum sunscreens as an adjunct form of sun protection. While sunscreen products used properly can provide protection from sunburns, skin can still be damaged by prolonged stays in the sun.^{129,134} Moreover, on occasions or in settings of intentional UVR exposure (e.g., a day at the beach), sun seekers should not deliberately prolong their time in the sun

regardless of having applied sunscreen. To minimize the harmful effects of excessive and unprotected sun exposure, sun protection behaviors should be a lifelong practice. (See sidebar, page 31.)

In an effort to provide consumers better information on the value and limits of sunscreen use, the Food and Drug Administration (FDA) has announced significant changes to the labeling of over-the-counter sunscreen products and provides guidance on how to select and use sunscreens; for additional information, go to fda.gov/Drugs/ResourcesForYou/Consumers/BuyingUsingMedicineSafely/UnderstandingOver-the-CounterMedicines/ucm239463.htm. Users of sunscreen (particularly those at high risk) should learn about proper selection of sunscreen types and application techniques. Adequate amounts of sunscreen should be applied 30 minutes to one hour prior to outdoor activities and reapplied after sweating, bathing, swimming, or accidental wiping away of sunscreen. In addition, sunscreen users are advised not to prolong their exposure time in the sun. For additional information, go to cancer.org/docroot/SPC/content/SPC_1_Sun_Safety_101.asp.

Vitamin D is essential for bone health. It is naturally present in a few foods, added to others, and available as a dietary supplement. It can also be obtained by small amounts of sunlight exposure; however, safety is a concern when sunlight is used to meet vitamin D requirements because UV light exposure is clearly linked to skin cancers, and the amount of sunlight exposure it takes to make enough vitamin D depends on many other environmental factors (i.e., latitude, season, etc.). Alternatively, vitamin D requirements can be obtained through dietary sources (particularly fortified milk and some cereals, oily fish, and eggs) and supplementation.¹³⁵ The current national recommended daily intake of vitamin D is 400 IU to 800 IU.¹³⁶ Research is under way to improve the understanding of vitamin D levels and their health effects, including the relationship with some cancers.¹³⁵

UVR Exposure Behaviors

UVR damage of unprotected skin should be minimized by limiting the amount of UVR exposure, by timing outdoor activities when UVR rays are less intense, by using protective clothing and applying adequate amounts of sunscreen, and by avoiding tanning booths and sunlamps.^{137,139} (See sidebar, page 31.)

Studies show that many adults and adolescents in the US do not regularly protect themselves when outdoors on sunny days.¹⁴⁰ In 2011, 10.8% of US high school students reported using sunscreen routinely; this was the only sun-protection practice assessed at the time in this population (Table 3A). In 2010, national data showed that 32.1% of adults reported always or often using sunscreen when outside for an hour or more on a warm, sunny day in the past 12 months, and 37.1% reported seeking shade, while fewer adults reported clothing protection behaviors, including using hats (12.8%) or long-sleeved shirts (11.5%) (Table 3A).

Table 3A. Ultraviolet Radiation Exposure Behaviors, US High School Students and Adults 18 Years and Older, US, 2011, 2010

High School Students, 2011	%	%	%
	Total	Male	Female
Apply sunscreen*	10.8	7.3	14.4
Used indoor tanning device†	13.3	6.2	20.9
Adults, 2010*	%	%	%*
	Total	Male	Female
Sunburns	37.1	38.6	35.7
Apply sunscreen	32.1	32.6	42.2
Wear a hat	12.8	13.0	12.5
Seek the shade	37.1	30.3	43.7
Wear long-sleeved shirt	11.5	12.2	10.9
Wear long pants	32.7	38.6	27.1
Used indoor tanning device‡	5.6	2.2	8.9

*“Always” or “Most of the time” used sunscreen with an SPF of 15 or higher when outside for more than 1 hour on a sunny day. †Used an indoor tanning device, such as a sunlamp, sunbed, or tanning booth, one or more times during the 12 months before the survey. ‡“Always” or “Often” practiced sun protection behaviors on any warm, sunny day. § Used an indoor tanning device, including a sunbed, sunlamp, or tanning booth at least once in the past 12 months.

Source: High school students: Youth Risk Behavior Surveillance System, 2011, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention. *MMWR Morb Mortal Wkly Rep*. Surveillance Summaries 2012;61(SS04). Adults: National Health Interview Survey Public Use Data File 2010, National Center for Health Statistics, Centers for Disease Control and Prevention, 2011.

American Cancer Society, Surveillance Research, 2013

Artificial Ultraviolet Radiation Exposure (Indoor Tanning)

A second source of exposure is artificial UVR emitted by devices (indoor tanning booths or lamps) that are increasingly available for cosmetic use and heavily promoted by the indoor tanning industry.^{139,141} Studies show that the use of indoor tanning devices is a risk factor for skin cancer. The International Agency for Research on Cancer listed UV-emitting indoor tanning devices as carcinogenic to humans; in its comprehensive review, the agency reported that indoor tanning has no positive effect on health, and found a 75% increase in melanoma risk among those who used indoor tanning booths in their teens and 20s.¹²⁸ Thus, additional exposure to artificial UVR from indoor tanning is likely to compound the well-known detrimental consequences of excessive solar UVR exposure.^{128,139,141}

The use of indoor tanning booths or sunlamps is particularly prevalent among young adults and women, who perceive a tanned appearance as healthy and attractive.^{141,142} In a 2011 survey of US high school students, 20.9% of girls and 6.2% of boys reported using an indoor tanning booth in the previous year. Although just 5.6% of US adults reported using indoor tanning, use of these devices was higher in certain groups: women (8.9%), whites (8.1%) and those 18 to 25 years of age (12.3%)¹⁴³ (Table 3A).

Because UVR exposure in childhood and teenage years can be so damaging, policy makers in some states are regulating minors' use of tanning devices. Thirty-three states have enacted legislation limiting minors' access to indoor tanning facilities, including restricting access to use of tanning facilities by age or requiring parental permission. Of these states, seven (Delaware, Georgia, Illinois, Maine, New Hampshire, New Jersey, and North Dakota) prohibit minors under 14 years of age from using tanning facilities; Texas and Wisconsin prohibit use by minors under the age of 16½ and 16, respectively; New York prohibits use under the age of 17; Rhode Island prohibits use under the age of 18 unless a parental permission slip is signed for every 2 visits; and California and Vermont recently passed legislation to prohibit use of tanning beds by adolescents under 18 years of age (Figure 3A). In addition, some counties also regulate the use of tanning devices, including Howard County, Maryland, which was the first jurisdiction to ban indoor tanning for all minors under the age of 18.¹⁴⁴

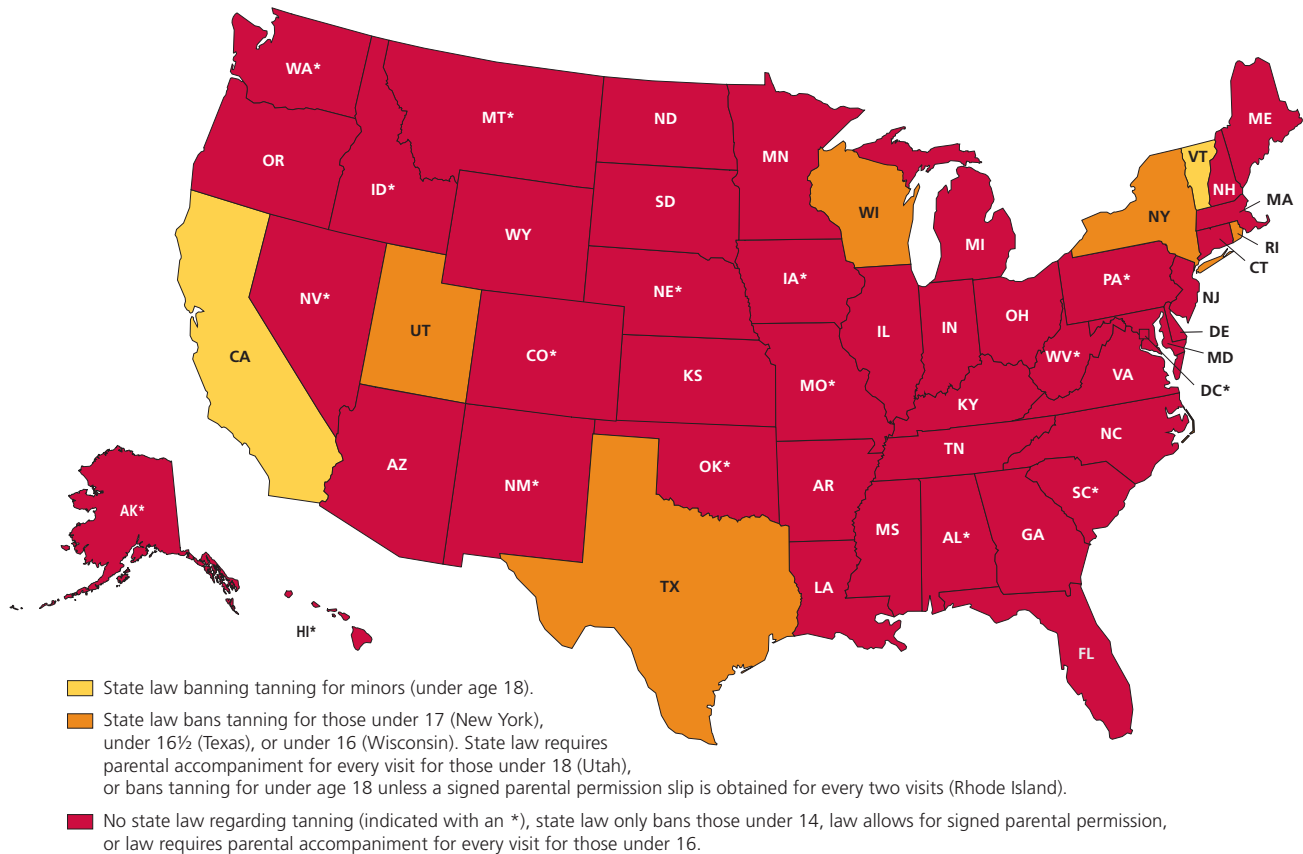
A recent survey of indoor tanning facilities to assess compliance with minors' access laws found that while many (87%) said they require parental consent before a teen may use indoor tanning facilities, 71% of establishments would allow a teen to tan more

often (every day on the first week of tanning) than the government's recommended limit of three times a week.¹⁴⁵ Both compliance with and enforcement of laws restricting the access of minors to indoor tanning facilities are low.^{145,146} Through its authority under the Tanning Accountability and Notification Act of 2007, the FDA regulates tanning devices (e.g., booths, sunbeds, or sunlamps) and enforces warning labels on indoor tanning devices to ensure consumers are effectively warned of the known dangers of indoor tanning, including the risk of skin cancer.¹⁴¹ Parents and adolescents need to be educated on the risks of using indoor tanning devices, and the tanning industry needs to be effectively regulated to protect public health.

Prevention Strategies in Skin Cancer

Sun protection practices among adults and youth have improved little during the past decades despite efforts to educate the public about the harms from excessive sun exposure and the benefits of sun protection.^{140,147} While education is important, more systematic efforts are needed to effect broader changes to improve and enable skin cancer preventive practices.^{137,148} Since children and adolescents are an important target group for skin cancer prevention, the Centers for Disease Control and Prevention

Figure 3A. Indoor Tanning Minors' Access Restrictions, by State, US, 2012



Source: American Cancer Society Action Network, Health Policy Tracking Service & Individual state bill tracking services; Updated as of October 2012.



(CDC) recommends developing comprehensive programs that include school intervention components, including physical, social, and organizational environments that promote UVR protection, and educating young people about sun safety.^{138,149} However, a CDC assessment of the School Health Policies and Programs indicated low adoption of sun-safety policies (e.g., scheduling outdoor activities during time of the day when the sun is not at peak intensity) in elementary, junior/middle, or senior high schools.¹⁵⁰ Moreover, the extent of adoption of school sun-safety policies may vary by geography and school grade. A national survey of adolescents 11 to 18 years of age found that younger adolescents were more likely to be aware of sun-safety policies in their school, sports program, camp, or swimming pools than older youth; in addition, about 50% of adolescents reported receiving sun-safety information, 69.7% reported the provision of shaded areas or pavilions to reduce sun exposure, 21.7% reported provision of sunscreen, and 20.2% reported exposure to sun-safety signs.¹⁵¹ In states where UVR exposure is high year-round, parents should work with schools to develop sun-protection programs at all grade levels and should establish proper protection practices for their own children.

A review by the Community Preventive Services Task Force found evidence of effective educational programs in the following settings: primary and middle schools and recreation/tourism.¹⁴⁸ The interventions evaluated in primary and middle schools had an educational and policy emphasis and showed an

increase in children's sun protection behavior, specifically wearing protective clothing and hats. The interventions in recreation/tourism, which showed an increase in adults' covering-up behavior, had multiple strategies, including providing educational materials on sun safety for outdoor recreation staff and supplying additional shaded areas and/or sunscreen. Even though workers in certain outdoor occupational settings are at a high risk for non-melanoma skin cancers because of chronic and intense UVR exposure, the Community Preventive Services Task Force concluded that the evidence supporting interventions in occupational settings is insufficient due to scant and inconsistent findings.¹⁵²

The SunWise School Program is an example of a cost-effective, school-based education program established by the Environmental Protection Agency (EPA). To facilitate program adoption by school health professionals, the EPA provides them with multiple resources to teach children and their families to protect themselves from overexposure to the sun through the use of classroom-, school-, and community-based components (More information is available at epa.gov/sunwise/). The Pool Cool intervention program is another innovative (research-tested) environmental and education sun-safety initiative designed for use at outdoor swimming pools. Though the primary target audience is children 5 to 10 years of age who are taking swimming lessons, parents of the children and lifeguards are also considered in the multilevel evaluation. Findings of the Pool

Cool evaluation have shown positive effects on child sun-protection behaviors and sunburn rates, parent sun-protection behaviors, and lifeguard sunburn rates, as well as changes to sun-protection policies and the environment of outdoor pools. Lessons learned from the Pool Cool program suggest that interventions in occupational settings may benefit from a multicomponent framework that targets individuals' behaviors and workplace organizational and social environments, including policies supporting sun-safety and social changes promoting sun-safety norms.¹⁵³ State and local health departments and voluntary health organizations interested in playing a role in skin cancer prevention can use the Community Guide resources available at cancercontrolplanet.cancer.gov/sun_safety.html.

The evidence supporting primary skin cancer prevention in health care settings is limited.^{137,148} According to a study by the American Cancer Society, about half of US adolescents and their parents reported being told by a physician to practice sun protection.¹⁵⁴ Physician communication to practice sun safety was associated with increased use of sunscreen and proper sunscreen application practices among adolescents, and increased insistence among parents that their children practice regular sunscreen use.¹⁵⁴ However, parents of US adolescents themselves were found to practice sun-protection behaviors at low rates, and nearly one in two experience summer sunburns.¹⁵⁵ Therefore, health care professionals, including pediatricians, may play an important role in educating their patients and parents about the importance of skin cancer prevention. More studies are needed to evaluate interventions in medical settings.¹⁵⁶

Lastly, given the prevailing belief and attitude that having or acquiring a tan makes you look healthy or attractive, concern has focused on such appearance perceptions as a barrier to sun protection education and promotion. Accordingly, another important approach to promoting individual protection against UV exposure involves interventions focused on appearance, which are designed to emphasize the harms to physical appearance associated with sun exposure (i.e., age spots and wrinkles) or to increase the perceived attractiveness of untanned skin. There is evidence that appearance-based interventions can lead to behavior change in certain groups (e.g., college-age women).^{141,142}

Early Detection of Skin Cancer

Important strategies aimed at improving early diagnosis of skin cancers include education of patients about signs and symptom recognition. Because people have the most opportunities to examine their own skin, their involvement in detection is important and supported by some organizations such as the American Academy of Dermatology (AAD). The early signs of skin cancer include changes in the surface of a mole or spot or a new appearance of skin growths. Suspicious growths (or lesions) or a progressive change in a lesion's appearance (size, shape, color,

Don't Fry Day

Since 2008, the Society has been collaborating with the National Council on Skin Cancer Prevention (NCSCP) to better coordinate prevention activities and improve national media relations efforts that promote and raise public health awareness about the importance of skin cancer prevention. The NCSCP and its partners have designated the Friday before Memorial Day (May 24 this year) as Don't Fry Day. This pre-Memorial Day awareness initiative uses key messages to ensure consistent communication about the individual steps people can take to prevent skin cancer; in 2012, awareness initiatives were disseminated by traditional-media and social media channels. In addition, the NCSCP has developed skin cancer prevention resource guides with information and suggestions for Don't Fry Day activities tailored to three groups: zoos and aquariums, schools and educators, and broadcast meteorologists. These materials can be accessed at the NCSCP Web site at skincancerprevention.org.

etc.) should be evaluated promptly by a physician. As part of its awareness campaign, the AAD established a Web site (see SpotSkinCancer.org) where individuals can learn how to perform a skin self-exam and find accessible skin cancer screening opportunities.

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.¹⁵⁷ (For more information about skin cancer prevention and early detection, go to cancer.org/docroot/SPC/content/SPC_1_Sun_Safety_101.asp.)



Cancer Screening

Early detection of cancer through screening has been determined to reduce mortality from cancers of the colon and rectum, breast, uterine cervix, and lung. Screening refers to testing in individuals who are asymptomatic for a particular disease (i.e., they have no symptoms that may indicate the presence of disease). In addition to detecting cancer early, screening for colorectal or cervical cancers can identify and result in the removal of abnormalities that may become precancerous and prevent potential progression to cancer.¹⁵⁷ Following the recommendations for cancer screening from the American Cancer Society is an important complement to healthy behaviors that reduce the risk of developing and dying from cancer. The American Cancer Society screening guidelines for the early detection of cancer are on page 37.

Improving access to and utilization of cancer screening is a key part of the Society's efforts to help people stay well. The Society and many other public health advocates consider health care reform necessary because the 48.6 million individuals in the US who lack health insurance experience barriers to appropriate health care, including preventive services such as cancer screening. The Affordable Care Act (ACA), which became law in March 2010, empowers states to reshape and improve their health delivery systems to fit the needs of their citizens. While many challenges will remain, health care reform legislation is a critical component for improving access to care. The American Cancer Society Cancer Action Network (ACS CAN), the Society's non-profit, nonpartisan advocacy affiliate, has worked diligently with multiple partners for comprehensive health reform legislation to improve access to timely, effective, and high-quality prevention, detection, and cancer treatment services.

Breast Cancer Screening

Breast cancer screening has been shown to reduce breast cancer mortality.¹⁵⁷ In the US, death rates from breast cancer in women have been declining since 1990, due in part to early detection by mammography screening and improvements in treatment.¹ Currently, 60% of breast cancers are diagnosed at a localized stage, for which the five-year survival rate is 98%.¹⁵⁸ Further reductions in breast cancer death rates are possible by improving regular use of mammography screening and providing timely access to high-quality follow up and treatment. The American Cancer Society played a key role in the early research to demonstrate the feasibility of mass screening for breast cancer, joining forces with the National Cancer Institute on the nationwide Breast Cancer Detection Demonstration Project.¹⁵⁹⁻¹⁶¹ The Society also provided support to the American College of Radiology to initiate the organization's Mammography Accreditation Program to improve the quality of mammography.

Table 4A. Mammography, Women 40 and Older, US, 2010

Characteristic	% Mammogram within the past year*	% Mammogram within the past 2 years*
Age		
40-49	46.8	62.3
50-64	56.1	72.7
65+	49.2	64.3
Race/ethnicity		
Hispanic/Latino	46.5	64.4
White (non-Hispanic)	51.5	67.0
African American (non-Hispanic)	50.6	65.9
American Indian/Alaska Native†	50.2	68.7
Asian American (non-Hispanic)‡	47.7	61.9
Education (years)		
11 or fewer	37.7	51.7
12	48.5	63.7
13-15	53.3	68.6
16 or more	57.0	74.6
Health insurance coverage		
No	16.9	31.5
Yes	54.9	70.7
Immigration§		
Born in US	51.6	67.1
Born in US territory	43.0	67.9
In US fewer than 10 years	26.8	37.4
In US 10+ years	47.7	65.2
Total	50.8	66.5

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

Source: National Health Interview Survey Public Use Data File 2010, National Center for Health Statistics, Centers for Disease Control and Prevention, 2011.

American Cancer Society, Surveillance Research, 2013

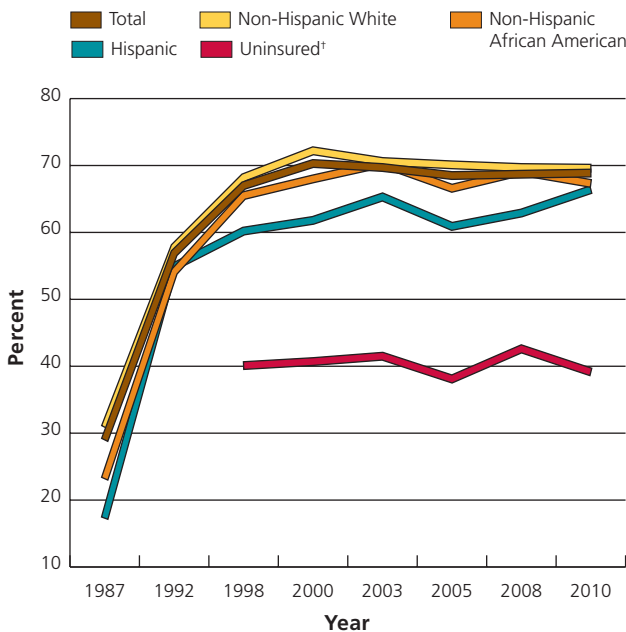
Despite the relatively high prevalence of recent use of screening mammograms in the US (for example, 66.5% of women reported use of mammogram within the past two years in 2010, Table 4A), studies suggest that many women are initiating mammography later than recommended, are not having mammography at recommended intervals,¹⁶² or are not receiving appropriate and timely follow up of positive screening results.¹⁶³⁻¹⁶⁵ These indicators of inadequate screening are associated with more advanced tumor size and stage at diagnosis. The American Cancer Society screening guidelines recommend that average-risk women 40 years of age and older receive mammography screening on an annual basis. There is no specific upper age at which mammography screening should be discontinued. Rather, the decision to stop regular mammography screening should be made on an individual basis based on the potential benefits and risks of screening, within the context of a patient's overall health status

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

Cancer Site	Population	Test or Procedure	Frequency
Breast	Women, age 20+	Breast self-examination (BSE)	It is acceptable for women to choose not to do BSE or to do BSE regularly (monthly) or irregularly. Beginning in their early 20s, women should be told about the benefits and limitations of BSE. Whether or not a woman ever performs BSE, the importance of prompt reporting of any new breast symptoms to a health professional should be emphasized. Women who choose to do BSE should receive instruction and have their technique reviewed on the occasion of a periodic health examination.
		Clinical breast examination (CBE)	For women in their 20s and 30s, it is recommended that CBE be part of a periodic health examination, preferably at least every three years. Asymptomatic women aged 40 and over should continue to receive a CBE as part of a periodic health examination, preferably annually.
		Mammography	Begin annual mammography at age 40.*
Cervix†	Women, ages 21-65	Pap test & HPV DNA test	Cervical cancer screening should begin at age 21. For women ages 21-29, screening should be done every 3 years with conventional or liquid-based Pap tests. For women ages 30-65, screening should be done every 5 years with both the HPV test and the Pap test (preferred), or every 3 years with the Pap test alone (acceptable). Women aged 65+ who have had ≥3 consecutive negative Pap tests or ≥2 consecutive negative HPV and Pap tests within the last 10 years, with the most recent test occurring within 5 years, and women who have had a total hysterectomy should stop cervical cancer screening. Women should not be screened annually by any method at any age.
Colorectal	Men and women, ages 50+	Fecal occult blood test (FOBT) with at least 50% test sensitivity for cancer, or fecal immunochemical test (FIT) with at least 50% test sensitivity for cancer, or	Annual, starting at age 50. Testing at home with adherence to manufacturer's recommendation for collection techniques and number of samples is recommended. FOBT with the single stool sample collected on the clinician's fingertip during a digital rectal examination is not recommended. Guaiac based toilet bowl FOBT tests also are not recommended. In comparison with guaiac-based tests for the detection of occult blood, immunochemical tests are more patient-friendly, and are likely to be equal or better in sensitivity and specificity. There is no justification for repeating FOBT in response to an initial positive finding.
		Stool DNA test**, or	Interval uncertain, starting at age 50
		Flexible sigmoidoscopy (FSIG), or	Every 5 years, starting at age 50. FSIG can be performed alone, or consideration can be given to combining FSIG performed every 5 years with a highly sensitive gFOBT or FIT performed annually.
		Double contrast barium enema (DCBE), or	Every 5 years, starting at age 50
		Colonoscopy	Every 10 years, starting at age 50
CT Colonography	Every 5 years, starting at age 50		
Endometrial	Women, at menopause	At the time of menopause, women at average risk should be informed about risks and symptoms of endometrial cancer and strongly encouraged to report any unexpected bleeding or spotting to their physicians.	
Lung	Current or former smokers ages 55-74 in good health with at least a 30 pack-year history	Low dose helical CT (LDCT)	Clinicians with access to high-volume, high quality lung cancer screening and treatment centers should initiate a discussion about lung cancer screening with apparently healthy patients ages 55-74 who have at least a 30 pack-year smoking history, and who currently smoke or have quit within the past 15 years. A process of informed and shared decision making with a clinician related to the potential benefits, limitations, and harms associated with screening for lung cancer with LDCT should occur before any decision is made to initiate lung cancer screening. Smoking cessation counseling remains a high priority for clinical attention in discussions with current smokers, who should be informed of their continuing risk of lung cancer. Screening should not be viewed as an alternative to smoking cessation
Prostate	Men, ages 50+	Digital rectal examination (DRE) and prostate-specific antigen test (PSA)	Men who have at least a ten-year life expectancy should have an opportunity to make an informed decision with their health care provider about whether to be screened for prostate cancer, after receiving information about the potential benefits, risks, and uncertainties associated with prostate cancer screening. Prostate cancer screening should not occur without an informed decision making process.
Cancer-related checkup	Men and women, ages 20+	On the occasion of a periodic health examination, the cancer-related checkup should include examination for cancers of the thyroid, testicles, ovaries, lymph nodes, oral cavity, and skin, as well as health counseling about tobacco, sun exposure, diet and nutrition, risk factors, sexual practices, and environmental and occupational exposures.	

*Beginning at age 40, annual clinical breast examination should be performed prior to mammography. **The stool DNA test approved for colorectal cancer screening in 2008 is no longer commercially available. New stool DNA tests are presently undergoing evaluation and may become available at some future time.

Figure 4A. Mammography within the Past Two Years*, Women 40 and Older, among Race/Ethnic Categories and the Uninsured†, US, 1987-2010



*Estimates for race and ethnic groups are age adjusted to the 2000 US standard population. †Estimates for the uninsured group are for women 40 to 64 years and are not age adjusted (see Statistical Notes for more information on age-adjustment).

Source: 1987-2003: National Cancer Institute. Cancer Trends Progress Report – 2007 Update. Available at progressreport.cancer.gov. Accessed September 10, 2009. Centers for Disease Control and Prevention, National Center for Health Statistics, Health, United States, 2008, With Special Feature on the Health of Young Adults. Hyattsville, Maryland: 2009. 2005, 2008, 2010: National Health Interview Survey Public Use Data File 2005, 2008, 2010. National Center for Health Statistics, Centers for Disease Control and Prevention, 2006, 2009, 2011. American Cancer Society, Surveillance Research, 2013

and estimated longevity. Women should be informed of the scientific evidence demonstrating the value of detecting breast cancer before symptoms develop and the importance of adhering to a schedule of regular mammograms. Women should also be told about the limitations of mammography, specifically that mammography will not detect all breast cancers, some breast cancers detected with mammography may still have poor prognosis, and a small percentage of breast neoplasms detected by screening, particularly ductal carcinoma in situ, may not progress, and thus may be treated unnecessarily. Further, women should be informed about the potential for false-positive results and the possibility of undergoing a biopsy for abnormalities that will prove to be benign.¹⁵⁷ It is the position of the American Cancer Society that the balance of benefits to possible harms strongly supports the value of breast cancer screening.

Scientific knowledge of how to identify women at increased risk of breast cancer is enabling the development of tools for risk assessment for clinical practice.^{157,166} For women at high risk for

breast cancer, the Society recommends annual screening using magnetic resonance imaging (MRI) in addition to mammograms beginning at age 30; the high-risk status of these women (lifetime risk approximately 20%-25% or greater) is based on the presence of mutations in the breast cancer susceptibility genes, *BRCA1* and *BRCA2*; strong family history of breast and/or ovarian cancer suggestive of mutation carrier status; or prior chest radiation therapy (e.g., for Hodgkin lymphoma).¹⁶⁷ In addition to MRI screening as an adjunct to mammography and screening at an earlier age, interventions offered to women at increased risk of breast cancer include chemoprevention with tamoxifen or raloxifene (two FDA-approved drugs), genetic counseling, and among women with *BRCA1* and *BRCA2* mutations, surgical options.¹⁶⁸ Recent assessments of the diffusion of breast cancer risk assessment in clinical care suggest that it is less than optimal; therefore, greater efforts are needed to encourage health care providers to use available tools and facilitate their incorporation into practice to ensure that many more eligible patients at high risk benefit from risk-reduction strategies.^{166,168}

Mammography Screening in the US

National breast cancer screening data are available from the National Health Interview Survey (NHIS) that measure screening within the past year and past two years. The NHIS has tracked trends in mammography since 1987.¹⁶⁹

- The percentage of women 40 years of age and older who reported having a mammogram within the past two years increased from 29% in 1987 to 70% in 2000; although this percentage declined by 3.4% between 2000 and 2005, thereafter, it has remained relatively stable (66.5% in 2010). While mammography rates over time improved in all race and ethnicity groups, they remained persistently low in uninsured women (Figure 4A).
- White, African American, and American Indian/Alaska Native women 40 years of age and older reported similar prevalence of having a mammogram in the past two years (66%-69%); however, in women of other racial/ethnic groups, the prevalence of mammography screening is lower: 64.4% in Hispanic women, and 61.9% in Asian women (Table 4A, page 36; Figure 4A).
- The lowest prevalence of mammography use in the past two years occurred among women who lack health insurance (31.5%), followed by immigrant women who have lived in the US for fewer than 10 years (37.4%) (Table 4A, page 36).
- Only 50.8% of women 40 years of age and older reported having a mammogram within the past year (Table 4A, page 36). The American Cancer Society recommends annual mammograms for women starting at age 40.

Table 4B. Mammography and Clinical Breast Exam, Women 40 and Older, by State, US, 2010

	% 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	56.2	54.6	59.7	27.8	29.4	47.1	47.3	46.5	23.9	25.4
Alaska	51.8	49.0	62.9	35.1	37.9	45.2	44.1	49.7	30.2	24.9
Arizona	58.8	57.0	63.5	31.4	34.3	50.4	50.3	50.6	27.1	31.4
Arkansas	53.9	52.6	56.3	24.3	26.2	44.8	45.5	43.3	19.0	20.0
California	60.8	59.4	64.5	35.0	31.5	50.2	50.9	48.4	27.1	27.6
Colorado	54.0	52.2	59.3	24.4	24.5	45.1	45.0	45.3	19.6	19.5
Connecticut	66.9	66.8	67.1	34.1	43.5	58.1	60.5	52.9	28.0	36.0
Delaware	65.4	63.8	68.9	26.8	38.5	55.4	56.0	54.2	22.2	31.9
District of Columbia	64.3	63.1	67.9	39.4	40.0	58.0	58.0	57.9	32.6	28.7
Florida	61.9	58.5	68.8	29.7	27.0	52.6	52.8	52.2	24.6	21.5
Georgia	64.1	62.6	68.6	34.5	29.3	56.7	57.3	54.5	25.5	24.8
Hawaii	57.7	57.9	57.3	31.2	28.2	45.2	47.4	40.9	25.6	19.5
Idaho	48.9	47.8	51.7	21.6	20.8	42.9	43.0	42.7	17.2	17.5
Illinois	54.9	54.1	56.7	22.8	33.5	45.8	46.5	44.0	18.5	26.1
Indiana	56.1	55.1	58.4	24.7	29.2	46.3	47.8	43.0	18.7	23.7
Iowa	64.3	64.6	63.7	35.5	34.8	56.3	59.4	50.3	29.8	30.2
Kansas	61.0	59.0	65.5	25.3	26.5	52.4	53.7	49.5	22.1	22.6
Kentucky	55.2	54.4	56.8	22.7	31.8	45.7	47.6	41.0	15.0	26.4
Louisiana	63.2	62.8	64.1	38.2	44.8	55.5	56.9	52.1	34.8	39.4
Maine	67.4	66.9	68.6	24.6	40.6	58.5	60.0	55.0	20.3	36.0
Maryland	67.2	66.5	69.1	29.2	33.6	59.3	60.7	55.8	27.5	27.6
Massachusetts	71.0	70.0	73.6	39.3	44.0	62.0	62.6	60.4	32.2	38.3
Michigan	61.4	59.8	65.5	26.2	36.4	53.4	53.8	52.3	19.5	31.5
Minnesota	66.2	66.4	65.7	47.1	45.9	58.7	59.9	56.1	39.4	41.9
Mississippi	52.3	51.7	53.7	23.7	26.4	44.7	45.7	42.4	19.9	22.7
Missouri	58.1	57.8	58.7	22.9	28.0	49.8	52.1	44.8	20.2	24.6
Montana	49.1	47.2	53.3	20.7	26.1	41.7	42.1	40.8	17.2	22.8
Nebraska	54.0	54.8	52.6	20.8	21.7	45.6	48.7	39.3	18.3	19.4
Nevada	52.9	51.1	57.4	30.6	20.7	41.1	42.3	38.0	23.8	13.8
New Hampshire	63.9	62.0	68.7	21.7	29.2	55.9	56.1	55.4	16.1	23.6
New Jersey	62.4	63.8	59.3	39.2	39.1	54.9	58.0	47.6	35.4	35.4
New Mexico	54.8	53.9	56.7	26.7	25.8	45.9	46.7	44.2	17.7	19.4
New York	63.3	62.7	64.5	34.8	45.5	55.8	56.2	54.8	25.7	37.6
North Carolina	63.8	61.6	69.0	30.8	35.1	55.7	55.7	55.8	25.3	29.6
North Dakota	60.4	59.6	61.8	32.3	40.6	52.9	53.6	51.6	25.5	36.9
Ohio	59.9	57.9	64.4	22.3	27.5	50.6	51.5	48.4	18.0	23.7
Oklahoma	51.1	50.2	53.0	26.5	24.0	41.6	42.9	38.8	22.6	20.0
Oregon	53.0	50.0	59.7	16.0	15.3	43.3	43.4	43.1	13.9	14.8
Pennsylvania	58.4	57.3	60.7	22.4	29.2	50.3	52.1	46.6	17.7	25.9
Rhode Island	67.8	67.7	67.9	32.5	37.9	59.3	61.1	55.4	26.8	30.8
South Carolina	58.3	56.0	63.5	24.5	30.8	48.5	49.1	47.3	19.0	25.4
South Dakota	63.3	62.5	64.9	32.3	38.2	55.7	58.0	51.2	28.8	33.9
Tennessee	61.9	61.6	62.5	30.7	30.1	54.5	56.0	50.9	24.9	27.4
Texas	53.2	51.6	57.7	26.4	33.0	45.3	46.0	43.4	23.1	28.6
Utah	49.1	45.8	57.6	23.7	24.8	39.3	38.9	40.6	16.2	18.9
Vermont	62.5	60.7	66.8	27.6	31.1	52.6	53.0	51.8	20.2	26.8
Virginia	63.2	63.1	63.4	37.0	36.3	53.9	56.3	47.5	32.0	31.8
Washington	57.1	55.0	62.3	26.1	26.1	46.9	47.2	46.1	21.1	23.3
West Virginia	58.0	57.6	58.8	21.1	31.3	48.6	51.4	43.1	17.6	29.3
Wisconsin	64.1	63.5	65.3	21.8	30.3	56.5	58.2	52.9	18.1	29.2
Wyoming	51.0	49.5	54.6	27.9	20.8	42.9	43.8	40.8	23.7	17.3
United States¶	59.9	58.6	62.9	29.8	31.8	51.2	52.1	48.9	24.3	27.1
Range	48.9-71	45.8-70	51.7-73.6	16-47.1	15.3-45.9	39.3-62	38.9-62.6	38-60.4	13.9-39.4	13.8-41.9

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

Source: Behavioral Risk Factor Surveillance System 2010, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 2011. American Cancer Society, Surveillance Research, 2013

State-level Mammography Screening

Current state-level breast cancer screening data are available from the 2010 Behavioral Risk Factor Surveillance System:

- In 2010, the percentage of women 40 years of age and older who reported having a mammogram in the past year ranged from 48.9% in Idaho to 71.0% in Massachusetts (Table 4B, page 39).
- Utah is the only state that does not have legislation to improve private insurance coverage for mammography screening and has the second lowest prevalence of mammography screening.¹⁷⁰
- Screening participation rates are approximately 7% to 9% lower when measuring those women who had a mammogram and clinical breast exam, ranging from 39.3% in Utah to 62.0% in Massachusetts.
- 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, page 39).

There is a need for continued efforts to increase mammography utilization. For the most recent period, between 2005 and 2010, the US trend in mammography utilization has remained stable (Figure 4A, page 38). In order to further reduce breast cancer mortality, it is important to improve access to screening; rates of mammography use continue to be low among those with low income levels, recent immigrants, and individuals who lack health insurance coverage.¹⁷¹ Access barriers to screening may lead to more advanced-stage breast cancer diagnosis and poorer survival.^{163,172} Programs and policies that both promote and enable access to mammography screening for low-income, uninsured, and underinsured women need to be enhanced and supported.¹⁷³

Cervical Cancer Screening

Cervical cancer incidence and mortality rates have decreased by more than 50% over the past three decades, with most of the reduction attributed to the Pap test, which detects cervical cancer and precancerous lesions.^{158,174} Between 60% and 80% of women with advanced cervical cancer have not had a Pap test in the past five years.¹⁷⁵ For women in whom precancerous lesions have been detected through Pap tests, the likelihood of survival is nearly 100% with appropriate evaluation, treatment, and follow up.¹⁷⁵ The American Cancer Society played a critical role in developing and promoting the use of the Pap test and provides screening guidelines in accordance with new evidence. In March 2012, the Society, along with the American Society for Colposcopy and Cervical Pathology and the American Society for Clinical Pathology, released an update to its cervical cancer

screening guidelines.¹⁷⁶ (See screening guidelines on page 37.) In brief, the latest recommendations target screening to those women most likely to benefit (i.e., certain age groups) while extending screening intervals to reduce harms associated with over-screening and over-diagnosis of HPV infections and cytology changes; the recommendations also address the role and use of newer screening technology, such as HPV testing.¹⁷⁶

Cervical cancer is now one of the most successfully controlled cancers in developed countries.¹⁷⁴ With the approved vaccine for immunization against the human papillomavirus (HPV) in young girls, there is potential for further reducing the occurrence of cervical cancer. In developing countries, where the burden of cervical cancer is high, the comprehensive control of cervical cancer through access to the HPV vaccine, screening and treatment should be a priority. The GAVI Alliance, a global public-private partnership dedicated to improving access to immunizations in low-resource countries, recently announced its decision to support the introduction of the HPV vaccine in the world's poorest countries. Contingent on successful negotiations with vaccine manufacturers and national governments, the effort could deliver the vaccine to up to two million girls in nine developing countries by 2015. As part of its longstanding efforts in cervical cancer prevention globally, the American Cancer Society played a strong role in advocating for this decision.

HPV Vaccine and Prevention of Cervical Cancer and Other Genital Cancers

HPV is the most common sexually transmitted infection in the US, with approximately 6.2 million people becoming newly infected annually.¹⁷⁷ There are more than 100 types of HPV, more than 40 of which can infect the genitals. Although most HPV infections are benign and transient, virtually all cervical cancers are causally related to persistent HPV infections. Approximately 70% of cervical cancers are caused by HPV types 16 or 18.¹⁷⁴ Vaccines have been developed against HPV-16 and HPV-18 and other subtypes; recent clinical trials show that these vaccines are effective in preventing persistent new infections and in reducing rates of precursor lesions (adenocarcinoma in situ or intraepithelial neoplasia) in the cervix.^{178,179} Made from noninfectious HPV-like particles, these vaccines offer a promising new approach to the prevention of cervical cancer, as well as other HPV-associated conditions (e.g., vulvar, anal, and oral cavity cancers, as well as genital warts).¹⁷⁷

The two FDA-approved vaccines for the prevention of the most common types of HPV infection that cause cervical and other HPV-associated cancers are Gardasil and Cervarix. Gardasil, which protects against four types of HPV including types 16 and 18, and Cervarix, which protects against HPV types 16 and 18 only, have been approved for use in females 9 to 26 years of age. In 2011, the use of Gardasil was also approved for males 9 to 26 years of age to prevent genital warts, anal cancer, and associated precancerous lesions (about 90% of anal cancers have been

linked to HPV infection).¹⁸⁰ The HPV vaccine is administered in three doses over the course of six months. To be most effective, it should be given before a person becomes sexually active. The accompanying sidebar includes the latest updates from the Advisory Committee on Immunization Practices (ACIP), the federal entity charged with making recommendations for the administration of vaccines to the pediatric and adult populations.^{181,182}

Based on ongoing assessments of vaccine safety information, the FDA and the Centers for Disease Control and Prevention (CDC) continue to find that vaccines are safe and that the side effects, which include pain or tenderness at the injection site, are mild.¹⁸³ In January 2007, the Society published its own recommendations for HPV vaccine use, which are generally consistent with those of the ACIP, although at present the Society has no recommendation regarding the use of HPV vaccine in males.¹⁸⁴

The HPV vaccine cost in the US is approximately \$130 per dose (or \$390 for the entire three-dose series during one year), excluding the cost of administering the injections and any physician's charge. Most large health insurance companies do include ACIP-recommended vaccines as a plan benefit, and most have agreed to cover the HPV vaccine. However, affordability concerns may be an issue among private health care providers, because some have experienced financial barriers to purchasing the HPV vaccine.¹⁸⁵

The HPV vaccine is available in all 50 states through the federal Vaccines for Children (VFC) program, which covers vaccine costs for children and teens who do not have insurance and for some children and teens who are underinsured or eligible for Medicaid.¹⁷⁷ The CDC has implemented the Pre-teen Vaccine Campaign to inform parents, caregivers, family physicians, and

HPV Vaccine Recommendations from the Advisory Committee on Immunization Practices*

Females

- Routine vaccination at 11 to 12 years of age (may start at 9 years of age) with 3 doses of either Cervarix or Gardasil
- Vaccination at 13 to 26 years of age for those who have not been previously vaccinated or have not completed the 3-dose series

Males

- Routine vaccination at 11 to 12 years of age (may start at 9 years of age) with 3 doses of Gardasil
- Vaccination at 13 to 21 years of age for those who have not been previously vaccinated or have not completed the 3-dose series; males 22 to 26 years of age may also be vaccinated
- Vaccination of men through 26 years of age who have a weakened immune system (e.g., due to HIV infection) or who have sex with men

*The Advisory Committee on Immunization Practices issues official, federal recommendations for the use of vaccines in the US that are published by the Centers for Disease Control and Prevention. The above recommendations are current as of July 1, 2012.^{181,182}

For additional information, visit the following Web sites:
cdc.gov/vaccines/pubs/vis/downloads/vis-hpv-gardasil.pdf.
cdc.gov/vaccines/pubs/vis/downloads/vis-hpv-cervarix.pdf

pediatricians about the new vaccination recommendations for 11- and 12-year-olds. Research shows that pre-teens generally do not get preventive health care and visit the doctor only when they are sick. One goal of this campaign is to encourage parents

Table 4C. HPV Vaccination Coverage among US Adolescents Aged 13-17 Years, by Race/Ethnicity and Poverty, 2011

Characteristic	Girls		Boys	
	% Initiation (> 1 dose)	% Completion rate*	% Initiation (> 1 dose)	% Completion rate*
Race/Ethnicity				
White (non-Hispanic)	47.5	74.8	5.6	25.9
African American	56.0	60.8	10.6	–
Hispanic	65.0	69.4	14.9	29.0
American Indian and Alaska Native	59.4	71.1	–	–
Asian American (non-Hispanic)	55.8	70.5	–	–
Poverty Level**				
Below poverty	62.1	66.4	14.1	28.9
At or above poverty	50.1	72.6	6.7	28.5
Total	53.0	70.7	8.3	28.1

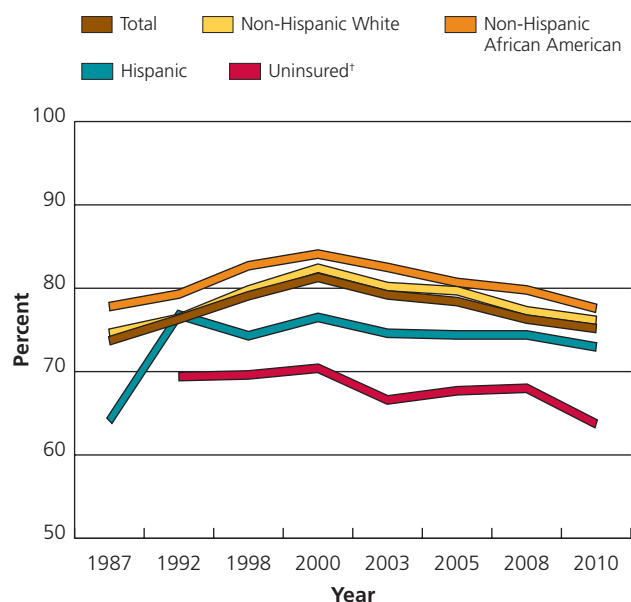
* The proportion of adolescents with at least one dose who completed the 3-dose series. Not available data denoted as “–.”

** A definition of “below poverty” is based on the adolescents’ family income that is less than the federal poverty levels based on household characteristics.

Source: National Immunization Survey-Teen (NIS-Teen); *MMWR Morb Mortal Wkly Rep.* 2012; 61(34):671-677.

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Figure 4B. Pap Test within the Past Three Years*, Women 18 and Older, among Race/Ethnic Categories and the Uninsured†, US, 1987-2010



*Estimates for race and ethnic groups are age adjusted to the 2000 US standard population. †Estimates for the uninsured group are for women 18 to 64 years of age and are not age adjusted. (see Statistical Notes for more information on age-adjustment). ‡Estimate for the uninsured group is for the year 1993.

Source: 1987-2003: National Cancer Institute. Cancer Trends Progress Report – 2007 Update. Available at progressreport.cancer.gov. Accessed September 10, 2009. Centers for Disease Control and Prevention, National Center for Health Statistics, Health, United States, 2008, With Special Feature on the Health of Young Adults. Hyattsville, MD: 2009. 2005, 2008, 2010: National Health Interview Survey Public Use Data File 2005, 2008, 2010, National Center for Health Statistics, Centers for Disease Control and Prevention, 2006, 2009, 2011. American Cancer Society, Surveillance Research, 2013

Table 4D. Pap Test, Women 21-65, US, 2010

Characteristic	% Pap test within past 3 years*
Age (years)	
21-30	84.1
31-40	84.7
41-50	82.5
51-65	80.8
Race/ethnicity	
Hispanic/Latino	78.7
White (non-Hispanic)	83.4
African American (non-Hispanic)	85.0
American Indian/Alaska Native†	78.7
Asian American (non-Hispanic)‡	75.4
Education§	
11 or fewer	69.4
12	77.7
13-15	85.3
16 or more	89.0
Health insurance coverage	
No	63.8
Yes	85.1
Immigration¶	
Born in US	85.0
In US fewer than 10 yrs	67.1
In US 10+ years	77.8
Total	83.0

*A Pap test within the past 3 years for all women 21 to 65 years of age and with intact uteri (age adjusted to the 2000 US standard population, see Statistical Notes for more information). †Estimates should be interpreted with caution because of the small sample sizes. ‡Does not include Native Hawaiians or other Pacific Islanders. §Women 25 years of age 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 2010, National Center for Health Statistics, Centers for Disease Control and Prevention, 2011. American Cancer Society, Surveillance Research, 2013

to take their pre-teens in for the recommended checkup for 11- or 12-year-olds, which is endorsed by the American Academy for Pediatrics, the American Academy of Family Physicians, and the CDC.¹⁸⁶

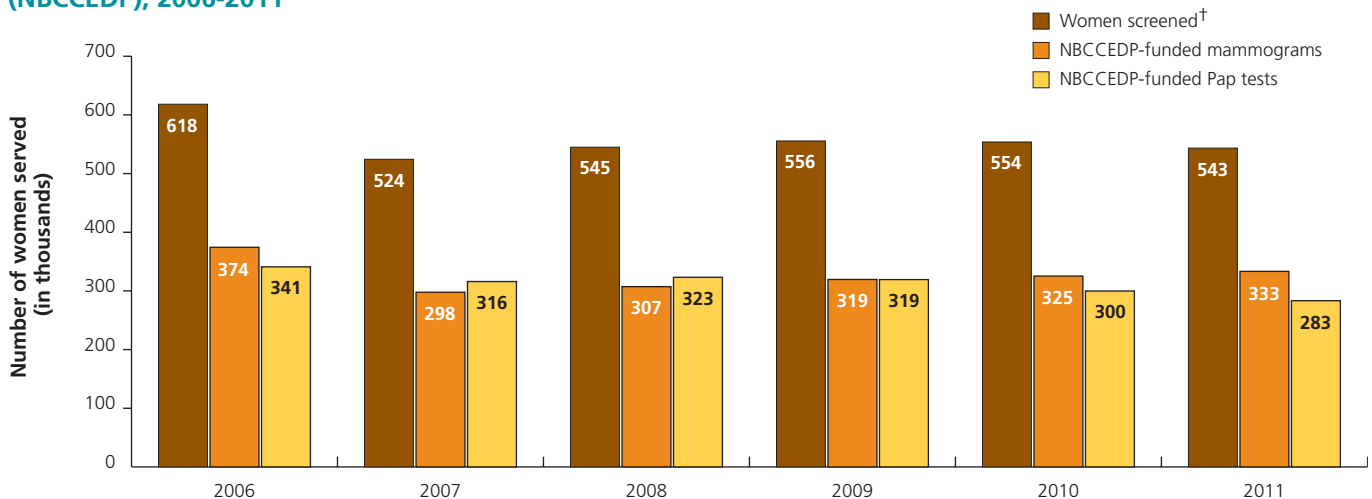
A CDC report based on analysis of the National Immunization Survey of Teens noted that despite increases with routine adolescent vaccines in the past 6 years, HPV vaccine utilization among adolescent females lags behind other recommended vaccines such as tetanus, diphtheria, and acellular pertussis. Also in this report, trend data for the period of 2007 to 2011 showed that uptake of the HPV vaccine initiation (at least one of the three-dose HPV vaccination series) among US girls 13 to 17 years of age increased from 25.1% to 53.0% and the uptake of > 3 doses of HPV vaccination rose from 18% to 34.8%.¹⁸⁷ In 2011, an estimated two-thirds (70.7%) of girls had the complete three-shot vaccine series; however, rates of completion were significantly lower in African American teens (60.8%) compared to other race or ethnic groups and in teens living below the poverty level (66.4%) compared to those living at or above the poverty level (see Table

4C, page 41). In US adolescent boys, HPV vaccination initiation increased from 1.4% in 2010 to 8.3% in 2011. The low vaccination coverage status in boys likely reflects the timing of the ACIP recommendations, which were issued in late 2011.¹⁸⁷

At the state level, coverage estimates for > 1 dose of HPV among adolescent girls ranged from 31.9% (Mississippi) to 76.1% (Rhode Island), and for > 3 doses of HPV, from 15.5% (Arkansas) to 56.8% (Rhode Island). Southern states had lower HPV vaccination rates compared with states in the Northeast and West (see Table 4E, page 44).

The promise of cervical cancer prevention from a broad public health perspective can be fully realized only if the HPV vaccine reaches those subgroups of women for whom access to cervical cancer screening services is especially challenging, particularly immigrants, those living in rural areas, low-income and uninsured females, and others who have limited access to health care

Figure 4C. Number of Women Screened* in the National Breast and Cervical Cancer Early Detection Program (NBCCEDP), 2006-2011*



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

Source: National Breast and Cervical Cancer Early Detection Program, Centers for Disease Control and Prevention, 2012.

American Cancer Society, Surveillance Research, 2013

services. Therefore, the Society supports and advocates for the widespread availability and use of the vaccine consistent with published guidelines.^{184,188,189} Legislators in at least 41 states and the District of Columbia have introduced legislation to require, fund, or educate the public about the HPV vaccine; to date, 21 states have enacted such legislation.^{190,191}

To improve vaccine coverage in the population, there should be expanded implementation of strategies known to improve vaccination coverage – such as education of potential age-eligible vaccine recipients, increased access to vaccination services in medical and complementary settings (i.e., pharmacies), and use of practices shown to improve vaccination coverage, including reminder-recall systems as well as removal of administrative and financial barriers to vaccination.^{188,192,193}

It is important to remember that the HPV vaccines supplement rather than replace cervical cancer screening because they do not provide protection against all types of HPV that cause cervical cancer. Thus, women in the appropriate age groups should continue to receive regular cervical cancer screening.¹⁸⁴

Pap Test Screening in the US

- According to data from the 2010 NHIS, 83.0% of women 21 to 65 years of age reported having had a Pap test within the past three years.¹⁶⁹ Increases in Pap test use have occurred among women of all racial and ethnic groups (Figure 4B) except in uninsured women.
- In 2010, the prevalence of Pap test use varied by race and ethnicity: African American (85.0%) and white women (83.4%) were most likely to have had a recent test, and Asian women (75.4%) were least likely (Table 4D).

- In 2010, the prevalence of recent Pap test use was lowest among women with no health insurance (63.8%) and recent immigrants (67.1%) (Table 4D).

State-level Pap Test Screening

- Across the states surveyed by the BRFSS in 2010 (Table 4E, page 44), the recent Pap test percentage among women 21 to 65 years of age with an intact uterus ranged from 80.2% in Arkansas to 93.0% in Massachusetts.

Programs to Increase the Rate of Breast and Cervical Cancer Screening

The CDC's National Breast and Cervical Cancer Early Detection Program (NBCCEDP) provides low-income, uninsured, and underinsured women with access to timely, high-quality screening exams for the early detection of breast and cervical cancers and diagnostic services.¹⁹⁴ The program is currently implemented in all 50 states, the District of Columbia, five US territories, and 12 American Indian/Alaska Native organizations. More than 50% of the women screened are from racial/ethnic minority groups. Since 1991, the NBCCEDP has served more than 4.2 million women, provided more than 10.4 million screening examinations, and diagnosed more than 54,200 breast cancers, 144,460 precancerous cervical lesions, and 3,100 cases of invasive cervical cancer.¹⁹⁴

In order to locate women eligible to receive services, state programs funded by NBCCEDP conduct outreach to priority populations (i.e., older women for breast cancer screening, women rarely or never screened for cervical cancer, and racial and ethnic minority women). Reaching those populations can

Table 4E. HPV Vaccination Coverage among Adolescent Girls, Pap Test, Women 21 to 65 Years, by State, US.

	% HPV Vaccination, 2011		% Recent Pap Test*, 2010		
	> 1 dose	3 doses	21-65 years	No usual source of medical care [†]	No health insurance [‡]
Alabama	49.5	31.2	86.4	72.2	73.5
Alaska	59.5	40.4	85.6	70.7	70.3
Arizona	55.3	36.7	85.9	68.6	67.4
Arkansas	36.1	15.5	80.2	61.8	62.5
California	65.0	42.9	86.7	76.4	75.5
Colorado	45.9	25.3	86.5	70.2	71.4
Connecticut	60.5	43.0	91.7	79.1	79.0
Delaware	60.2	46.8	87.7	65.9	64.9
District of Columbia	55.0	36.0	91.4	82.5	75.3
Florida	50.0	35.3	85.1	68.3	66.0
Georgia	48.4	30.0	88.4	75.3	73.5
Hawaii	73.1	50.9	84.2	64.8	62.3
Idaho	45.5	30.0	81.4	65.7	70.0
Illinois	51.6	34.0	88.1	69.8	72.1
Indiana	40.8	28.4	84.5	67.1	65.6
Iowa	53.5	40.7	88.7	63.2	68.1
Kansas	37.2	21.9	87.4	71.5	73.4
Kentucky	46.0	30.5	84.6	71.1	73.6
Louisiana	63.0	36.3	87.7	75.6	78.3
Maine	56.1	44.5	91.9	70.0	77.5
Maryland	45.7	29.9	90.6	78.9	78.3
Massachusetts	61.1	48.5	93.0	71.7	69.7
Michigan	55.6	31.6	88.9	66.3	72.7
Minnesota	55.5	35.1	91.7	83.9	74.4
Mississippi	31.9	19.6	83.6	68.0	68.5
Missouri	49.5	30.8	85.5	67.5	64.7
Montana	52.9	39.8	83.5	64.6	69.6
Nebraska	59.0	32.6	86.7	63.1	70.5
Nevada	55.3	30.9	82.8	63.7	58.7
New Hampshire	65.8	46.0	88.5	70.1	73.6
New Jersey	55.5	38.7	88.6	73.0	73.8
New Mexico	58.1	29.7	84.8	70.6	73.7
New York	46.6	34.2	88.4	72.1	71.0
North Carolina	54.4	32.3	87.8	75.9	74.0
North Dakota	51.2	27.8	88.8	76.7	76.5
Ohio	45.5	32.6	85.6	61.2	64.8
Oklahoma	49.8	27.7	81.0	67.1	68.8
Oregon	68.6	38.5	80.5	49.5	51.5
Pennsylvania	51.9	41.0	85.4	56.7	61.8
Rhode Island	76.1	56.8	90.3	76.1	77.2
South Carolina	38.7	23.3	87.0	70.7	73.3
South Dakota	58.1	50.1	88.5	71.0	78.7
Tennessee	46.0	27.2	85.8	63.8	65.1
Texas	48.8	31.5	82.3	63.7	66.9
Utah	53.3	20.4	80.3	71.1	69.4
Vermont	63.0	50.1	88.8	63.3	71.6
Virginia	46.9	29.8	89.1	81.5	72.8
Washington	66.5	40.0	86.6	73.1	71.5
West Virginia	50.6	28.6	82.8	69.9	70.5
Wisconsin	65.7	46.2	90.9	70.6	75.5
Wyoming	60.9	40.9	83.6	67.9	63.4
United States§	53.0	34.8	86.7	70.6	70.2
Range	31.9-76.1	15.5-56.8	80.2-93.0	49.5-83.9	51.5-79.0

*A Pap test within the preceding three years for women 21 to 65 years of age with intact uteri. †Among women, 21-65 years of age, with no personal doctor or health care provider, % who have had a Pap test within the past 3 years. ‡Among women, 21-65 years of age, who did not have any kind of health care coverage, including health insurance, prepaid plans such as HMOs or government plans such as Medicare, % who have had a Pap test within the past 3 years. §See Statistical Notes for definition.

Source: National Immunization Survey-Teen, 2011; *MMWR Morb Mortal Wkly Rep* 2012; 61(34):671-677. Behavioral Risk Factor Surveillance System 2010, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 2012.

American Cancer Society, Surveillance Research, 2013

be difficult and costly and requires ongoing efforts with community partners and health care providers.¹⁹⁴ In the most recent period (2007-2011), figures indicate little change in the number of eligible women served by the NBCCEDP (Figure 4C, page 43). Studies estimate that approximately 12.5% of NBCCEDP-eligible women 40 to 64 years of age are screened for breast cancer, and 8.5% of eligible women 18 to 64 years of age are screened for cervical cancer through the program.¹⁹⁴

The Society and ACS CAN continue to advocate for additional NBCCEDP funding at both the state and federal level, and are also partnering with state health departments and other key organizations to implement best practices in communities that could strengthen the NBCCEDP. In addition, the Society and ACS CAN have worked hard to guarantee that every woman has access to proven screening exams by ensuring that health insurance coverage of early detection services be part of the Affordable Care Act (ACA). As of 2010, all new health insurance plans and Medicare are required to cover preventive services rated “A” or “B” by the US Preventive Service Task Force, which includes Pap and mammography screening, at no cost to patients. This requirement will be extended in 2014 to cover all insurance companies enrolled in state health insurance exchanges and individuals newly covered through the ACA’s expansion of Medicaid.

The Breast and Cervical Cancer Prevention and Treatment Act of 2000 gave states the option to provide medical assistance through Medicaid for follow up and treatment for women diagnosed with breast or cervical cancer through the NBCCEDP; all 50 states and the District of Columbia have elected to provide this coverage.¹⁹⁴ Currently, the Society and ACS CAN are working to ensure that state Medicaid dollars supporting the treatment program are protected.

Colorectal Cancer Screening

Colorectal cancer (CRC) is the third leading cause of cancer death in the US in men and women. Promoting CRC screening is a major priority for the American Cancer Society, because screening can reduce death rates from CRC both by preventing the disease and by detecting it at earlier, more treatable stages. The relative five-year survival rate is 90% for CRC patients diagnosed at an early, localized stage; however, only 39% of cases are diagnosed at this stage.¹ CRC can also be prevented through screening because precancerous polyps, from which these cancers usually develop, can be identified and removed.^{195,196} Of the 50,830 people expected to die of CRCs in 2013, screening (or use of early detection tests) could have saved more than half of them.¹⁹⁷ In the past decade, there has been unprecedented progress in reducing CRC incidence and death rates; recent studies have shown that these declines can be attributed to improved CRC screening utilization, risk-factor reduction (e.g., declining tobacco use), and improved treatments.¹⁹⁸

Table 4F. Colorectal Cancer Screening, Adults 50 and Older, US, 2010

Characteristic	% Fecal Occult Blood Test*§	% Endoscopy ^{†§}	% Combined FOBT/ Endoscopy ^{†§}
Gender			
Male	9.0	57.4	60.2
Female	8.6	55.6	58.3
Age (years)			
50-64	8.0	52.3	55.2
65+	9.7	61.2	63.7
Race/ethnicity			
Hispanic/Latino	5.6	45.3	47.0
White (non-Hispanic)	9.2	58.5	61.5
African American (non-Hispanic)	8.4	53.0	55.5
American Indian and Alaska Native¶	6.1	46.5	48.1
Asian American (non-Hispanic)#	6.9	44.5	45.9
Education (years)			
11 or fewer	5.8	42.1	43.9
12	6.8	51.9	54.2
13 to 15	11.0	59.5	63.1
16 or more	10.4	66.7	69.2
Health insurance coverage			
No	1.6	17.8	18.8
Yes	9.2	59.4	62.2
Immigration**			
Born in US	9.2	58.0	60.9
Born in US Territory	4.7	53.3	55.6
In US fewer than 10 years	1.7	24.1	25.3
In US 10 years or more	6.5	46.5	48.4
Total	8.8	56.4	59.1

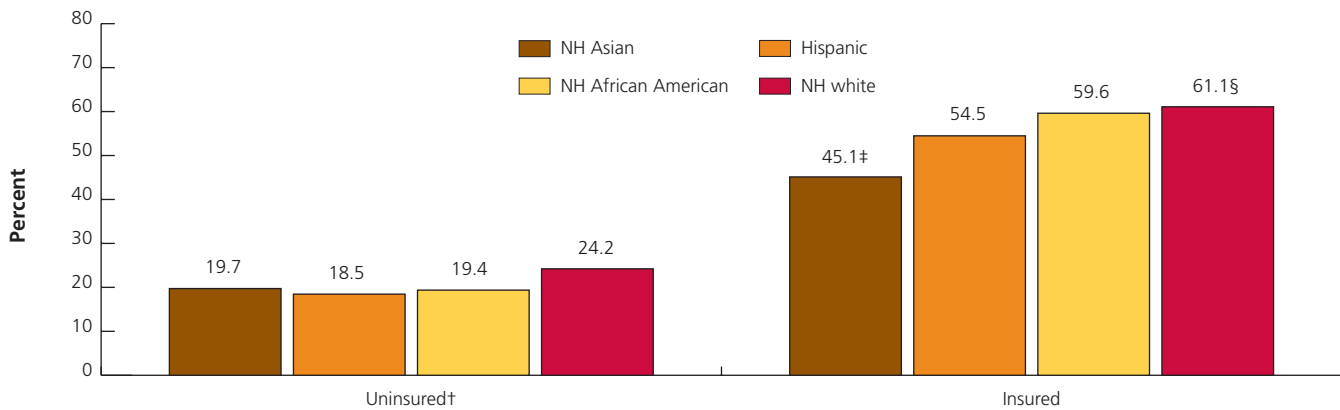
Note: The 2010 estimate for endoscopy and combined FOBT/endoscopy are not comparable to estimates from 2008 and prior because of changes in questions assessing endoscopy use. †A sigmoidoscopy within the past five years or a colonoscopy within the past 10 years. ‡Either a fecal occult blood test within the past year, sigmoidoscopy within the past five years, or a colonoscopy within the past 10 years. §Percentages are age adjusted to the 2000 US standard population. See Statistical Notes for more information. ¶Estimates should be interpreted with caution because of the small 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.

Source: National Health Interview Survey Public Use Data File 2010, National Center for Health Statistics, Centers for Disease Control and Prevention, 2011.

American Cancer Society, Surveillance Research, 2013

The American Cancer Society and other organizations have developed and promoted CRC screening guidelines for more than three decades. In March 2008, the Society, the American College of Radiology, and the US Multisociety Task Force on Colorectal Cancer (a consortium representing the American College of Gastroenterology, the American Society of Gastrointestinal Endoscopy, and the American Gastroenterological Association) released updated CRC guidelines. These guidelines categorize screening methods into two distinct groups: tests that primarily detect cancer, and structural exams that detect

Figure 4D. Colorectal Cancer Screening*, Adults 50 to 64 Years, by Race/Ethnicity and Insurance Status, US, 2010



NH: non-Hispanic *Either a fecal occult blood test within the past year or sigmoidoscopy within the past 5 years or colonoscopy within the past 10 years (age adjusted to the 2000 US standard population, see Statistical Notes for more information). †The uninsured are those who did not report having health insurance at the time of the interview. There are no significant differences in test rates between race and ethnic groups. Insured: ‡NH Asians are significantly less likely to be tested compared to NH whites, NH African Americans, and Hispanics; §Hispanics are significantly less likely to have been tested than NH whites.

Source: National Health Interview Survey Public Use Data File 2010. National Center for Health Statistics, Centers for Disease Control, 2011.

American Cancer Society, Surveillance Research, 2013

both cancer and precancerous adenomatous polyps (and thus have a greater potential to contribute to cancer prevention). The guidelines also highlight the potential of some newer screening methods, as well as the importance of quality in CRC screening by delineating a number of quality factors required to attain optimal benefits from screening. There are several recommended methods for colorectal cancer screening. (For American Cancer Society screening guidelines, see page 37.) Methods in the cancer detection group consist of stool home-collection kits – the guaiac-based fecal occult blood test (gFOBT), the fecal immunochemical test (FIT), and the stool DNA test. The methods for structural examinations include flexible sigmoidoscopy, colonoscopy, CT colonography, and double-contrast barium enema. These tests not only find cancer, but also are more likely to result in the detection and removal of adenomatous polyps/lesions, which are associated with an increased risk of CRC.¹⁹⁵

Colorectal Cancer Screening in the US

Although utilization is improving, CRC screening prevalence continues to lag behind use of mammography and Pap testing.

According to the 2010 NHIS:

- Among adults 50 years of age and older, the use of any CRC screening test within recommended time intervals (either an FOBT within the past year or a sigmoidoscopy within the past five years or a colonoscopy within the past 10 years) increased between 2000 and 2010 (59.1%). The increase appears to be due to an increased use of colonoscopy, which increased to 56% in 2010, compared to use of home-based FOBT, which

declined from 17% in 2000 to 8.8% in 2010.¹⁹⁹ However, fecal tests (home-based FOBT or FIT) remain an important screening option (Table 4F, page 45).

- People with no health insurance coverage have significant access barriers and are less likely to be up to date with CRC screening compared to their insured counterparts, irrespective of race and ethnicity. Among the insured, Asian Americans and Hispanics are less likely to have had CRC screening than other racial/ethnic groups (Figure 4D). The prevalence of CRC screening is also lower among those with lower educational status and recent immigrants (Table 4F, page 45).

State-level Colorectal Cancer Screening

- Across the states surveyed in 2010, the percentages of adults 50 years of age and older who had a home-based FOBT (within the past year) ranged from 5.0% in Utah to 19.1% in California (Table 4G). CRC screening with endoscopy tests (either a sigmoidoscopy or colonoscopy within the past 10 years) ranged from 51.7% in West Virginia to 73.0% in Connecticut (Table 4G).

The increases in CRC screening may be attributed to multiple efforts to increase awareness of the importance of screening, expansions in coverage for colonoscopy screening by Medicare since 2001, changes in private health plan screening policies as a result of state legislation, increasing provider recommendations for screening, and the establishment of screening programs in certain states.²⁰⁰⁻²⁰² However, broader community efforts need to be intensified to increase availability and utilization of CRC

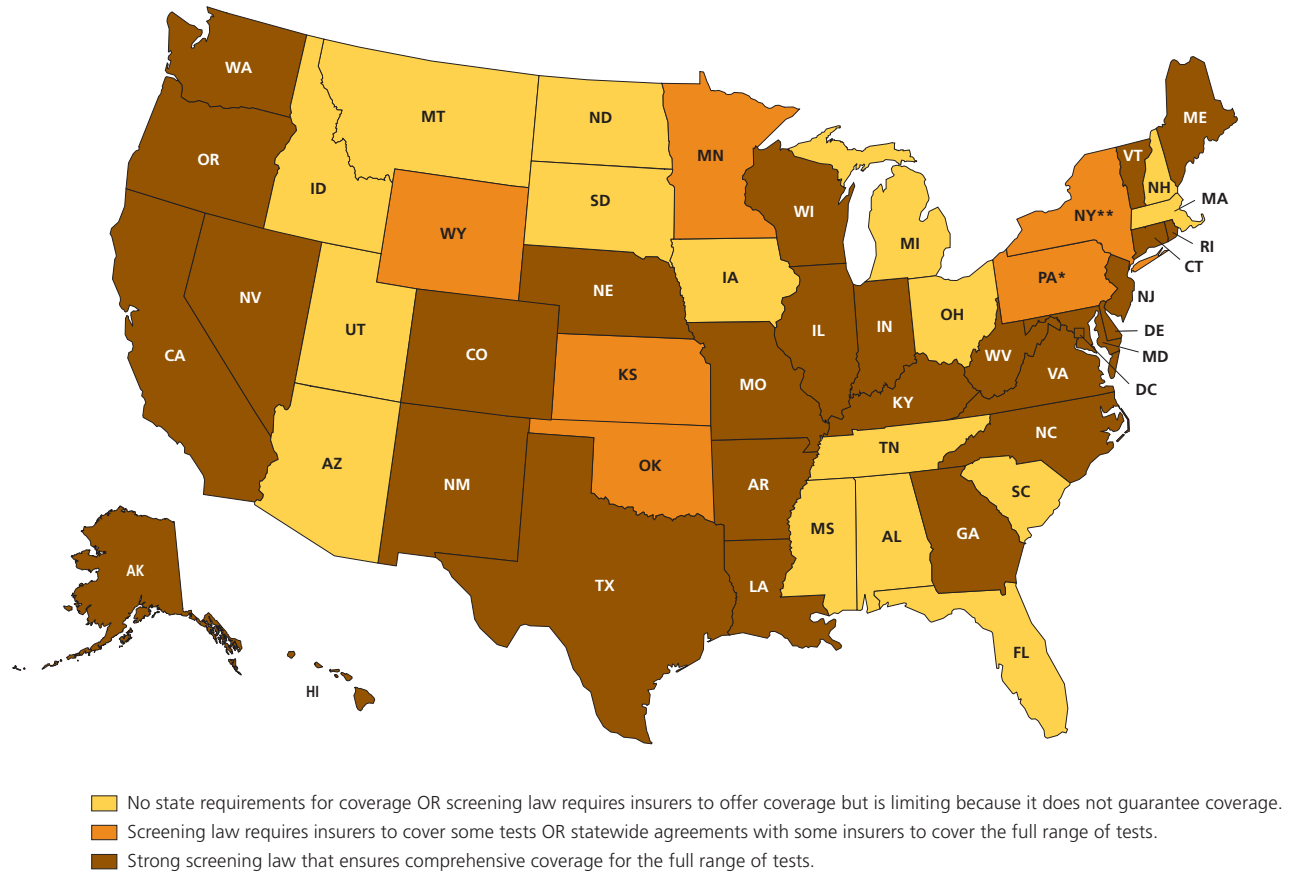
Table 4G. Colorectal Cancer Screening, Adults 50 and Older, by State, US, 2010

	% Fecal Occult Blood Test*					% Endoscopy†					Combined FOBT/Endoscopy past 10 years [¶]
	50 years and older	50 to 64 years	65 years and older	No usual source of medical care‡	No health insurance§	50 years and older	50 to 64 years	65 years and older	No usual source of medical care‡	No health insurance§	
Alabama	10.2	10.3	10.0	2.8	7.2	60.9	54.8	69.5	30.5	27.7	63.2
Alaska	7.2	6.1	9.8	2.9	4.8	58.4	53.9	69.8	36.1	26.1	58.7
Arizona	11.4	7.6	17.8	2.9	1.7	57.9	50.6	70.3	28.9	25.4	60.7
Arkansas	11.0	9.3	13.3	7.8	6.6	56.9	51.4	64.2	26.1	29.2	59.8
California	19.1	17.5	21.6	7.4	4.9	58.6	50.4	71.5	24.3	19.1	64.6
Colorado	12.0	10.4	15.0	5.6	5.7	61.1	56.1	70.1	33.2	32.4	64.7
Connecticut	11.5	9.9	13.7	3.1	7.1	73.0	70.2	77.0	40.3	46.1	74.2
Delaware	9.7	7.4	12.8	2.1	5.2	70.8	66.9	76.0	34.7	46.1	72.1
District of Columbia	16.2	13.8	20.8	3.3	4.9	63.9	59.5	72.3	31.4	27.1	67.3
Florida	14.7	11.3	19.1	4.7	6.6	64.9	56.6	75.4	32.6	29.7	67.9
Georgia	14.4	12.8	17.1	9.6	7.1	64.7	59.8	73.2	28.9	29.3	67.1
Hawaii	15.6	15.5	15.7	6.9	2.9	57.4	49.7	67.0	26.9	19.5	63.0
Idaho	8.5	7.6	10.0	3.7	3.2	55.5	48.5	66.3	26.4	20.8	57.5
Illinois	7.4	6.3	9.0	3.6	5.9	57.8	51.8	66.6	22.3	31.2	59.5
Indiana	10.3	8.7	12.6	2.9	4.7	59.6	53.9	67.9	19.8	32.2	62.0
Iowa	11.3	10.0	13.2	3.0	9.1	60.8	57.0	65.7	29.5	41.9	63.1
Kansas	12.1	9.1	16.5	4.2	6.1	60.6	55.4	68.3	24.1	24.5	63.8
Kentucky	8.9	7.1	11.5	6.5	6.7	60.7	55.9	67.8	23.1	24.8	62.4
Louisiana	13.0	11.7	15.0	9.7	11.6	57.9	51.6	67.6	27.4	32.3	61.1
Maine	12.0	10.5	14.0	4.0	7.8	71.7	67.3	78.0	30.2	40.2	73.9
Maryland	14.6	12.4	17.9	3.0	6.1	69.7	65.6	75.9	42.3	51.1	71.7
Massachusetts	12.6	10.0	16.3	8.4	7.4	72.6	71.0	74.9	34.1	52.3	74.1
Michigan	11.9	10.7	13.8	2.6	7.3	67.5	62.3	75.2	25.0	34.8	70.0
Minnesota	7.1	4.6	10.9	6.6	4.5	69.5	65.1	76.3	48.8	34.0	70.3
Mississippi	11.6	10.0	13.8	4.3	7.1	56.0	50.3	64.4	29.5	27.4	58.5
Missouri	9.1	8.3	10.2	3.2	5.4	60.9	57.4	65.8	26.2	21.0	63.2
Montana	8.9	7.8	10.6	2.5	7.3	56.6	50.1	66.5	24.8	24.6	59.3
Nebraska	9.2	7.4	11.7	5.4	6.1	58.2	52.6	65.7	27.6	33.2	61.0
Nevada	10.8	9.7	12.3	3.5	4.6	55.6	51.0	62.4	29.2	27.6	58.3
New Hampshire	10.8	9.1	13.6	3.1	7.5	72.7	70.1	76.7	28.7	39.0	74.8
New Jersey	11.8	10.3	14.1	4.7	4.9	62.3	58.0	68.6	33.0	29.6	64.8
New Mexico	10.3	9.5	11.4	4.1	6.7	57.2	52.0	64.7	24.5	26.0	60.3
New York	10.3	8.8	12.4	3.9	6.0	68.5	63.4	75.7	35.3	37.1	69.7
North Carolina	14.8	13.0	17.6	8.0	7.5	66.3	60.8	74.7	29.3	30.1	68.4
North Dakota	11.1	10.0	12.6	6.1	6.2	57.0	47.7	68.9	24.4	22.5	59.7
Ohio	12.0	9.6	15.4	6.1	7.1	60.6	55.0	68.6	25.0	28.1	63.4
Oklahoma	9.8	8.4	11.8	3.4	3.2	53.5	47.9	61.3	22.1	23.8	56.1
Oregon	11.3	10.1	13.1	5.1	3.3	61.8	54.8	72.2	23.6	23.6	64.6
Pennsylvania	9.6	8.0	11.7	4.3	5.0	64.9	60.5	70.7	25.2	32.0	66.9
Rhode Island	10.6	9.0	12.8	3.2	5.4	72.1	69.5	75.6	36.1	36.6	73.8
South Carolina	9.8	8.4	11.9	2.8	5.0	63.8	57.7	72.7	29.8	31.1	65.5
South Dakota	10.4	8.7	12.7	3.7	10.1	63.7	57.3	72.0	33.0	32.6	65.9
Tennessee	12.9	11.4	15.2	5.3	9.5	58.2	53.2	65.6	24.1	30.4	60.8
Texas	9.1	7.9	11.0	5.3	6.8	57.8	51.7	67.8	23.0	28.1	60.0
Utah	5.0	3.8	6.9	1.9	1.7	66.8	62.0	74.5	40.2	39.0	67.1
Vermont	9.2	7.1	12.4	5.4	2.0	69.8	65.7	76.1	33.1	32.0	71.3
Virginia	12.7	9.8	17.1	5.4	5.4	66.0	60.6	74.2	38.8	40.6	68.4
Washington	14.2	12.0	17.7	7.7	7.1	70.4	64.3	80.5	39.0	34.3	72.4
West Virginia	13.6	11.5	16.4	7.3	5.0	51.7	46.8	58.2	24.7	23.1	55.8
Wisconsin	8.8	7.4	11.0	2.7	5.3	65.6	61.0	72.7	28.7	37.7	68.3
Wyoming	8.1	7.2	9.5	3.6	4.8	55.5	49.2	65.9	27.5	32.1	57.8
United States#	12.1	10.3	14.7	5.3	6.1	62.7	56.9	71.2	28.7	29.5	65.3
Range	5-19.1	3.8-17.5	6.9-21.6	1.9-9.7	1.7-11.6	51.7-73	46.8-71	58.2-80.5	19.8-48.8	19.1-52.3	55.8-74.8

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

Source: Behavioral Risk Factor Surveillance System 2010, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 2011. American Cancer Society, Surveillance Research, 2012

Figure 4E. Colon and Rectum Cancer Screening Coverage Legislation, by State, US, 2013



Source: Health Policy Tracking Service & Individual State Bill Tracking Services. Provided by American Cancer Society Cancer Action Network.
 *Pennsylvania passed its law in 2008, but restricted the mandate to employers with more than 50 employees. **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.

screening, especially for persons with lower socioeconomic status who are more likely to lack health care coverage and to experience greater difficulties in accessing health care.^{200,201}

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 and ACS CAN are working with Congress to help pass federal legislation that will authorize a national program coordinated by the CDC to increase screening especially among medically underserved populations through outreach, education, and clinical services. In addition, in 2009, the CDC awarded grants (totaling about \$27 million) to 25 states and 4 tribal organizations for a 5-year period. The funded program, referred to as the CDC’s Colorectal Cancer Control Program (CRCCP), aims to increase population-level CRC screening among all persons 50 years of age and older in the participating states and tribes and

to reduce health disparities in CRC screening, incidence, and mortality by providing colorectal cancer screening services along with education and outreach for low-income people 50 to 64 years of age who are underinsured or uninsured. Local CRCCP program staff collaborates widely with local comprehensive cancer control program and Society staff and other partners to share resources more efficiently. This new program effort builds on a previous CDC Colorectal Cancer Screening Demonstration Program, funded from 2005-2009; for more information, see cdc.gov/cancer/colorectal and cdc.gov/cancer/crccp/about.htm.

Broadening insurance coverage for the full range of CRC screening tests is important to reduce the burden of the disease. The Society and ACS CAN have advocated for comprehensive colorectal cancer screening coverage for private and public plans at both the state and federal levels. To date, 27 states and the District of Columbia have passed screening legislation (Figure 4E). On the federal level, the Affordable Care Act (ACA)

requires most colorectal cancer screening exams to be covered at no cost to the patient.

The Society is also collaborating with the Centers for Medicare & Medicaid Services (CMS) to help increase CRC screening use among the 44 million Medicare beneficiaries. CMS promotes a wide range of interventions, including communicating with beneficiaries who are due for screening, informing physicians about Medicare CRC screening coverage, and including CRC screening measures in Medicare-quality improvement initiatives.

The Society and ACS CAN were successful in advocacy efforts to mandate coverage for an annual wellness visit for Medicare beneficiaries. As of January 2011, all Medicare beneficiaries have the option to see a provider for an annual wellness exam at no cost to patients. During the visit, doctors and their patients establish a personalized prevention plan to assess risk, medical history, and to develop a recommended screening schedule.

Initiatives

The National Colorectal Cancer Roundtable, cofounded by the American Cancer Society and the Centers for Disease Control and Prevention, is a national coalition of public, private, and voluntary organizations and invited individual experts dedicated to reducing the incidence of and mortality from colorectal cancer in the US through coordinated leadership, strategic planning, and advocacy. The roundtable works to stimulate key member organizations to act earlier, more effectively, and collaboratively in the area of colorectal cancer. It taps into the expertise of member organizations to create tools, conduct studies, and develop consensus on outreach and support projects that can advance the community's overall work in this area.

Many of these projects fill a key need among collaborating partners. Examples include the creation of the Family PLZ! Campaign, which helps people share their family health history; the publication of a policy paper on unexpected patient copays for colonoscopies; the development of an action plan for primary care clinicians guide looking to increase colorectal cancer screening rates in practice; and the development of a colorectal cancer evaluation 101 tool kit to support evaluation activities intended to increase awareness of colorectal cancer screening. Such initiatives enhance the efforts of each of the member organizations, including the American Cancer Society, and create a multiplier effect in the community's work against this disease. For more information, go to nccrt.org.

The American Cancer Society has developed an educational video and an information resource kit explaining the various colorectal cancer screening options to help consumers talk with their physicians and decide what is best for them. (More information on these and other programs can be found in *Colorectal Cancer Facts & Figures 2011-2013*, available at cancer.org/statistics or at cancer.org/colonmd.)

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. Mortality trends for prostate cancer have been declining, which is thought to be in part due to early detection using the prostate-specific antigen test (PSA, a blood test to assess the levels of a protein made by the prostate). However, the results of three large clinical trials designed to determine the efficacy of PSA testing were not in agreement. Two European studies found a lower risk of death from prostate cancer among men receiving PSA screening, while a US study did not.²⁰³⁻²⁰⁵ Further analyses of these studies are under way. Most experts agree that the current evidence is insufficient to recommend for or against routine testing for early prostate cancer detection.²⁰⁶

Table 4H. Prostate Cancer Test Use, Men 50 and Older, US, 2010

	% PSA in the past year*
Age (years)	
50-64	34.4
65+	49.6
Race/ethnicity	
Hispanic/Latino	24.3
White (non-Hispanic)	44.4
African American (non-Hispanic)	35.2
American Indian/Alaska Native†	N/A
Asian American (non-Hispanic)‡	34.4
Education (years)	
11 or fewer	26.2
12	34.8
13 to 15	43.0
16 or more	53.9
Health insurance coverage	
No	13.9
Yes	43.5
Immigration[§]	
Born in US	43.1
Born in US territory	28.3
In US fewer than 10 years	15.0
In US 10+ years	30.8
Total	41.3

Note: The 2010 estimate for PSA screening is not comparable to estimates from 2003 and prior years because of changes in the population surveyed. *A prostate-specific antigen test within the past year for men 50 and older who did not report that they had ever been diagnosed with prostate cancer (age adjusted to 2000 US standard population, see Statistical Notes for more information.). †Estimates could not be generated because of insufficient sample size. ‡Does not include Native Hawaiians or other Pacific Islanders. §Definition has changed such that individuals born in the US or in a US territory are reported separately from individuals born outside the US. Individuals born in a US territory have been in the US for any length of time.

Source: National Health Interview Survey Public Use Data File 2010, National Center for Health Statistics, Centers for Disease Control and Prevention, 2011. American Cancer Society, Surveillance Research, 2013

Table 4I. Prostate Cancer Test Use, Men 50 and Older, by State, US, 2010

	% 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	55.5	50.8	63.0	23.3	16.5	41.9	38.8	47.0	20.1	23.9
Alaska	42.5	36.4	60.0	22.5	15.8	45.1	43.6	49.1	24.5	18.1
Arizona	50.0	40.9	68.8	12.5	5.5	43.0	36.9	55.8	12.1	4.0
Arkansas	55.1	51.6	60.8	32.1	29.2	40.6	36.7	47.0	22.2	16.5
California	46.9	41.6	57.8	19.3	15.6	40.9	36.1	50.7	13.5	10.6
Colorado	49.0	44.2	59.3	20.6	21.7	46.2	42.7	53.7	18.7	19.2
Connecticut	58.8	54.8	66.2	18.1	25.3	59.6	57.6	63.3	19.1	21.8
Delaware	55.9	51.8	62.6	13.9	¶	47.8	46.0	50.8	9.0	¶
District of Columbia	53.8	50.0	63.3	23.0	¶	51.7	47.9	61.5	15.7	¶
Florida	60.2	51.1	74.2	21.6	19.4	47.7	41.2	58.0	16.5	14.3
Georgia	61.4	56.1	73.2	22.7	28.7	51.7	48.3	58.9	20.5	24.5
Hawaii	40.3	37.0	45.2	14.6	¶	27.3	24.3	31.7	7.1	3.7
Idaho	46.7	38.5	62.1	20.4	18.0	38.9	34.4	47.2	17.5	13.0
Illinois	45.8	40.4	56.2	23.8	17.4	39.9	35.1	49.2	26.3	20.7
Indiana	51.9	45.7	64.1	16.5	25.3	42.7	38.2	51.5	12.4	20.6
Iowa	51.7	45.9	61.4	20.1	29.2	48.6	44.2	56.1	15.6	27.9
Kansas	56.8	49.7	70.7	19.1	27.4	46.3	42.6	53.5	11.0	17.2
Kentucky	51.6	46.2	61.7	17.2	17.4	38.4	35.6	43.6	8.7	13.5
Louisiana	58.8	55.5	65.1	28.3	27.5	40.1	34.9	50.1	19.5	17.4
Maine	49.1	44.3	58.0	21.5	27.1	52.6	49.5	58.4	17.0	30.6
Maryland	58.5	53.9	67.3	22.8	23.8	55.4	53.6	58.7	16.5	23.2
Massachusetts	58.0	53.2	67.1	17.6	31.1	64.1	63.4	65.4	27.3	45.1
Michigan	54.6	48.8	66.0	10.0	17.2	51.6	48.9	56.8	15.0	30.3
Minnesota	49.8	42.5	64.5	27.8	22.7	47.7	43.9	55.7	27.7	19.7
Mississippi	54.8	48.3	66.6	19.1	22.3	39.4	34.4	48.7	15.7	17.2
Missouri	53.8	49.3	62.1	15.7	17.9	42.5	38.6	49.4	12.0	10.6
Montana	49.5	44.0	60.1	23.8	20.1	40.6	36.3	48.8	13.6	16.2
Nebraska	49.1	45.0	56.5	27.3	29.1	36.8	34.4	41.0	22.3	22.1
Nevada	53.4	46.9	64.6	14.9	25.5	35.9	31.3	44.0	16.6	23.3
New Hampshire	55.3	50.9	64.0	18.6	18.9	58.2	56.0	62.7	18.5	24.3
New Jersey	58.8	53.4	69.2	27.2	24.2	47.6	44.0	54.6	20.6	20.0
New Mexico	50.6	46.2	58.3	20.7	18.8	41.0	37.4	47.3	16.5	15.1
New York	58.9	51.8	71.3	26.6	32.3	50.5	47.3	56.2	22.8	22.3
North Carolina	58.5	52.8	69.2	22.7	19.2	56.4	51.9	64.9	18.7	18.3
North Dakota	48.8	43.0	58.9	20.0	18.0	42.8	37.1	53.0	15.4	16.8
Ohio	54.1	46.0	69.3	17.8	19.5	46.0	42.7	52.2	14.1	14.8
Oklahoma	48.4	43.1	57.7	17.4	12.4	35.5	32.6	40.6	9.8	12.0
Oregon	47.6	43.1	55.3	15.0	13.7	40.1	36.7	46.0	10.8	8.9
Pennsylvania	53.7	47.3	64.8	12.9	27.2	46.1	41.9	53.7	12.1	21.5
Rhode Island	58.2	54.2	66.0	20.1	24.0	62.7	60.4	67.1	20.7	27.0
South Carolina	56.8	50.8	67.7	24.4	26.9	45.0	40.7	52.9	16.6	21.1
South Dakota	60.7	55.0	70.7	21.5	28.1	47.4	44.8	51.9	14.3	21.4
Tennessee	50.4	44.4	61.5	21.3	15.6	41.9	37.4	50.2	15.5	8.7
Texas	53.8	48.8	64.0	19.0	28.4	43.1	41.0	47.3	14.8	20.2
Utah	48.5	43.9	57.9	17.8	22.0	43.6	42.4	46.2	13.9	20.6
Vermont	48.9	44.6	58.0	10.3	22.5	50.5	46.9	57.7	16.3	16.8
Virginia	56.4	50.5	67.1	16.6	33.0	50.5	47.6	55.7	19.3	34.7
Washington	45.8	41.1	55.3	19.5	14.9	43.9	40.9	50.2	17.6	13.7
West Virginia	54.1	48.9	62.4	20.0	19.2	36.0	29.6	46.3	12.5	9.9
Wisconsin	50.7	45.2	61.3	21.3	23.6	47.4	44.2	53.4	19.2	22.5
Wyoming	58.2	55.8	63.3	33.5	37.9	29.9	25.8	38.6	12.1	14.8
United States#	53.5	47.6	64.7	20.2	21.7	45.8	42.0	53.1	16.7	17.8
Range	40.3-61.4	36.4-56.1	45.2-74.2	10-33.5	5.5-37.9	27.3-64.1	24.3-63.4	31.7-67.1	7.1-27.7	3.7-45.1

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

Source: Behavioral Risk Factor Surveillance System 2010, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 2011. American Cancer Society, Surveillance Research, 2013

The American Cancer Society recommends that asymptomatic men who have at least a 10-year life expectancy have an opportunity to make an informed decision with their health care provider about whether to be screened for prostate cancer after receiving information about the uncertainties, risks, and potential benefits associated with PSA screening.²⁰⁶ Men at average risk should receive this information beginning at age 50; men at higher risk should receive this information at 40 or 45 years of age, depending on their particular risk profile.²⁰⁶ Asymptomatic men who have less than a 10-year life expectancy based on age and health status should not be offered prostate cancer screening.

Prostate cancer screening should not occur without an informed decision-making process. However, studies have shown that informed and shared decision-making measures are inconsistently utilized in clinical practice, and that when such discussions take place the content varies widely and frequently falls short of accepted standards.²⁰⁷ In an effort to address these shortcomings, the 2010 American Cancer Society guideline for the first time provided detailed recommendations to clinicians on the core factors related to prostate cancer screening and treatment that should be shared with men to enable them to make a truly informed decision about whether to be screened. The guideline also includes updated recommendations for the testing and follow up of men who choose to be screened for prostate cancer after a process of shared or informed decision making.²⁰⁶ The Society also created a decision aid to inform men about the potential benefits, limitations, and uncertainties associated with prostate cancer early detection and treatment. This aid links to decision aids from other organizations and other information and related materials (available at cancer.org/prostatemd) to prostate cancer screening.

Prostate Cancer Testing in the US

According to the 2010 NHIS:

- The prevalence of having a PSA test in men 50 years of age and older within the past year was 41.3% (Table 4H, page 49).
- Among men 50 years of age and older, those who had no health insurance, American Indian/Alaska Native men, and recent immigrants were the least likely to have a PSA test (Table 4H, page 49).

State-level Prostate Cancer Testing

- Across states (Table 4I), the prevalence of PSA testing in 2010 for men 50 years of age and older ranged from 40.3% in Hawaii to 61.4% in Georgia. The digital rectal exam (DRE) percentages in 2010 for men 50 years of age and older ranged from 27.3% in Hawaii to 64.1% in Massachusetts. For both of these tests, use was greater among men 65 and older than in those 50 to 64 years of age. Across all states, men 50 years of age and older who lacked a usual source of health care and uninsured men 50 to 64 years of age were significantly less likely to have had a recent PSA or a DRE.



Lung Cancer Screening

Among US men and women, lung cancer is the leading cause of cancer mortality, expected to account for 27% of all cancer deaths in 2013. Whereas lung cancer incidence and mortality rates have been declining over the past two decades in men, rates began to decrease only recently after a long period of increasing rates in women. These trends reflect historical differences in smoking initiation and cessation.

Until recently, screening to detect early lung cancer had not been shown to reduce mortality. Studies evaluating the efficacy of chest x-ray, analysis of cells in sputum, and fiberoptic examination of the bronchial passages to screen for lung cancers were not associated with a reduced risk of lung cancer death.²⁰⁸ However, the application of low-dose spiral computed tomography (LDCT) scans significantly outperformed chest x-ray in both sensitivity and the rate of detection of small, early stage lung cancers. Based on these results, prospective randomized trials were initiated in the US and Europe. The largest trial, the National Cancer Institute's National Lung Screening Trial (NLST), was designed to assess whether screening individuals at high risk for lung cancer with LDCT was associated with fewer lung cancer deaths than screening with chest x-ray. Launched in 2002, the NLST study included more than 53,000 current or former smokers (who quit within 15 years) with a minimum 30 pack-year (e.g., smoking one pack of cigarettes per day for 30 years) smoking history who were randomly assigned to three

lung cancer screenings with either LDCT or chest x-ray.²⁰⁹ The trial was stopped in October 2010 after early results showed 20% fewer lung cancer deaths in the group randomized to receive an invitation to LDCT screening compared with the chest X-ray group.²⁰⁹⁻²¹¹

Based on the results of the NLST, the American Cancer Society issued guidelines for lung cancer screening in 2013.²¹² The Society recommends that clinicians with access to high-volume, high-quality lung cancer screening and treatment centers should initiate a discussion about lung cancer screening with apparently healthy patients 55 to 74 years of age who have at least a 30 pack-year smoking history, and who currently smoke or have quit within the past 15 years. A process of informed and shared decision making with a clinician related to the potential benefits, limitations, and harms associated with screening for lung cancer with LDCT should occur before any decision is made to initiate lung cancer screening. Smoking cessation counseling remains a high priority for clinical attention in discussions with current smokers, who should be informed of their continuing risk of lung cancer. Screening should not be viewed as an alternative to smoking cessation.²¹²

In 2010, a national survey estimated the utilization of LDCT screening in high-risk subpopulations and found that 1.8% of high-risk smokers (high risk is defined as those with a smoking history of 30 or more pack-years) and 4.4% of high-risk former smokers reported having undergone such a test for lung cancer screening within the past year.²¹³

The possible risks associated with LDCT screening include cumulative radiation exposure from multiple scans and unnecessary biopsy and surgery in individuals who do not have lung cancer (false positives). Another legitimate concern is that some smokers might use LDCT imaging as an excuse to continue smoking. However, the best evidence to date is that an additional benefit of LDCT screening might be a positive effect on smoking cessation among smokers who choose to be screened. Some studies have shown higher rates of smoking cessation among those choosing to be screened by LDCT than are seen at the community level in unscreened groups.^{211,212} Therefore, smoking cessation efforts must accompany CT screening for adults who are current smokers.²¹²

Cancer Screening Obstacles and Opportunities to Improve Cancer Screening Utilization

Access to affordable, quality health care continues to be a fundamental policy priority for the American Cancer Society and ACS CAN. People who lack health insurance have less access to preventive care and are less likely to get timely cancer screening examinations.²¹⁴ Furthermore, studies have shown that those who lack health insurance are more likely to be diagnosed at an advanced stage of cancer, when survival rates are much lower and treatment is more expensive.^{164,172} These patients often face

much more difficult and far more extensive medical treatments, as well as a diminished quality of life – avoidable outcomes if they had the same level of access as insured patients to the current advances in cancer prevention, detection, and treatment options.

Because of the Medicare program, health insurance coverage is nearly universal among people 65 years of age and older.²¹⁵ In contrast, health insurance coverage in the population under the age of 65 varies depending on age, employment and citizenship status, and other factors. For example, 21.5% of adults 18 to 64 years of age had no health insurance coverage in 2011.²¹⁶ As a group, uninsured adults are more likely to have a lower income, to be Hispanic, American Indian/Alaska Native, or African American, or have less education. Among adults 18 to 64 years of age, it is estimated that 16.5% had Medicaid coverage and 55.1% had employer-sponsored coverage in 2011.^{215,216} Even among the employed, changes in employment status can also affect health care coverage.²¹⁶ Recent reports document that higher-paid workers are more likely than their lower-paid counterparts to have health insurance and health-related benefits, such as paid sick leave and coverage for preventive care services. Lower-paid workers and uninsured persons are much more likely to delay or forgo needed health care because of cost and to report difficulty paying medical bills.^{216,217}

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.^{218,219}

Studies have shown that people who receive a clinician's recommendation for cancer screening are more likely to be screened than those who do not receive a recommendation.^{218,219} Studies also have shown that adults who have had a recent checkup also are more likely to have been screened for cancer.²²⁰ To maximize the potential impact of interventions for improving cancer screening, a diverse set of strategies should be implemented. These include centralized or office-based systems, including computer-based reminder systems to assist clinicians in counseling age-/risk-eligible patients about screening, as well as organizational support systems to help manage referrals and follow up of cancer screening tests.²¹⁹ In addition, multiple interventions directed at patients (strategies to raise awareness about the importance of cancer screening), physicians (strategies for cancer screening counseling and follow up), and health care systems (strategies to ensure the delivery of high-quality and timely cancer screening) may provide the best approaches to improving rates of cancer screening.²¹⁹

Statistical Notes

Sample Surveys

In measuring the prevalence of certain behaviors in a population, it is usually costly and unfeasible to survey every person. Therefore, most population-based surveys are conducted by choosing a randomly selected sample of people to estimate the true prevalence in a population. Such surveys are considered to have high external validity; therefore, results are considered applicable to the entire population that the sample represents. All of the adult and youth statistics presented in this publication have been weighted and are estimates of the true prevalence in the population. The population-based survey methodology introduces sampling error to the estimated prevalence since a true prevalence is not calculated. In addition, a standard error is associated with the estimated prevalence and can be used to calculate the confidence interval. (See Other Statistical Terms, 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 40 years of age 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 40 years of age and older living in Florida in 2004.

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

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

Sample: A smaller group of people chosen from the population defined by the survey. The sample is chosen based on the age, race, ethnic, and gender demographics of a given 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 or state, or nationwide. Once the sample of the population has completed the survey, statistical analyses are conducted to extrapolate the surveyed group's responses to the entire population (city or state, or nationwide). For example, BRFSS data in

this publication are representative of all non-institutionalized, civilian adults with telephones. The YRBSS data in this publication are representative of all public and private high school students in grades nine through 12.

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

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

Comparison of survey estimates over time: When studying trends in risk factor and screening behavior estimates using this and prior *Cancer Prevention & Early Detection Facts & Figures* reports, it is important that readers pay particular attention to the footnotes in tables and figures that alert to changes in survey questions that may make comparisons over time inaccurate.

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 half-width ranges for the prevalence estimates. Example: The confidence interval range for obesity

among adults is between 0.8% and 2.5%. The narrowest confidence interval is around the percentage for Kansas (29.6%±0.8%) or (28.8, 30.4), and the percentage for Tennessee has the widest range of possible values (29.3%±2.5%) or (26.8, 31.8).

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. The distance between the prevalence estimate to the minimum or maximum of its 95% CI.

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

Confidence Interval (CI) Half-width Ranges for Percentages Listed in Tables by State, CPED 2013

Table	Description	95% CI half-width range
1A	Current cigarette smoking, high school students, total	± 1.2% to 6.5%
2A	Overweight, high school students, total	± 1.0% to 4.1%
	Met currently recommended levels of physical activity, high school students, total	± 1.4% to 4.7%
	Consumed 100% fruit juice or fruit two or more times per day, high school students, total	± 2.7% to 4.5%
	Ate vegetables three or more times per day, high school students, total	± 0.8% to 4.7%
2B	Clinical overweight, adults 18 and older	± 0.9% to 2.7%
	Clinical obese, adults 18 and older	± 0.8% to 2.5%
	No leisure-time physical activity, adults 18 and older	± 0.8% to 2.6%
	Met 2008 physical activity guidelines, adults 18 and older	± 0.7% to 2.2%
	Ate two or more fruit servings a day, adults 18 and older	± 0.8% to 2.3%
	Ate three or more vegetable servings a day, adults 18 and older	± 0.6% to 1.9%
4B	Recent mammogram, women 40 and older	± 1.3% to 5.2%
	Recent mammogram, women 65 and older	± 1.8% to 9.5%
4E	HPV vaccination, adolescent girls 13-17 years - >1 dose	± 5.9% to 13.8%
	HPV vaccination, adolescent girls 13-17 years - 3 doses	± 5.5% to 10.3%
	Recent Pap test, women 21-65 years	± 1.2% to 4.1%
4G	Recent fecal occult blood test, adults 50 and older	± 0.7% to 2.6%
	Recent sigmoidoscopy or colonoscopy, adults 50 and older	± 1.0% to 4.4%

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 conducted by the Centers for Disease Control and Prevention (CDC) and the National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP) of 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 ages 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. In past years of the survey, the prevalence estimates are only applicable to adults living in households with a residential telephone line. Beginning in 2011, data collection has expanded to include adults living in cellular phone-only households (no landlines). Improved weighting, adjustment, and estimation methods were developed to reduce the potential for bias and allow the survey to maintain validity in response to declining response rates and the incorporation of cellular telephone interviews. For more information, visit the BRFSS Web site at cdc.gov/brfss/.

National Health and Nutrition Examination Survey (NHANES). The NHANES is a survey of the CDC's National Center for Health Statistics (NCHS). The survey is designed to provide national prevalence estimates on the health and nutritional status of US adults and children, such as prevalence of major diseases, nutritional disorders, and potential risk factors. Data are gathered through in-person interviews and direct physical exams in mobile examination centers. Questions regarding diet and health are asked in the interview; the physical exam consists of medical and dental exams, physiological measurements, and laboratory tests. Three cycles of NHANES were conducted between 1971 and 1994; the most recent and third cycle (NHANES III) was conducted from 1988 to 1994. Beginning in 1999, NHANES was implemented as a continuous annual survey. For more information, visit the NHANES Web site at 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 18 years of age 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 cdc.gov/nchs/nhis.htm.

National Youth Tobacco Survey (NYTS). The NYTS was conducted by the CDC in 2004 and 2006, and the latest survey was conducted in 2009. The survey is designed to provide national data for public and private students in grades six through 12. It allows for the design, implementation, and evaluation of a comprehensive tobacco-control program with more detailed tobacco-related questions than the YRBSS, including those on nontraditional tobacco products such as bidis, secondhand smoke exposure, smoking cessation, and school curriculum. Data are gathered through a self-administered questionnaire completed during a required subject or class period. The NYTS was first conducted in fall 1999, again in spring 2000, and has subsequently been conducted every other year.

Tobacco Use Supplement to the Current Population Survey (TUS-CPS). The TUS-CPS is a National Cancer Institute (NCI)-sponsored survey of tobacco use that has been administered as part of the US Census Bureau's Current Population Survey in 1992-1993, 1995-1996, 1998-1999, 2000, 2001-2002, 2003, and 2006-2007. The Centers for Disease Control and Prevention (CDC) has been a co-sponsor of the survey with NCI since 2001-02. The TUS-CPS is a large, nationally representative sample of civilian, noninstitutionalized population ages 15 years and older and provides national, state, and some substate-specific estimates on smoking and other tobacco use in the US household population. About 70% of respondents conduct the survey by telephone, and 30% of respondents conduct the survey in person. Responses are mostly self-reports (about 20% are by proxy for a few measures of use). For more information, visit the TUS-CPS Web site at riskfactor.cancer.gov/studies/tus-cps/.

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 54.) Data are gathered through a self-administered questionnaire completed during a required subject or class period. The YRBSS is a biennial survey

that began in 1991. The state and local surveys are of variable data quality, and caution should be used in comparing data among them. Data from states and local areas with an overall response rate of 60% and appropriate documentation are considered weighted and are generalized to all public and private high school students in grades nine through 12 in the respective jurisdiction. However, data from states and local areas without an overall response rate of 60% and those with inadequate documentation are reported as 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 cdc.gov/HealthyYouth/yrbs/index.htm.

National Immunization Survey-Teen (NIS-Teen). The National Immunization Survey – Teen (NIS-Teen) is sponsored by the National Center for Immunizations and Respiratory Diseases (NCIRD) and conducted jointly by NCIRD and the National Center for Health Statistics (NCHS) and the Centers for Disease Control and Prevention. This study collects data by interviewing households in all 50 states, the District of Columbia, and selected

areas for oversampling. Before 2011, a random-digit-dialed, list-assisted landline telephone sample of households was used to monitor national, state, and selected local area vaccination coverage among children ages 13-17 years in the United States. As a result of the increase in cellular telephone usage, beginning in 2011, the NIS sampling frame was expanded from a single landline frame to dual landline and cellular telephone sampling frames. This change increased the representativeness of the sample characteristics. To assure the accuracy and precision of the vaccination coverage estimates, immunization data for surveyed adolescents are also collected through a mail survey of their pediatricians, family physicians, and other health care providers. The parents and guardians of eligible adolescents are asked during the telephone interview for consent to contact the adolescents' vaccination providers. Types of immunizations, dates of administration, and additional data about facility characteristics are requested from immunization providers that are identified during the telephone survey of households. The NIS-Teen's estimates of adolescent vaccination coverage reflect a comparison of information provided by both surveyed households and immunization providers.

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List of Tables and Figures

Tables

- 1A. Tobacco Use, High School Students, by State and City/County, US, 2011
- 1B. Current Cigarette Smoking, Adults 18 and Older, US, 2010
- 1C. Smoking-attributable Mortality Rate 2000-2004, and Tobacco Use, Adults, by State, US, 2009-2010, 2011
- 1D. Comprehensive Tobacco Control Measures, by State, US, 2013
- 2A. Overweight, Obesity, and Related Factors, High School Students, by State and City/County, US, 2011
- 2B. Overweight, Obesity, and Related Factors, Adults 18 and Older, by State, US, 2011
- 3A. Ultraviolet Radiation Exposure Behaviors, US High School Students and Adults 18 Years and Older, US, 2011, 2010
- 4A. Mammography, Women 40 and Older, US, 2010
- 4B. Mammography and Clinical Breast Exam, Women 40 and Older, by State, US, 2010
- 4C. HPV Vaccination Coverage among US Adolescents Aged 13-17 Years, by Race/Ethnicity and Poverty, 2011
- 4D. Pap Test, Women 18-65 and Older, US, 2010
- 4E. HPV Vaccination Coverage among Adolescent Girls, Pap Test, Women 21 to 65 Years, by State, US
- 4F. Colorectal Cancer Screening, Adults 50 and Older, US, 2010
- 4G. Colorectal Cancer Screening, Adults 50 and Older, by State, US, 2010
- 4H. Prostate Cancer Test Use, Men 50 and Older, US, 2010
- 4I. Prostate Cancer Test Use, Men 50 and Older, by State, US, 2010

Figures

- 1A. Cigarette Smoking Trends, 12th-graders, by Race/Ethnicity, US, 1977-2011
- 1B. Annual Number of Cancer Deaths Attributable to Smoking, Males and Females, by Site, US, 2000-2004
- 1C. Cigarette Smoking Trends, Adults 25 and Older, by Education, US, 1974-2010
- 1D. Annual Percentage Change in Tobacco Industry Marketing Expenditures for Cigarettes and Smokeless Tobacco, US, 1997-2007
- 1E. Trends in Exposure to Tobacco Marketing, Middle and High School Students, US, 2004-2009
- 1F. Funding for Tobacco Prevention, by State, US, Fiscal Year 2013
- 2A. Obesity Trends, Adolescents 12-19 Years, by Gender and Race/Ethnicity, US, 1976-2010
- 2B. Obesity Trends, Adults 20-74 Years, by Gender and Race/Ethnicity, US, 1976-2010
- 2C. Trends in Walking among US Adults, 2005 and 2010
- 3A. Indoor Tanning Minors' Access Restrictions, by State, US, 2012
- 4A. Mammography within the Past Two Years, Women 40 and Older, among Race/Ethnic Categories and the Uninsured, US, 1987-2010
- 4B. Pap Test within the Past Three Years, Women 18 and Older, among Race/Ethnic Categories and the Uninsured, US, 1987-2010
- 4C. Number of Women Screened in the National Breast and Cervical Cancer Early Detection Program (NBCCEDP) 2006-2011
- 4D. Colorectal Cancer Screening, Adults 50 to 64 Years, by Race/Ethnicity and Insurance Status, US, 2010
- 4E. Colon and Rectum Cancer Screening Coverage Legislation, by State, US, 2013

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