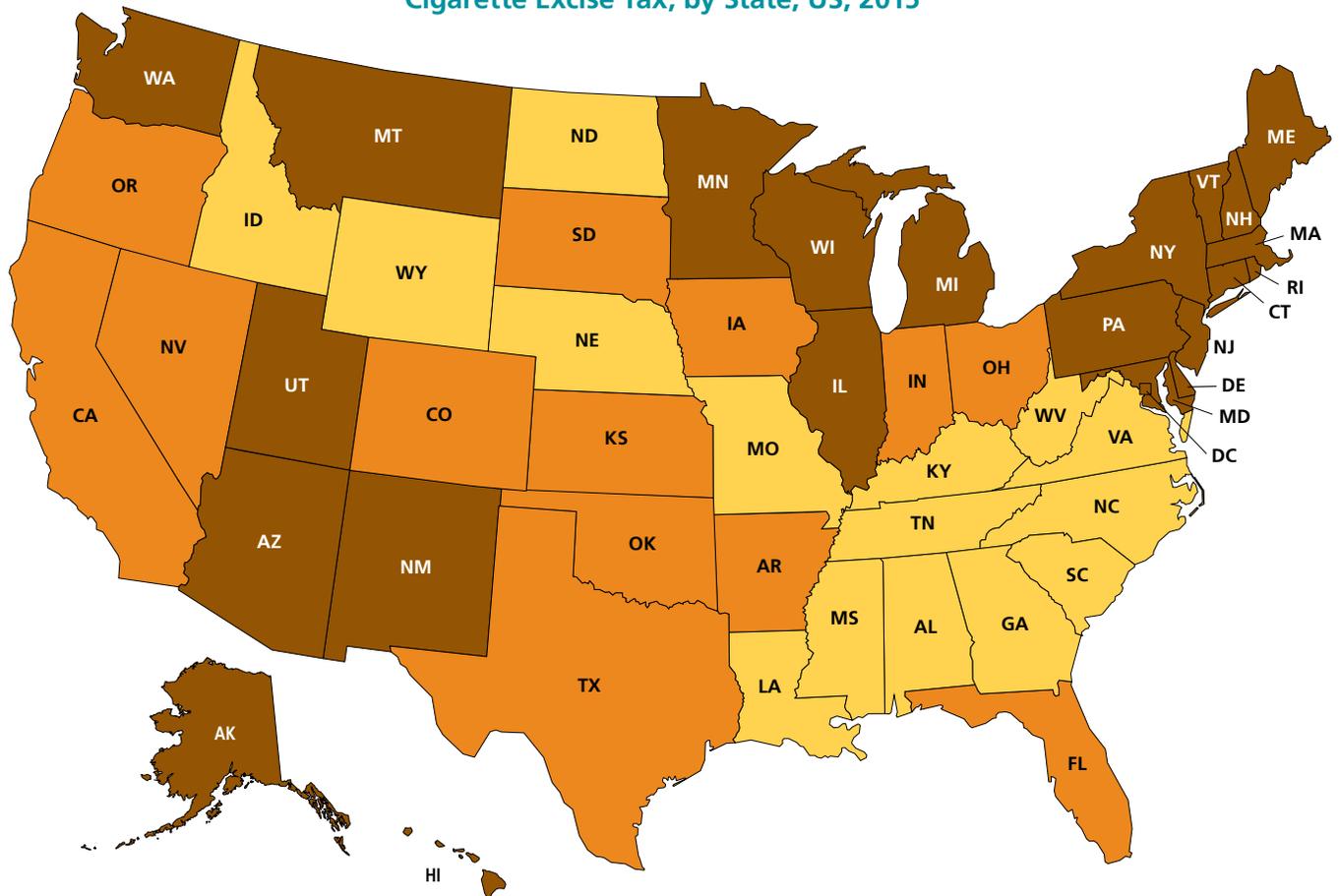


Cancer Prevention & Early Detection Facts & Figures

2015-2016

Cigarette Excise Tax, by State, US, 2015*



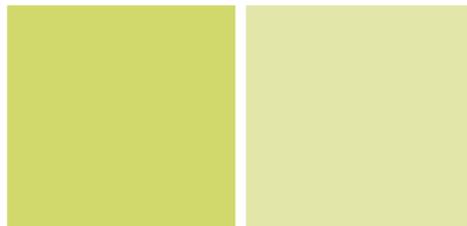
*Taxes in effect or increases passed, reported as of January 1, 2015.

Source: American Cancer Society Cancer Action NetworkSM, 2015.

- Above national average of \$1.54 per pack
- Between \$0.77 and \$1.53 per pack
- Equal to or below \$0.77 per pack (50% of national average)

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Atlanta: American Cancer Society; 2015.

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. Avoiding the use of tobacco products and exposure to secondhand smoke, maintaining a healthy weight, staying physically active throughout life, and consuming

a healthy diet can substantially reduce a person's lifetime risk of developing or dying from cancer.^{1,2} The American Cancer Society estimates that in 2015 about 171,000 cancer deaths will be caused by tobacco smoking alone.³ In addition, approximately one-quarter to one-third of the 1,658,370 cancer cases expected to occur in 2015 can be attributed to poor nutrition, physical inactivity, overweight, and obesity.¹⁻³ Regular use of cervical and colorectal cancer screening tests can prevent the development of cancer through identification and removal or treatment

Highlights, CPED 2015-2016

Tobacco Use

- In 2013, 18% of adults (men: 21%, women: 15%) were current smokers. Smoking prevalence varied greatly by state, ranging from 10% in Utah to 27% in West Virginia.
- There was an overall decline in current cigarette use among high school students between 1997 (36%) and 2013 (16%). The drop was sharper from 1997-2003 (36% to 22%), compared to the more recent time period 2003-2013 (22% to 16%).
- Electronic cigarettes (e-cigarettes) have been gaining popularity in recent years. In 2012-2013, 2% of adults were (every day or some days) e-cigarette users, and the prevalence of ever use nearly doubled between 2010 and 2011. Additionally, expenditures on e-cigarette advertising have tripled in recent years.
- Raising cigarette prices by increasing excise taxes reduces tobacco consumption. Cigarette taxes can be levied at the federal, state, and local levels. In 2014, the federal excise tax was \$1.01 per pack. As of January 1, 2015, the average state cigarette excise tax was \$1.54 per pack, with wide variation between states ranging from 17 cents in Missouri to \$4.35 in New York.
- Since 2002, there have been more former smokers than current smokers in the US. In 2013, almost half (48%) of the 42 million current smokers tried to quit in the previous year.

Overweight and Obesity, Physical Activity, and Nutrition

- According to 2011-2012 data, 19% of adolescents and 36% of adults are obese. Since 2003, obesity prevalence in the US has remained about the same for both adolescents and adults.
- In 2013, the proportion of US adults and high school students who were obese varied widely across states; among adults, obesity prevalence was lowest in Colorado (21%) and highest in Mississippi (35%). Among high school students, obesity prevalence was lowest in Utah (6%) and highest in Kentucky (18%).
- In 2013, about one-half (50%) of adults reported meeting recommended levels of physical activity (at least 150 minutes of moderate or 75 minutes of vigorous activity per week). Approximately 25% of youth ages 12-15 years and 27% of high school students met recommended levels of physical activity (being physically active for at least 60 minutes daily).

- In 2013, consumption of fruits and vegetables in the US was low; only 30% and 15% of adults reported eating two or more servings of fruits and three or more servings of vegetables per day, respectively. About one in three (33%) US high school students consumed fruit two or more times per day and 16% consumed vegetables three or more times per day.

Ultraviolet Radiation and Skin Cancer

- In 2013, approximately 4% of US adults reported using an indoor tanning device in the past year; use was highest among women (7%), non-Hispanic whites (7%), and those ages 18 to 29 years (9%).
- In 2013, 20% of female and 5% of male high school students reported using an indoor tanning device in the previous year.
- Forty-two states have enacted legislation limiting minors' access to indoor tanning facilities, including restricting access by age or requiring parental permission and/or a physician's order.

Infectious Agents

- HPV vaccination among adolescents lags behind other recommended vaccines, though rates have increased in recent years. Between 2007 and 2013, HPV vaccine initiation (at least one of the three-dose HPV vaccination series) among US girls 13 to 17 years of age increased by 5% per year, rising to 57% in 2013. Among adolescent boys, HPV vaccine initiation increased by 10% per year between 2010 and 2013, increasing to 35% in 2013.

Cancer Screening

- In 2013, 66% of women 40 years of age and older reported having a mammogram within the past two years. The lowest prevalence of mammography use in the past two years occurred among women who lack health insurance (38%).
- In 2013, 81% 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 (61%), recent immigrants (66%), and those with less than a high school education (69%).
- In 2013, 59% 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, prevalence remains substantially lower in uninsured individuals and those with lower socioeconomic status.

of premalignant abnormalities. Cancer screening tests can also improve survival and decrease mortality by detecting cancer at an early stage when treatment is more effective.

The American Cancer Society has published *Cancer Prevention & Early Detection Facts & Figures* (CPED) 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 Society's mission to save lives from cancer by helping people stay well and get well, by finding cures, and by fighting back against the disease.

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.

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 initiated 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

2014 marked the 50th anniversary of the first Surgeon General's Report on Smoking and Health. This landmark report helped determine that cigarette smoking caused lung cancer,⁴ and since then other tobacco products including cigars, cigarillos, roll-your-own products, and smokeless tobacco have been causally linked to cancer as well.⁵ Substantial gains in tobacco control have been made since the first Surgeon General's report, yet, there have been 20 million deaths due to tobacco since 1964 and tobacco use remains the single largest preventable cause of disease and premature death in the US.⁵ Each year, smoking results in an estimated 480,000 premature deaths, and about one-third of these premature deaths are due to cancer.^{5,6} In 2012, smoking accounted for \$176 billion in health care expenditures in the US.⁵

Adult Tobacco Use

Tobacco use increases the risk of cancers of the lung, mouth, larynx, pharynx, esophagus, stomach, colorectum, liver, pancreas, kidney, bladder, uterine cervix, and ovary (mucinous), as well as myeloid leukemia.^{5,7} Limited but mounting evidence suggests that long-term, heavy smoking increases the risk of breast cancer, particularly among women who began smoking before giving birth to their first child.^{8,9} Exposure to secondhand smoke (SHS) also increases the risk of lung cancer in adults.^{5,10} Thirty percent of all cancer deaths and about 80% of lung cancer deaths, can be attributed to tobacco⁵ (Figure 1A).

Current Patterns and Trends in Cigarette Smoking

- According to the 2013 National Health Interview Survey (NHIS), an estimated 17.8% of adults (men: 20.5%, women: 15.3%) smoked cigarettes (Table 1A, page 4), compared to 23.5% in 1999.¹¹
- Between 1999 and 2013, the percentage of adults who smoked decreased the most among people with undergraduate and graduate degrees, but a decline has also been observed among people with other levels of educational attainment (Figure 1B, page 5).
- In 2013, smoking prevalence was two to four times higher among adults with a high school diploma, GED, or less than a college degree compared to college graduates (Table 1A, page 4).
- Smoking prevalence was lowest among Asians (9.6%) and highest in American Indians/Alaska Natives (22.7%) (Table 1A, page 4).
- Smoking prevalence was also higher among people who identified themselves as gay or lesbian (25.8%) or bisexual (28.6%) than among those who identified as straight (17.6%) (Table 1A, page 4).
- The state with the highest smoking prevalence (West Virginia, 27.3%) had a smoking prevalence more than twice as high as the state with the lowest prevalence (Utah, 10.3%) (Table 1B, page 6).

Other Combustible Tobacco Products

Other combustible forms of tobacco include small cigars, large cigars, pipes, roll-your-own products, and water pipes (or hookah). Water pipes heat tobacco (that is often flavored) in a basin, and users inhale the smoke that is produced through a pipe. Water pipe smoking is popular in other parts of the world including the Eastern Mediterranean region and is becoming more popular in the United States.¹² In 2012-2013, 0.5% of US adults reported using hookah some or every day and 3.4% reported using hookah rarely.¹³ Users often believe that hookah is less harmful than cigarettes; however, water pipe smoking increases the risk of lung cancer and other respiratory illnesses.^{12, 14}

In contrast to cigarettes, cigars are wrapped in leaf tobacco or other substances containing tobacco. The use of some of these products has continued to increase.¹³ Between 2000 and 2011, consumption of other combustible forms of tobacco increased from 15.2 billion to 33.8 billion cigarette equivalents (a weight of tobacco equivalent to cigarettes), whereas cigarette consumption in the US decreased from 435.6 billion to 292.8 billion cigarettes.¹⁵ Cigar smoking increases the risk of cancers of the lung, oral cavity, larynx, esophagus, and likely the pancreas.¹⁶ Compared to nonsmokers, cigar smokers are four to 10 times more likely to die from lung, laryngeal, oral, or esophageal cancers.^{7, 17}

- According to the 2012-2013 National Adult Tobacco Survey (NATS), the prevalence of smoking cigars (including cigarillos and filtered little cigars) every day or some days was 2.0% (men: 3.2%, women: 0.7%) among US adults 18 years and older.¹³

- Cigar use (every day or some days) decreased with age and was highest among non-Hispanic blacks (3.7%) and those with household incomes <\$20,000 (3.8%).¹³

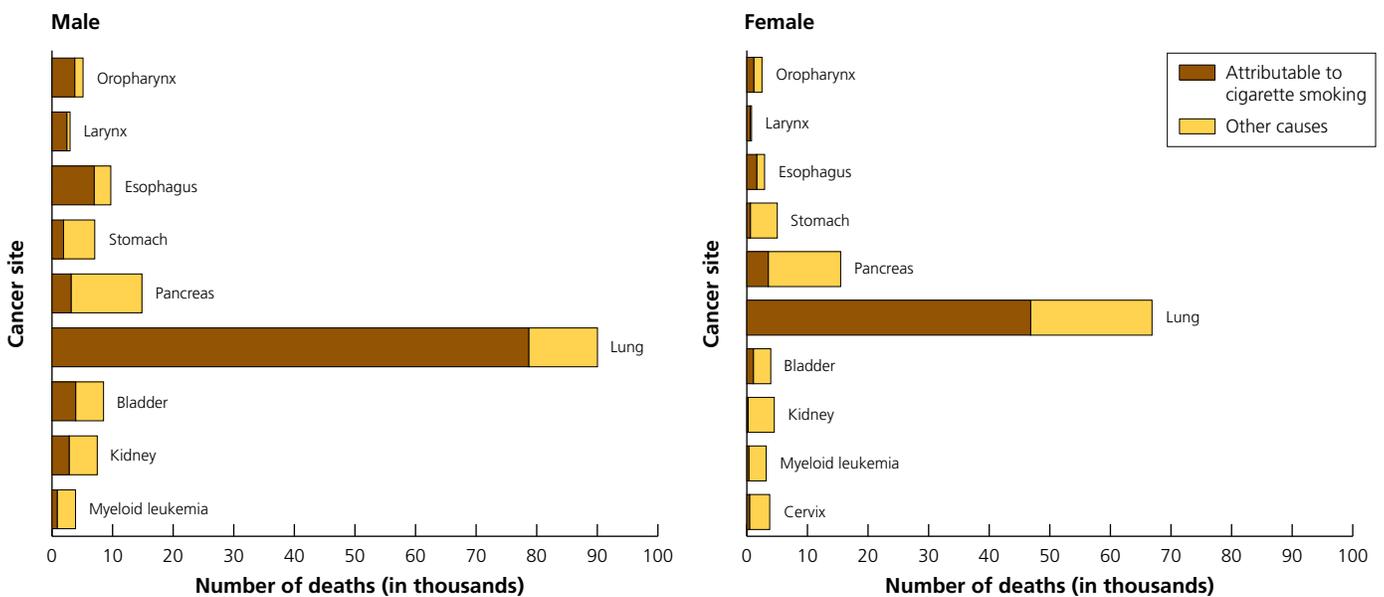
Cigars, including small cigars, which are similar in shape and size to cigarettes, are not regulated like cigarettes in terms of advertising and taxes resulting in lower prices, making these products appealing, especially to youth. Additionally, while flavored cigarettes are prohibited, there are no such restrictions on flavored cigars, cigarillos, and small cigars. It is important to regulate and tax non-cigarette tobacco in line with cigarettes to prevent the tobacco industry from taking advantage of existing loopholes in tobacco control legislation, which is discussed in further detail in the Regulation of tobacco products section (page 9).

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.¹⁸ Compared to quitting completely, switching to smokeless tobacco products as a substitute for smoking has also been shown to increase the risk of tobacco-related death.¹⁹

- According to the NATS, in 2012-2013, 2.6% of adults 18 and older (4.8% of men and 0.8% of women) used smokeless products (including chewing tobacco, snuff, dip, snus, and dissolvable tobacco products) every day or some days.¹³

Figure 1A. 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, Inc., Surveillance Research, 2015

- Young adults (18-24 years of age: 4.4%) were two times more likely to use smokeless products than older adults (45-64 years of age: 2.1%, 65+ years of age: 1.0%).¹³
- Smokeless tobacco use among non-Hispanic whites (3.0%) was higher than among Hispanics (0.6%) and non-Hispanic blacks (1.0%).¹³
- According to the 2013 Behavioral Risk Factor Surveillance System (BRFSS) data, smokeless tobacco use (chewing tobacco, snuff, or snus) was highest in West Virginia (9.4%) and lowest in California, the District of Columbia, and Massachusetts (1.5%) (Table 1B, page 6).

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.^{20, 21} In addition, cigarette companies are test-marketing dissolvable tobacco products such as orbs, strips, and sticks in certain markets. These products are especially troubling because of their appeal to children. They look and dissolve like candy, the packaging resembles the size and shape of mint tins or cellphones, and are easily concealed from teachers and parents.

Electronic Cigarettes

Electronic nicotine delivery systems (ENDS) are battery-operated devices that allow the user to inhale a vapor produced from cartridges or tanks filled with a liquid typically containing nicotine, propylene glycol and/or vegetable glycerin, other chemicals, and possibly flavoring.²² The term e-cigarettes will be used hereafter to refer to any ENDS, including those not designed to mimic cigarettes. E-cigarettes have been gaining in popularity; in 2012-2013, 1.9% of adults were (every day or some days) e-cigarette users,¹³ and the prevalence of ever use of e-cigarettes nearly doubled between 2010 and 2011.²³ Additionally, expenditures on e-cigarette advertising has tripled in recent years.²⁴

E-cigarettes are promoted as a way to bypass smoke-free laws and as a healthier alternative to traditional cigarettes; however, to date there is little evidence to support these claims.²⁵ While the health risks of e-cigarettes are not fully known,^{26, 27} there is growing concern that e-cigarette use will normalize cigarette smoking and lead to the use of other forms of tobacco products with known health risks.^{23, 26} There is also potential for these products to discourage utilization of evidence-based cessation therapies among those who want to quit.

Youth Tobacco Use

A majority of (almost 90%) adults who smoke regularly indicate that they began smoking before the age of 18.²⁸ Even though the sale of tobacco to youth under the age of 18 is prohibited, youth indicate that cigarettes are easy to obtain and may be stolen or purchased directly or from other kids.^{29, 30} Adolescents are more sensitive to nicotine and appear to be more easily addicted.²⁸

Table 1A. Current Cigarette Smoking* (%), Adults 18 Years and Older, US, 2013

	Males	Females	Overall
Overall	20.5	15.3	17.8
Age (years)			
18-24	21.9	15.4	18.7
25-44	23.3	17.1	20.1
45-64	21.9	18.1	19.9
65+	10.6	7.5	8.8
Race/Ethnicity			
White (non-Hispanic)	21.2	17.9	19.5
Black (non-Hispanic)	22.2	15.6	18.5
Hispanic	17.3	7.0	12.1
American Indian/Alaska Native	25.9	19.7	22.7
Asian (non-Hispanic) [†]	15.0	4.9	9.6
Education[‡]			
8 or fewer years	21.9	9.2	15.4
9 to 11 years	40.0	26.6	33.2
12 years, no diploma	24.2	15.4	19.8
GED	42.9	39.7	41.4
12 years, HS graduate	26.7	17.6	22.0
Some college	22.4	19.6	20.9
Associate degree	17.9	17.7	17.8
Undergraduate degree	10.4	7.9	9.1
Graduate degree	5.7	5.5	5.6
Sexual Orientation			
Gay or lesbian [§]	25.8	25.7	25.8
Straight [¶]	20.3	15.0	17.6
Bisexual	28.8	28.5	28.6
Insurance Status			
Uninsured	33.4	24.7	29.3
Insured	17.6	13.6	15.5

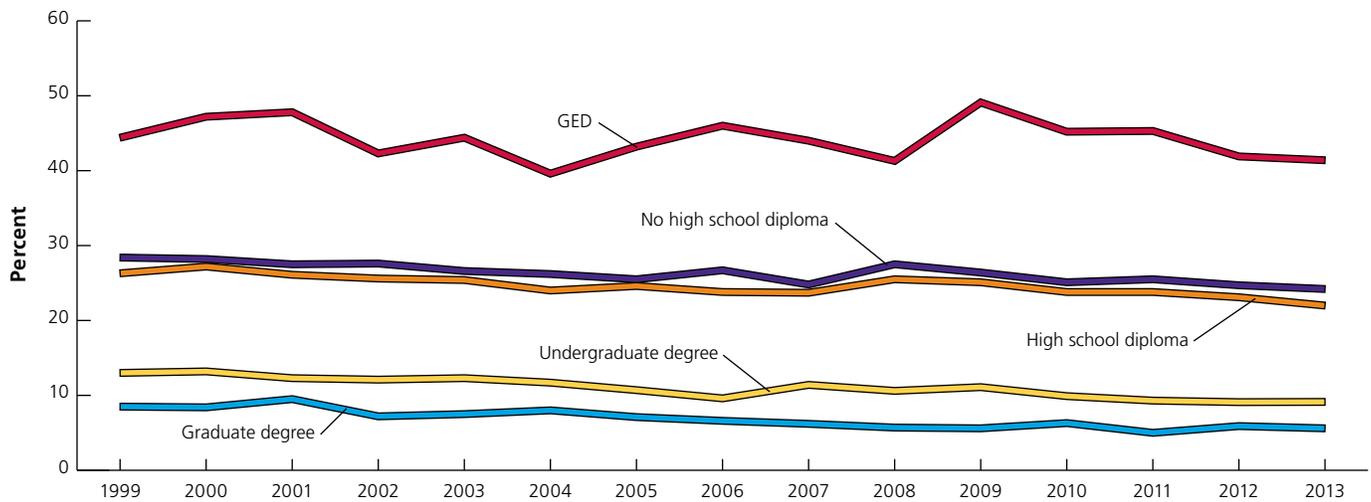
GED-General Educational Development high school equivalency. *Ever smoked 100 cigarettes in lifetime and smoking every day or some days at time of survey. †Does not include Native Hawaiians or other Pacific Islanders. ‡Among persons ages 25 years or older. §Response option provided on the NHIS was "gay" for men and "gay or lesbian" for women. ¶Response option provided on the NHIS was "straight, that is, not gay" for men and "straight, that is not gay or lesbian" for women.

Source: Centers for Disease Control and Prevention. National Health Interview Survey, 2013. Public use data file. See Survey Sources (page 53) for complete citation.

American Cancer Society, Inc., Surveillance Research, 2015

Further, the likelihood of developing smoking-related cancers increases with the duration of smoking, such that those who start at younger ages and continue to smoke are at higher risk for tobacco-related illness and death.²⁸

Figure 1B. Current Cigarette Smoking* Trends, Adults 25 Years and Older, by Education, US, 1999-2013



GED-General Educational Development high school equivalency. *Ever smoked 100 cigarettes in lifetime and smoking every day or some days at time of survey.

Sources: Centers for Disease Control and Prevention, National Center for Health Statistics. National Health Interview Survey. 1999-2012: *MMWR Morb Mortal Wkly Rep.* 2001;50(40):869-873. *MMWR Morb Mortal Wkly Rep.* 2002;51(29):642-645. *MMWR Morb Mortal Wkly Rep.* 2003;52(4):953-956 and 2003;52(42):1025. *MMWR Morb Mortal Wkly Rep.* 2004;53(20):427-431. *MMWR Morb Mortal Wkly Rep.* 2005;54(20):509-513. *MMWR Morb Mortal Wkly Rep.* 2005;54(44):1121-1124. *MMWR Morb Mortal Wkly Rep.* 2014;63(2):29-34. *MMWR Morb Mortal Wkly Rep.* 2007;56(44):1157-1161. *MMWR Morb Mortal Wkly Rep.* 2009;58(44):1227-1232. *MMWR Morb Mortal Wkly Rep.* 2010;59(35):1135-1140. *MMWR Morb Mortal Wkly Rep.* 2012;61(44):889-894. 2013: Public use data file, 2014

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Current Patterns and Trends in Cigarette Smoking

- According to the 2013 Youth Risk Behavior Survey (YRBS), current cigarette use (smoked cigarettes on one or more of the 30 days preceding the survey) among high school students decreased from 36.4% in 1997 to 15.7% in 2013; the decrease was much larger during 1997-2003 (36.4% to 21.9%) than during 2003-2013 (21.9% to 15.7%).^{31, 32}
- Of the 40 states and the District of Columbia with representative data for 2013, Utah had the lowest high school student smoking prevalence (4.4%) and West Virginia had the highest (19.6%) (Table 1C, page 7).
- For the most recent data year (2013), 5.6% of high school students reported frequent smoking (smoked cigarettes on 20 or more of the 30 days preceding the survey) (Table 1C, page 7).
- Cigarette smoking among youth varies by race/ethnicity. Among 12th-graders, since the early 1980s, the prevalence has been the highest among whites, followed by Hispanics, and the lowest among African Americans (Figure 1C, page 8).

Other Tobacco Products

While cigarettes remain the primary tobacco product used by youth, use of other forms of tobacco, including cigars, smokeless tobacco products, and hookahs (tobacco water pipes), is also concerning.

- In 2013, 12.6% of high school students reported current use of cigars and 8.8% reported current use of smokeless tobacco (Table 1C, page 7).
- Male high school students had noticeably higher cigar use (16.5%) compared to females (8.7%). Males also had higher smokeless tobacco prevalence (14.7%) than females (2.9%).³²
- Among high school students, the prevalence of cigar smoking remained stable between 2001 (15.2%) and 2013 (12.6%), and the use of smokeless tobacco use has not changed (1999: 7.8% and 2013: 8.8%).³¹⁻³³

Hookah

An emerging trend among adolescent and young adult smokers is the use of hookahs. Estimates of current (past 30 days) hookah use among college students vary, ranging from 10% to 20%.^{34, 35} In 2012, about 5% of high school students reported current (past 30 days) hookah use.³⁶ This increase is likely associated with the growing number of hookah “bars” and the misperceptions regarding the relative health hazards of hookah use compared to cigarette smoking.³⁷

Electronic Cigarettes

Use of e-cigarettes is also increasing among youth. The prevalence of current e-cigarette use among high school students increased from 1.5% in 2011 to 4.5% in 2013.^{36, 38} Ever use of e-cigarettes among high school students has more than doubled during the same time period from 4.7% in 2011 to 11.9% in 2013.^{38, 39} The

Table 1B. Tobacco Use (%), Adults 18 Years and Older, by State, US, 2013

	Current smoking*					Current smokeless tobacco use§
	18 and older	Rank† (1 = high)	Men 18 and older	Women 18 and older	Low education‡	
Alabama	21.5	13	25.1	18.2	34.6	6.1
Alaska	22.6	9	22.9	22.2	49.7	6.8
Arizona	16.3	43	19.3	13.5	25.5	3.2
Arkansas	25.9	3	26.7	25.3	41.6	6.9
California	12.5	50	16.2	9.1	14.7	1.5
Colorado	17.7	34	19.0	16.4	29.8	4.3
Connecticut	15.5	48	16.8	14.3	24.5	1.8
Delaware	19.6	21	22.0	17.3	30.8	2.2
District of Columbia	18.8	28	23.4	14.7	40.3	1.5
Florida	16.8	38	19.5	14.4	25.1	2.6
Georgia	18.8	28	22.6	15.4	30.0	5.0
Hawaii	13.3	49	15.7	11.0	21.0	1.6
Idaho	17.2	37	19.4	15.0	36.6	5.7
Illinois	18.0	32	21.2	15.0	20.2	2.6
Indiana	21.9	12	23.6	20.4	38.1	4.9
Iowa	19.5	23	22.5	16.6	31.1	4.9
Kansas	20.0	20	22.3	17.8	33.5	5.5
Kentucky	26.5	2	28.4	24.6	40.3	7.0
Louisiana	23.5	7	27.3	20.0	37.1	5.7
Maine	20.2	19	22.4	18.2	39.7	2.1
Maryland	16.4	42	19.4	13.7	26.0	2.5
Massachusetts	16.6	39	18.7	14.7	26.6	1.5
Michigan	21.4	14	24.7	18.3	41.9	4.0
Minnesota	18.0	32	19.4	16.7	32.1	5.0
Mississippi	24.8	4	28.0	22.0	38.1	8.5
Missouri	22.1	10	24.3	20.1	40.3	5.2
Montana	19.0	26	20.7	17.3	38.5	8.0
Nebraska	18.5	31	19.8	17.2	29.0	5.3
Nevada	19.4	24	20.6	18.1	29.2	3.2
New Hampshire	16.2	44	16.7	15.8	34.7	2.6
New Jersey	15.7	47	17.6	13.9	22.5	1.7
New Mexico	19.1	25	22.2	16.2	24.4	4.3
New York	16.6	39	19.3	14.2	26.4	2.2
North Carolina	20.3	18	23.4	17.3	25.6	4.3
North Dakota	21.2	15	22.9	19.5	29.6	7.6
Ohio	23.4	8	24.1	22.6	41.2	4.2
Oklahoma	23.7	6	25.8	21.7	38.8	6.3
Oregon	17.3	36	18.7	16.0	34.5	4.6
Pennsylvania	21.0	16	23.5	18.6	31.1	4.4
Rhode Island	17.4	35	19.1	15.9	25.9	1.9
South Carolina	22.0	11	26.2	18.1	38.3	4.4
South Dakota	19.6	21	19.7	19.4	31.3	6.6
Tennessee	24.3	5	26.8	22.0	39.4	4.8
Texas	15.9	46	18.8	13.1	18.8	4.3
Utah	10.3	51	11.9	8.8	21.0	2.9
Vermont	16.6	39	17.9	15.4	33.5	2.8
Virginia	19.0	26	21.6	16.7	32.0	4.0
Washington	16.1	45	17.8	14.3	29.8	3.7
West Virginia	27.3	1	28.6	26.1	37.5	9.4
Wisconsin	18.7	30	20.1	17.3	36.8	4.3
Wyoming	20.6	17	22.1	19.2	35.0	8.8
United States (median)	19.0		21.6	17.2	32.0	4.3
Range	10.3 - 27.3		11.9 - 28.6	8.8 - 26.1	14.7 - 49.7	1.5 - 9.4

*Smoked 100 cigarettes in their entire lifetime and are current smokers (regular and irregular). †Based on overall % 18 and older. ‡Adults 25 and older with less than a high school education. §Reported currently using chewing tobacco, snuff, or snus every day or some days. Note: Behavioral Risk Factor Surveillance System (BRFSS) 2013 data results are not directly comparable to BRFSS data prior to 2011 because of the changes in weighting methodology and the addition of the cell phone sampling frame.

Source: Centers for Disease Control and Prevention. Behavioral Risk Factor Surveillance System, 2013. Public use data file. See Survey Sources (page 53) for complete citation.

American Cancer Society, Inc., Surveillance Research, 2015

Table 1C. Tobacco Use (%), High School Students, By State and City/County*, US, 2013

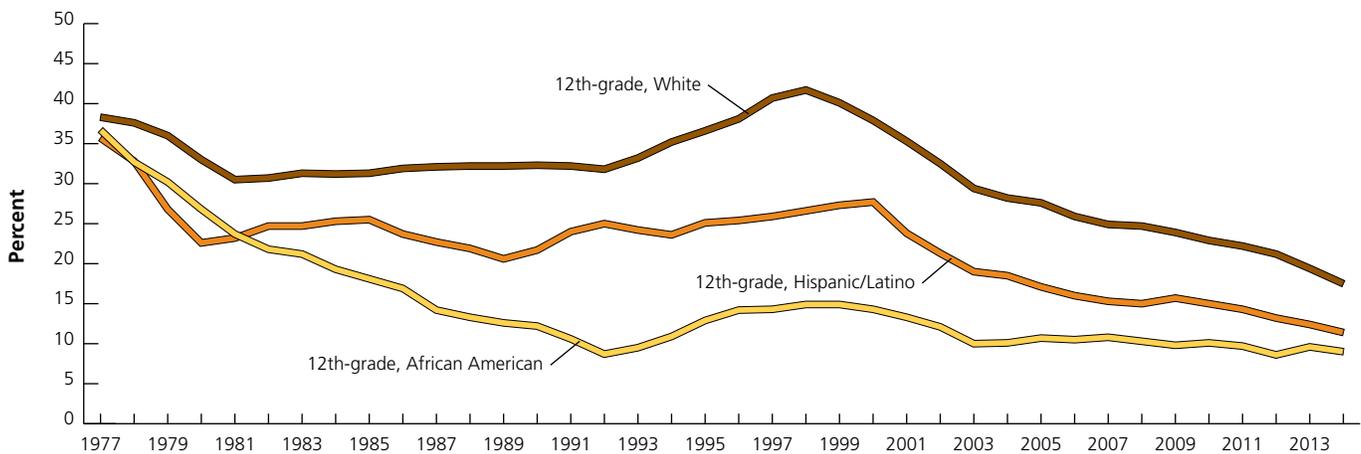
	Current cigarette smoking [†]	Rank [‡] (1=high)	Frequent cigarette smoking [§]	Current cigar smoking [¶]	Current smokeless tobacco use [#]
United States	15.7		5.6	12.6	8.8
State					
Alabama	18.0	5	6.7	16.5	14.7
Alaska	10.6	35	3.9	7.3	9.1
Arizona	14.1	18	4.6	11.8	6.6
Arkansas	19.1	2	7.6	17.1	14.8
California**	–	–	–	–	–
Colorado**	–	–	–	–	–
Connecticut	13.5	22	4.1	–	–
Delaware	14.2	17	4.9	12.0	7.1
District of Columbia	–	–	–	16.5	4.3
Florida	10.8	33	3.7	–	–
Georgia	12.8	24	4.4	13.5	9.5
Hawaii	10.4	37	3.0	–	–
Idaho	12.2	26	3.8	9.2	8.0
Illinois	14.1	18	5.0	14.0	8.4
Indiana**	–	–	–	–	–
Iowa**	–	–	–	–	–
Kansas	10.2	39	2.7	10.3	8.1
Kentucky	17.9	6	7.3	13.3	13.2
Louisiana	12.1	27	4.5	14.4	12.7
Maine	12.8	24	5.2	10.6	6.0
Maryland	11.9	28	3.6	12.5	7.4
Massachusetts	10.7	34	3.2	10.8	4.8
Michigan	11.8	29	4.3	10.7	6.9
Minnesota ^{††}	–	–	–	–	–
Mississippi	17.2	8	5.8	13.6	10.3
Missouri	14.9	15	5.5	13.3	10.4
Montana	15.2	12	5.5	15.8	13.4
Nebraska	10.9	32	3.0	8.3	7.7
Nevada	10.3	38	3.8	9.2	5.0
New Hampshire	13.8	21	5.5	13.0	7.3
New Jersey	12.9	23	4.7	–	–
New Mexico	14.4	16	3.6	12.3	8.0
New York	10.6	35	4.5	12.2	7.0
North Carolina	15.0	14	5.0	–	8.5
North Dakota	19.0	3	6.6	11.7	13.8
Ohio	15.1	13	6.8	11.5	8.6
Oklahoma	18.5	4	5.5	13.9	12.1
Oregon ^{††}	–	–	–	–	–
Pennsylvania**	–	–	–	–	–
Rhode Island	8.0	40	3.1	9.4	7.0
South Carolina	16.0	10	4.9	15.0	7.8
South Dakota	16.5	9	6.7	–	11.5
Tennessee	15.4	11	6.2	15.3	13.3
Texas	14.1	18	3.6	13.7	8.1
Utah	4.4	41	1.3	4.1	2.6
Vermont	–	–	–	14.6	9.1
Virginia	11.1	31	3.5	11.3	8.3
Washington ^{††}	–	–	–	–	–
West Virginia	19.6	1	8.9	13.4	15.9
Wisconsin	11.8	29	4.3	11.5	8.0
Wyoming	17.4	7	8.5	14.9	14.2
City/County*					
Baltimore, MD	7.0		2.2	15.1	8.3
Boston, MA	7.9		2.5	8.5	2.9
Broward County, FL	5.8		1.2	7.2	4.1
Charlotte-Mecklenburg, NC	9.7		3.0	–	5.3
Chicago, IL	10.7		3.0	9.5	4.5
Detroit, MI	3.4		0.7	8.7	5.1
Duval County, FL	9.6		3.3	13.0	7.2
Houston, TX	11.3		2.7	16.6	6.1
Los Angeles, CA	6.7		0.8	5.9	2.1
Memphis, TN	6.5		1.9	14.4	4.8
Miami-Dade County, FL	7.5		1.3	6.1	2.5
Milwaukee, WI	8.6		2.5	–	–
New York City, NY	8.2		2.2	7.7	4.4
Orange County, FL	6.4		1.8	10.8	5.2
Palm Beach County, FL	10.2		2.7	13.8	8.7
Philadelphia, PA	7.5		2.6	8.6	4.0
San Bernardino, CA	9.0		1.7	7.0	2.8
San Diego, CA	8.9		1.1	7.0	2.9
San Francisco, CA	7.5		2.2	6.1	3.3
Seattle, WA	6.2		2.0	5.6	3.8

*Representative of large urban school districts. †Smoked cigarettes on one or more of the 30 days preceding the survey. ‡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, snuff, or dip on one or more of the 30 days preceding the survey. **Youth Risk Behavior Surveillance System (YRBSS) does not report unweighted state survey data. ††State did not participate in the YRBSS 2013 cycle. Participation in YRBSS is a voluntary collaboration between a state's departments of health and education.

Source: Kann L, Kinchen S, Shanlin SL, et al., Youth Risk Behavior Surveillance - US, 2013. *MMWR Surveill Summ* 2014;63(SS04): 1-168.

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Figure 1C. Current Cigarette Smoking* Trends, 12th-graders, by Race/Ethnicity, US, 1977-2014†



*Used cigarettes in the past 30 days. †Percentages are two-year moving averages.

Source: Monitoring the Future Study, 1976-2014, University of Michigan. Available from: <http://www.monitoringthefuture.org/data/14data/14tobtbl8.pdf>
Last accessed: January 29, 2015.

American Cancer Society, Inc., Surveillance Research, 2015

growing prevalence of e-cigarette use is likely due to increased awareness and advertising of e-cigarettes.⁴⁰ Between 2011 and 2013, there was a 256% increase in youth exposure to e-cigarette advertising.⁴⁰

There is no safe level of tobacco use, especially during adolescence. Use of tobacco in any form can induce nicotine dependence and subsequently lead to smoking-related diseases. In addition to the tobacco products already discussed, high school students are also current (past 30 days) users of tobacco pipes (4.1%); kreteks, which are cigarettes containing tobacco and cloves (0.8%); and bidis, which are thin, rolled cigarettes (0.6%).³⁹ Prevention and cessation programs should address all tobacco products, not just cigarettes. The US Surgeon General recommends that school-based tobacco control programs include specific components, such as those based on the social influences model with interactive delivery methods and teaching of refusal skills, to effectively reduce youth smoking. More sustained results are possible when such efforts are part of a multicomponent approach that includes tobacco control strategies outlined in this publication.^{28, 41, 42}

Comprehensive Tobacco Control Programs

There are tobacco control strategies outlined at the global level by the World Health Organization (WHO), as well as strategies outlined by the Centers for Disease Control and Prevention (CDC) for the US, which include state and federal strategies. However, the WHO's Framework Convention on Tobacco Control is not the same as the CDC's best practices; the comprehensive tobacco control programs highlighted in this section will focus

on the CDC's comprehensive tobacco control program since the US has not yet ratified the WHO's Framework Convention on Tobacco Control. The CDC's comprehensive tobacco control program aims to a) prevent initiation among youth and young adults, b) promote quitting among youth and adults, c) eliminate SHS, and d) identify and eliminate tobacco-related disparities among population groups. The CDC recommends the following components for state-based comprehensive tobacco control programs:⁴¹

- State and community interventions that prevent tobacco initiation, promote cessation, eliminate SHS, and reduce tobacco-related disparities using health communication and other initiatives to mobilize communities
- Health communication interventions that deliver culturally appropriate and high-impact messages that target specific audiences through various communication channels
- Cessation interventions that promote changes in health systems, expand insurance coverage for effective cessation treatments, and support state quitline capacity
- Surveillance and evaluation to be used to inform policies, programs, demonstrate effectiveness, and monitor progress made toward reducing disparities
- Administration and management to ensure adequate infrastructure and skilled staff to oversee programs

Evidence for these recommendations stems, in part, from states that have documented the benefits of implementing comprehensive tobacco control programs.⁴² For example, California's longstanding comprehensive tobacco control program is associated with a marked drop in adolescent smoking initiation.⁴³

more difficult to quit smoking.⁴⁸ In 2013, the FDA issued a report against menthol, which utilized TSAC findings.⁴⁹ Anti-tobacco advocates were hopeful that this 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. However, the FDA report was withdrawn (summer 2014) after US courts ruled in favor of a lawsuit filed by tobacco companies that the report was biased against the tobacco industry. Tobacco companies have also filed lawsuits opposing the implementation of the pictorial warnings in the US; some of the lawsuits have been upheld. As a result, the pictorial warnings proposed in the Federal Tobacco Act of 2009 have not yet been implemented.

Currently, the FDA only regulates cigarettes, roll-your-own tobacco products, and smokeless tobacco. A proposal to regulate all other tobacco products, including certain cigars, pipe and hookah tobacco, e-cigarettes, dissolvables, and gels, was issued in April 2014, but a final ruling has not been issued.²⁶ This new regulation would prohibit the sale of these products to people under the age of 18, require that health warnings be included on packaging, and also require manufacturers to disclose the ingredients of these products to the FDA.⁵⁰ The American Cancer Society Cancer Action Network (ACS CAN) supports the FDA's regulation of all tobacco products because such regulation may decrease the use of and harm from these products.

Federal tobacco taxes: If not absorbed by the tobacco industry, federal tobacco excise tax increases prevent smoking initiation, reduce consumption, and promote quitting.^{42, 51} In addition, such increases can also form an important revenue source for federally funded health care or tobacco control programs. However, taxes on tobacco products other than cigarettes continue to lag behind, providing a less expensive alternative for tobacco users. 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).⁵² Cigarette taxes can be levied at the federal, state, and local levels; the following section discusses tobacco excise taxes in more detail.

Other initiatives: Other initiatives that would bolster the national tobacco control infrastructure include the US ratification of the WHO's Framework Convention on Tobacco Control, which has been ratified by 179 of the United Nations' 193 member states (as of November 2014).⁵³

State and Local 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% and youth prevalence by 6% to 7%.⁴² The WHO recommends that excise taxes account for at least 70% of the final consumer price.⁵⁴ Youth who smoke are up to three times more responsive to price increases than adults.⁵⁵

In addition, cigarette price increases through taxation could potentially reduce socioeconomic (SES) disparities, given that low-income smokers and certain lower SES occupational groups are more responsive to tax increases than higher SES groups.⁵⁵

- As of February 2015, the federal excise tax was \$1.01.⁵⁶
- The average state cigarette excise tax rate was \$1.54 with wide variation between states ranging from 17 cents per pack in Missouri to \$4.35 per pack in New York (Table 1D).

Cigarette affordability, which incorporates the price of cigarettes along with an individual's ability to pay for them, varied widely across the US. Cigarettes are most affordable in the Southeastern states and least affordable in Northeastern states.⁵⁷ 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 are not too low even if the product is heavily discounted. The average among states that tax moist snuff as a percentage of price is approximately 43%, ranging from 5% in South Carolina to 210% in Massachusetts.⁵⁸ One state, Pennsylvania, does not tax non-cigarette tobacco products at all. Tax rates for non-cigarette tobacco products often vary by product type.⁵⁹ E-cigarettes are not taxed at a federal level, and only one state (Minnesota) has an e-cigarette excise tax.⁶⁰

Loopholes in tax regulations and tobacco industry tactics can negate the benefits of increases in state cigarette excise tax increases. For example, in 2011, tobacco companies devoted approximately 95% of their marketing expenditures (\$7.9 billion) to strategies (price discounts, coupons, and promotional allowances to retailers and wholesalers) to buffer price-sensitive smokers from the shock of price increases.⁴⁵ Furthermore, in most states, taxes are higher on cigarettes, which incentivizes smokers to use alternative, less expensive tobacco products. 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 are more price-sensitive and may have fewer opportunities to access cessation services in response to tax increases.⁴⁷

Smoke-free Initiatives to Reduce Exposure to Secondhand Smoke

Exposure to SHS increases the risk of lung disease and cancer, coronary artery disease, and heart attacks.⁶¹⁻⁶³ Smoke-free initiatives (also referred to as clean 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 the risk of smoking-related disease.^{63, 64}

Table 1D. Comprehensive Tobacco Control Measures, by State, US, 2014 and 2015

	Cigarette tax per pack (\$)*	100% smoke-free laws in workplaces and/or restaurants and/or bars†	Tobacco prevention spending (\$ millions)‡	Tobacco prevention spending % of tobacco revenue§
Alabama	0.425		0.4	0.2
Alaska	2.00		9.7	9.9
Arizona	2.00	W, R, B	18.6	4.4
Arkansas	1.15		17.5	6.3
California	0.87	R, B	58.9	3.8
Colorado	0.84	R, B	23.1	8.2
Connecticut	3.40	R, B	3.5	0.7
Delaware	1.60	W, R, B	8.7	6.5
District of Columbia	2.50	W, R, B	2.0	2.9
Florida	1.339	W, R	66.6	4.3
Georgia	0.37		1.8	0.5
Hawaii	3.20	W, R, B	7.5	4.5
Idaho	0.57	R	2.7	3.7
Illinois	1.98	W, R, B	11.1	1.0
Indiana	0.995	W, R	5.8	1.0
Iowa	1.36	W, R, B	5.2	1.8
Kansas	0.79	W, R, B	0.9	0.6
Kentucky	0.60		2.5	0.7
Louisiana	0.36	W, R	6.8	2.4
Maine	2.00	W, R, B	8.2	4.4
Maryland	2.00	W, R, B	8.5	1.6
Massachusetts	3.51	W, R, B	3.9	0.4
Michigan	2.00	W, R, B	1.5	0.1
Minnesota	2.90	W, R, B	22.3	1.6
Mississippi	0.68		10.9	4.3
Missouri	0.17		0.1	0.0
Montana	1.70	W, R, B	5.4	4.7
Nebraska	0.64	W, R, B	2.4	2.3
Nevada	0.80	W, R	1.0	0.7
New Hampshire	1.78	R, B	0.1	0.0
New Jersey	2.70	W, R, B	0.0¶	0.0¶
New Mexico	1.66	R, B	5.9	4.6
New York	4.35	W, R, B	39.3	1.9
North Carolina	0.45	R, B	1.2	0.3
North Dakota	0.44	W, R, B	9.5	15.4
Ohio	1.25	W, R, B	7.7	0.7
Oklahoma	1.03		23.6	6.5
Oregon	1.31	W, R, B	9.9	2.9
Pennsylvania	1.60	W	13.8¶	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	4.5	5.3
Tennessee	0.62		5.0	1.2
Texas	1.41		10.7	0.6
Utah	1.70	W, R, B	7.4	4.9
Vermont	2.75	W, R, B	3.9	3.6
Virginia	0.30		8.5	2.8
Washington	3.025	W, R, B	1.9	0.3
West Virginia	0.55		4.9	2.9
Wisconsin	2.52	W, R, B	5.3	0.7
Wyoming	0.60		4.6	10.4
State average	1.54		9.6	3.0
State range	0.17 - 4.35		0.0 - 66.6	0.0 - 15.4

W-workplaces, R-restaurants, B-bars. *Taxes in effect as of January 1, 2015. †Smoke-free laws passed or implemented, reported as of December 2014. ‡Includes only state funds for fiscal year 2015. §Tobacco revenue is the projected collections from tobacco taxes and payments to states from the Master Settlement Agreement with the tobacco companies. ¶Estimated, not confirmed.

Source: Robert Wood Johnson Foundation and other partners. Broken Promises to Our Children: The 1998 State Tobacco Settlement Sixteen Years Later. December 2014. American Cancer Society, Inc., Surveillance Research, 2015

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, which likely reflects widespread implementation of smoke-free laws and reductions in smoking prevalence.^{10, 65} Since then, SHS exposure has declined to 25.3% in 2011-2012, but certain groups, such as those with lower SES, have considerably higher SHS exposure.⁶⁶

State and Local Smoke-free Legislation

- Reflecting the current success of smoke-free legislation, approximately half of the US population is covered by a comprehensive law that prohibits smoking in all non-hospitality workplaces (such as offices, factories, and warehouses), restaurants, and bars.⁶⁷
- There are 697 municipalities in the US with 100% smoke-free laws in non-hospitality workplaces, restaurants, and bars (as of February 2015).⁶⁷
- Twenty-four states, the District of Columbia, Puerto Rico, and the US Virgin Islands have statewide smoke-free laws that prohibit smoking in all non-hospitality workplaces, restaurants, and bars (Table 1D, page 11).

According to a 2011 CDC report, if the progress made in smoke-free initiatives between 2000 and 2010 continued nationally and intensified in certain regions, 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.⁶⁸ In particular, certain segments of the population, such as hospitality and casino workers, continue to be exposed to SHS.

Countering Tobacco Industry Marketing

Exposure to tobacco industry marketing (advertising and promotions) significantly increases the likelihood that adolescents will use tobacco and increases per-capita cigarette consumption in the general population.⁶⁹ Tobacco industry marketing is targeted toward youth in a variety of ways. Between 2006 and 2013, US middle and high school students reported either decreased or unchanged exposure to select marketing tactics (Figure 1E).

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 promotional allowances, is highly prevalent and has been identified as a strong risk factor for youth smoking initiation.⁷⁰ Internet and direct advertising represent new avenues for promoting tobacco use. The focus on these venues by the tobacco industry is reflected in reports of frequent exposure to Internet advertising that increased slightly between 2006 and 2013. These trends highlight the need for comprehensive restrictions on existing and emerging tobacco marketing and effective implementation of FDA restrictions on marketing to youth.

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.⁶⁹ With funding from the Prevention and Public Health Fund, the CDC launched its first federally funded nationwide tobacco education media 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.⁷¹ In 2014, the FDA launched The Real Cost, a tobacco prevention campaign targeting youth at risk for using tobacco or who have begun experimenting. The aim of the campaign is to educate this population about the harmful effects of tobacco use in order to prevent initiation or proceeding from initiation to regular use.⁷² In contrast, tobacco industry media campaigns that purport to discourage youth smoking have proved to be ineffective in deterring youth smoking, and in fact may have had a counterproductive effect.⁷³ 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

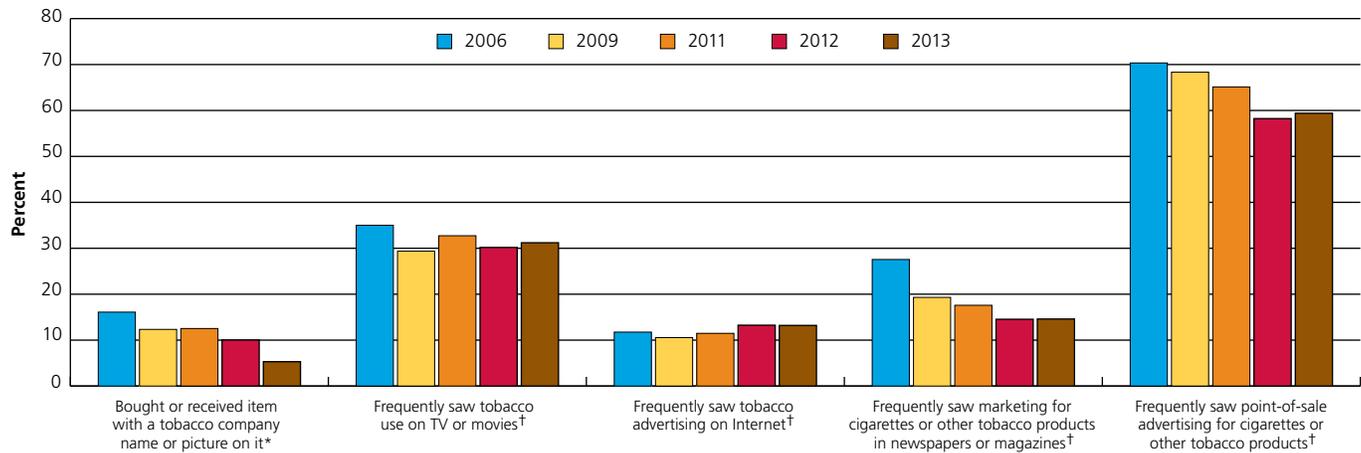
Adult Tobacco Cessation

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.⁷⁴ 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.⁷⁴ In addition, cancer survivors who quit smoking have better health outcomes than those who do not.⁵ Unfortunately, some cancer survivors continue to smoke. A recent Society study estimated that approximately nine years after diagnosis, 1 in 10 cancer survivors reported current (past 30 day) smoking.⁷⁵

- Since 2002, there have been more former smokers than current smokers in the US. According to the 2013 NHIS, approximately, 55.2% (51.9 million) of the 94.1 million Americans who have ever smoked 100 cigarettes in their lifetime are former smokers.⁷⁶
- Of the 42.1 million Americans who currently smoke, 20.1 million (47.7%) reported having attempted to quit for at least one day in the past year.⁷⁶
- 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 same time period.⁷⁷
- Thirty-two percent of current smokers (tried to quit in the past year) and former smokers (successfully quit in the past two years) used recommended pharmacotherapy and/or counseling; only 4.3% used both.⁷⁷

Tobacco dependence is a chronic condition; smokers should utilize effective treatment that can double or triple their chances of

Figure 1E. Trends in Exposure to Tobacco Marketing, Middle and High School Students, US, 2006-2013



*During the 12 months preceding the survey. †Respondents who reported "Most of the time," "All of the time," or "Always" among those who reported that they watch TV or go to movies; use the Internet; read newspapers or magazines; or go to convenience stores, supermarkets, or gas stations, respectively.

Source: Centers for Disease Control and Prevention, Office on Smoking and Health. National Youth Tobacco Surveys, 2006, 2009, 2011, 2012, 2013. Public use data files and documentation http://www.cdc.gov/TOBACCO/data_statistics/surveys/NYTS/index.htm. 2008, 2010, 2014, 2015.

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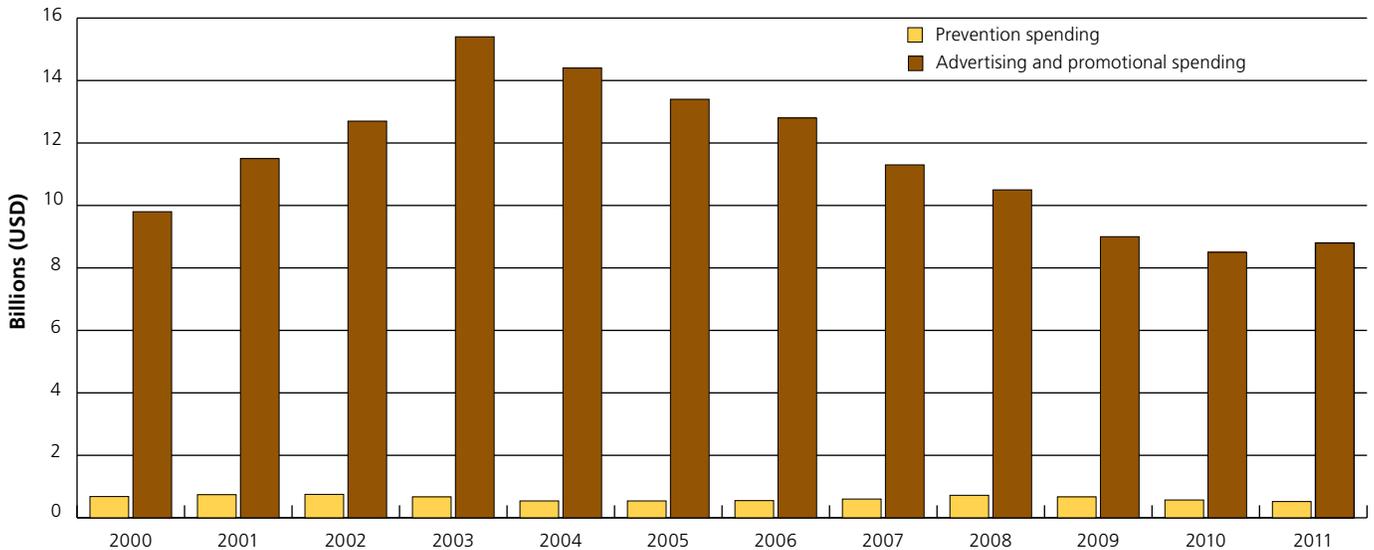
long-term abstinence. According to the latest US Public Health Service (USPHS) and US Preventive Services Task Force guidelines, these treatments include nicotine replacement therapy (NRT) products, prescription medications other than NRT, or combinations of these medications and counseling (individual, group, or telephone).^{78, 79} The combined use of counseling and medication has been shown to be more effective than the use of any individual treatment. A strategy to facilitate cessation is to integrate population-wide cessation services, including physician outreach and education, quit-smoking clinics, tobacco quitlines, text messaging systems for teens, mobile phone applications, and free distribution of NRT, into comprehensive tobacco control programs. In addition, statewide telephone quitlines have broad accessibility and can deliver effective behavioral counseling to diverse groups of tobacco users, including those who are low-income, elderly, uninsured, racial or ethnic minorities, and those who reside in rural areas.⁷⁸ Studies show that integrating standard NRT into state quitline programs can improve quit rates and are cost-effective.⁸⁰ Unfortunately, funding for state quitlines is inadequate.

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 insured smokers. However, provisions in the ACA ensuring coverage of evidence-based cessation treatments may mitigate some or all of these costs for people with non-grandfathered private health plans or who are insured through Medicare. The ACA requires new and renewed health plans to cover screen-

ing for tobacco use and two quit attempts per year that include counseling and approved medication at no cost. Medicare, which insures most people over the age of 65, covers several cessation treatments, including nicotine spray, nicotine inhalers, pharmacologic treatments, and individual counseling.⁸¹ Pregnant women and people who are eligible for Medicaid in states that have expanded coverage have access to no-cost tobacco cessation services because of the ACA. For people who were eligible for Medicaid prior to the ACA, individual states determine which cessation treatments are covered under their Medicaid programs; coverage is incentivized through a federal dollars matching program.⁸¹ Just seven states offer comprehensive coverage of cessation treatments.⁸²

The Quit for Life® Program, which is a collaboration between the Society and Alere Wellbeing, has helped more than two million tobacco users make a plan to quit completely. For more than three decades, the Society has encouraged smokers to quit or make a plan to quit on the third Thursday in November as part of the American Cancer Society Great American Smokeout® event. The aim of this initiative is to raise awareness about the benefits of quitting and motivate smokers nationwide to stop smoking, even if just for a day, in hopes that they might stop smoking completely. For more information, visit cancer.org/healthy/stayawayfromtobacco/greatamericansmokeout/index or call 1-800-227-2345. In addition, a US Department of Health and Human Services website (smokefree.gov) offers online advice and downloadable information on quitting, and a national quitline service (1-800-QUITNOW) also provides free quitline counseling services.

Figure 1F. Spending for State Tobacco Prevention Programs and Tobacco Company Advertising and Promotions, US, 2000-2011



USD-United States dollars.

Source: Prevention Spending: Campaign for Tobacco Free Kids. History of Spending for State Tobacco Prevention Programs FY2000-2014. Available at: <http://www.tobaccofreekids.org/research/factsheets/pdf/0209.pdf>. Accessed September 2, 2014. Advertising and Promotional Spending: Federal Trade Commission. Federal Trade Commission Smokeless Tobacco Report for 2011, Federal Trade Commission Cigarette Report for 2011, Washington, DC, 2013.

American Cancer Society, Inc., Surveillance Research, 2015

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.⁸³ Most young smokers want to quit smoking and have tried to quit. In 2013, 48.0% of high school smokers made a quit attempt in the past 12 months.³²

The USPHS updated its clinical practices guideline for tobacco dependence in 2008 and determined that counseling increases tobacco cessation among adolescent smokers. 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 adolescent tobacco use interventions.⁷⁸ More research is needed on the effectiveness of tobacco dependence treatments among young smokers.⁷⁸

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 encouragement, advice, and tips to teens trying to quit smoking. Teens can sign up online at teen.smokefree.gov or text QUIT to iQUIT (47848). Visit youthtobaccocessation.org/index.html or cdc.gov/tobacco/quit_smoking/cessation/youth_tobacco_cessation to find more youth cessation resources.

Funding for Tobacco Control

Since the Master Settlement Agreement with 46 states in 1998, tobacco companies increased their cigarette advertising and promotional expenditures from \$6.9 billion per year to its peak of \$15.4 billion in 2003. Since 2003, these expenditures have declined but still remain higher than they were in 1998. In 2011, tobacco companies spent \$8.8 billion on advertising and promotions (cigarettes: \$8.4 billion, smokeless tobacco: \$450 million) (Figure 1F). Additionally, advertising smokeless tobacco continues to increase, and expenditures on e-cigarette advertising have tripled in recent years.^{24,46}

Research indicates that increased spending on tobacco control by states is associated with lower youth and adult smoking prevalence.^{84,85} However, several of the most effective comprehensive tobacco control programs in the nation have been jeopardized or even eliminated by severe budget cuts as a result of state budget deficits and other political pressures.⁵²

Support for the creation and sustainability of state-level comprehensive tobacco control programs funded at levels recommended by the CDC and commensurate with the state's population, demographics, and tobacco use prevalence has been recommended.^{5,47} In 2014, the CDC-recommended funding level for comprehensive tobacco controls programs in the US was \$3.3 billion.⁴¹ Unfortunately, for fiscal year 2015, the funding level for state tobacco prevention programs is slated to be less than 12% of the recommended level for about one-half of states.⁵²

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. ACS CAN has worked to ensure the passage of numerous state- and federal-level tobacco control efforts and will continue to collaborate with their public health partners to reduce the burden of tobacco use 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.^{1, 86, 87} 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 insufficient physical activity, as well as overweight and obesity.² The American Cancer Society periodically publishes guidelines on nutrition and physical activity for cancer prevention based on a comprehensive review of the scientific literature.⁸⁷ The most recent guidelines, published in 2012, provide recommendations regarding individual behaviors related to weight control, physical activity, diet, and alcohol consumption. The guidelines also include recommendations for community action because of the large influence that physical and social environments have on individual food and activity behaviors.

Individual Choices

The American Cancer Society guidelines for nutrition and physical activity include the four main overarching recommendations shown in the sidebar below.

Adhering to 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. Studies estimate that adults who follow all healthy lifestyle recommendations, including not smoking, are 36% less likely to be diagnosed with cancer and 40% less likely to die from the disease.⁸⁸ Even apart from smoking, each of the recommendations for physical activity, a healthful diet, healthy body weight, and limiting alcohol consumption is an important factor in reducing cancer and all-cause mortality.⁸⁹

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 one hour of moderate- or vigorous-intensity physical activity each day, with vigorous-intensity activity at least three 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 the 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.

Limit alcohol consumption, if you drink at all.

- Drink no more than one drink per day for women or two per day for men.

Community Action

Public, private, and community organizations should work collaboratively at national, state, and local levels to implement environmental policy 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). The World Health Organization (WHO) has defined the ranges for BMI categories as follows: healthy weight 18.5 to 24.9 kg/m², overweight 25.0 to 29.9 kg/m², and obese 30.0 kg/m² or higher for adults. For children, overweight and obesity are also determined by BMI but rely on percentile rankings as described in the sidebar.

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).^{90, 91} Excess body fat can be reduced by decreasing caloric intake and increasing physical activity levels. Limiting consumption of foods and beverages high in calories, fat, and added sugars and replacing them with vegetables and fruits, whole grains, healthy protein sources, and lower-calorie beverages may help reduce caloric intake. Eating smaller portions, limiting between-meal snacks, keeping track of food intake and engaging in physical activity have been shown to be effective weight management strategies.^{87, 92}

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. Children who are overweight are more likely to be overweight in adulthood; 70% of those who are overweight by adolescence will remain overweight as adults.^{93, 94} Therefore, a focus on promoting healthy habits and preventing overweight and obesity in children and adolescents is important because these habits will set the foundation for their lifestyle and risk of disease as adults.^{95, 96}

Body Weight and Cancer Risk

Overweight and obesity are associated with increased risk for developing many cancers, including cancers of the breast in postmenopausal women, colon and rectum, endometrium, kidney, and pancreas, as well as adenocarcinoma of the esophagus.⁸⁷ 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 and levels of hormones (including insulin and estradiol).^{87, 97} Although knowledge about the relationship between weight loss and cancer risk is limited, studies suggest that losing weight may reduce the risk of (postmenopausal) breast cancer.⁹⁸⁻¹⁰⁰ Additionally, 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, which are thought to contribute to the relationship between obesity and certain cancers.¹⁰¹

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 208 pounds and obese if he weighs 209 pounds or more.

Height (feet, inches)	Body weight (pounds)		
	Overweight*	Obese†	Extremely Obese‡
6'4"	205	246	328
6'3"	200	240	319
6'2"	194	233	311
6'1"	189	227	302
6'0"	184	221	294
5'11"	179	215	286
5'10"	174	209	278
5'9"	169	203	270
5'8"	164	197	262
5'7"	159	191	255
5'6"	155	186	247
5'5"	150	180	240
5'4"	145	174	232
5'3"	141	169	225
5'2"	136	164	218
5'1"	132	158	211
5'0"	128	153	204
4'11"	124	148	198
4'10"	119	143	191

*Overweight is defined as BMI of 25-29.9 kg/m². †Obesity is defined as BMI of 30 kg/m² or greater. ‡Extreme obesity is defined as BMI of 40 kg/m² or greater. Note: 1kg = 2.2 pound; 1 inch = 0.0254 meters.

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.¹⁰² 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 the 85th to less than the 95th percentile.¹⁰²

Current Obesity Levels and Trends

Adults

- Among adults ages 20 to 74 years, the prevalence of obesity (BMI \geq 30 kg/m²) doubled between 1976-1980 (15.0%) and 1999-2000 (30.9%).¹⁰³ Since 2003, obesity prevalence among adults ages 20 years and older has not changed and remains around 32-34%.¹⁰⁴ Prevalence of extreme obesity (BMI \geq 40 kg/m²) among adults ages 20 to 74 years increased from 1.4% in 1976-1980 to 6.6% in 2011-2012.¹⁰³
- In 2011-2012, more than two-thirds of American adults were overweight or obese.¹⁰⁴

- Hispanic (45.2%) and non-Hispanic black (57.4%) women had notably higher prevalence of obesity than non-Hispanic white (33.3%) women, but such wide differences are not observed among men (Figure 2A).
- Among non-Hispanic whites, lesbians were more likely to be overweight (55.3%) compared to heterosexual women (50.5%), while gay men are less likely to be overweight (56.6%) compared to heterosexual men (69.4%).¹⁰⁵
- In 2013, obesity prevalence varied widely by state, ranging from 21.3% in Colorado to 35.1% in Mississippi (Table 2A, page 18).

Children and Adolescents

- Between 1976 and 2002, there were rapid increases in obesity prevalence among adolescents (ages 12-19 years); prevalence increased from 5.0% to 16.0%, and this increase was observed across all race/ethnicities and genders.¹⁰⁶ During more recent time periods (between 2005-2008 and 2009-2012), obesity prevalence remained the same for non-Hispanic white boys, Mexican American boys, and Mexican American girls, but decreased for non-Hispanic black girls (Figure 2B, page 19).
- During 2011-2012, the prevalence of obesity among all children and adolescents ages 2 to 19 years was 16.7% among boys and 17.2% among girls. The prevalence of obesity increased with age as 8.4%, 17.7%, and 20.5% in 2- to 5-year-olds, 6- to 11-year-olds, and 12- to 19-year-olds, respectively, were obese.¹⁰⁴

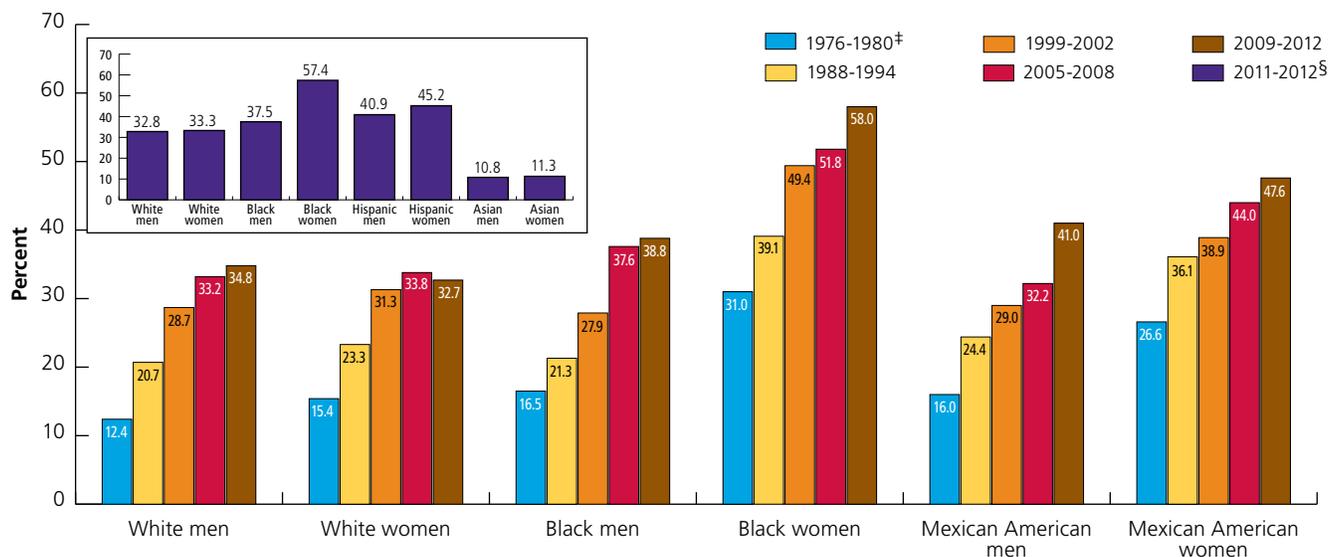
- Among girls ages 12 to 19 years, obesity prevalence was lowest among non-Hispanic Asians (7.3%) and highest among non-Hispanic blacks (22.7%).¹⁰⁴ Among boys ages 12 to 19 years, obesity prevalence was lowest among non-Hispanic Asians (14.8%) and highest in Hispanics (23.9%) (Figure 2B, page 19).
- The percentage of US high school students who were obese in 2013 varied widely across states, ranging from about 6% in Utah to 18% in Kentucky (Table 2B, page 20).

Adopt a physically active lifestyle.

Benefits of Physical Activity

The American Cancer Society recommends that adults get at least 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity exercise per week, or an equivalent combination, preferably spread throughout the week (see page 21). Physical activity acts in a variety of ways to reduce the risk of several types of cancer, including cancers of the breast, colon, and endometrium.⁸⁶ 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 also reduce the risk of mortality and other chronic diseases, such as heart disease, type 2 diabetes, osteoporosis, and hypertension.^{87, 107, 108}

Figure 2A. Obesity* Trends, Adults 20-74 Years, by Gender and Race/Ethnicity†, US, 1976-2012



*Body mass index of 30.0 kg/m² or greater. †Persons of Mexican origin may be of any race. Whites, blacks, and Asians are all non-Hispanic (NH). Data estimates for NH white and NH black 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. Hispanic includes all Hispanics, not just Mexican American Hispanic persons. ‡Data for Mexican Americans are for 1982-84. §NH Asian persons and all Hispanic persons were over-sampled in the 2011-12 National Health and Nutrition Examination Survey sample, NH Asian persons for the first time. Note: Estimates are age adjusted to the 2000 US standard population; see Statistical Notes (page 52) for further information.

Source: National Center for Health Statistics. Health, United States, 2013: With Special Feature on Prescription Drugs. Hyattsville, MD. 2014. Complete trend data available at: <<http://www.cdc.gov/nchs/hus/contents2013.htm#069>> Accessed: May 20, 2014. Insert: Centers for Disease Control and Prevention. National Health and Nutrition Examination Survey, 2011-2012. Public use data file. See Survey Sources (page 53) for complete citation.

American Cancer Society, Inc., Surveillance Research, 2015

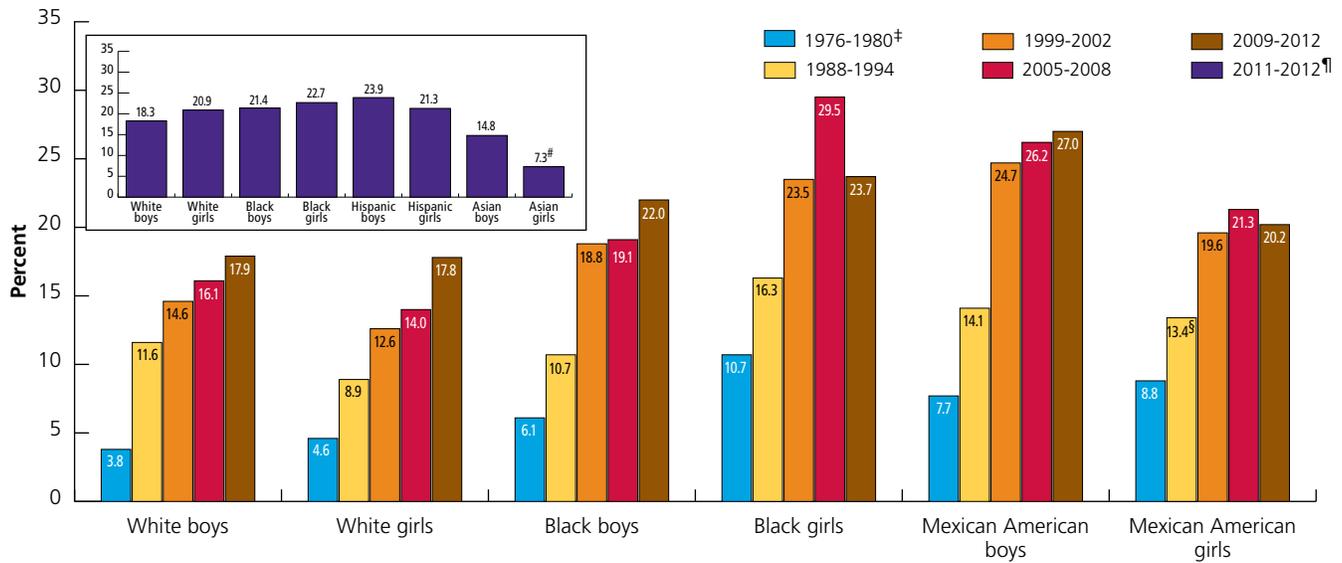
Table 2A. Overweight, Obesity, and Related Factors (%), Adults 18 Years and Older, by State, US, 2013

	Overweight or obese (25.0 kg/m ² or greater)	Overweight (25.0-29.9 kg/m ²)	Obese (30.0 kg/m ² or greater)	Rank* (1=high)	No leisure-time physical activity in past 30 days	Met recommended levels of aerobic activity [†]	Met recommended levels of aerobic & muscle-strengthening activity [‡]	Consumed two or more fruit servings a day	Consumed three or more vegetable servings a day [§]
Alabama	68.2	35.7	32.4	8	31.5	44.7	15.7	20.3	12.4
Alaska	66.1	37.7	28.4	28	22.3	55.0	24.8	30.5	19.5
Arizona	61.8	35.1	26.8	34	25.2	51.0	21.3	27.8	17.7
Arkansas	69.9	35.3	34.6	3	34.4	40.3	13.1	22.4	13.0
California	60.1	36.0	24.1	46	21.4	56.0	23.7	39.8	22.7
Colorado	56.4	35.1	21.3	51	17.9	59.5	25.6	33.5	18.1
Connecticut	62.6	37.6	25.0	43	24.9	50.2	20.0	34.4	15.7
Delaware	64.6	33.5	31.1	13	27.8	48.9	20.4	30.2	14.3
District of Columbia	53.8	30.9	22.9	49	19.5	57.8	25.1	35.2	18.5
Florida	62.8	36.4	26.4	37	27.7	49.4	18.9	31.7	16.8
Georgia	65.7	35.4	30.3	18	27.2	50.1	20.9	26.0	16.0
Hawaii	55.4	33.6	21.8	50	22.1	59.1	25.7	29.1	18.3
Idaho	64.9	35.4	29.6	23	23.7	53.9	20.2	30.6	17.6
Illinois	64.7	35.3	29.4	25	25.1	51.2	20.1	34.5	16.9
Indiana	67.3	35.4	31.8	9	31.1	43.7	15.8	27.2	13.2
Iowa	67.0	35.7	31.3	12	28.5	46.1	17.4	27.5	11.8
Kansas	65.3	35.3	30.0	19	26.5	48.3	17.2	24.2	14.2
Kentucky	67.3	34.1	33.2	5	30.2	45.8	16.3	22.8	11.7
Louisiana	67.4	34.3	33.1	6	32.2	44.5	16.9	20.9	11.3
Maine	64.8	36.0	28.9	27	23.3	53.4	20.2	34.3	17.9
Maryland	64.2	35.9	28.3	29	25.3	48.0	21.1	30.9	16.1
Massachusetts	58.0	34.4	23.6	48	23.5	53.6	22.5	33.8	16.9
Michigan	66.2	34.7	31.5	11	24.4	52.4	18.8	30.1	13.8
Minnesota	61.1	35.6	25.5	41	23.5	52.1	20.4	30.2	14.3
Mississippi	69.3	34.2	35.1	1	38.1	36.5	14.3	21.7	10.9
Missouri	65.5	35.1	30.4	16	28.3	47.4	16.4	25.2	13.2
Montana	61.4	36.8	24.6	45	22.5	56.9	22.6	28.9	16.5
Nebraska	65.5	35.9	29.6	23	25.3	49.5	18.3	29.8	14.2
Nevada	64.9	38.6	26.2	40	23.7	52.4	22.7	30.7	17.6
New Hampshire	61.8	35.0	26.7	35	22.4	54.6	22.2	32.7	17.0
New Jersey	62.8	36.5	26.3	39	26.8	50.0	21.1	31.3	15.1
New Mexico	62.7	36.3	26.4	37	24.3	54.4	22.7	28.3	17.8
New York	61.3	35.9	25.4	42	26.7	47.1	19.2	34.1	16.2
North Carolina	66.1	36.7	29.4	25	26.6	48.1	18.7	23.6	12.7
North Dakota	67.6	36.6	31.0	14	27.6	45.1	16.2	28.1	11.7
Ohio	65.1	34.7	30.4	16	28.5	48.9	18.1	26.4	12.9
Oklahoma	67.9	35.4	32.5	7	33.0	43.0	14.9	19.0	10.6
Oregon	59.9	33.4	26.5	36	18.6	63.2	24.1	34.6	19.7
Pennsylvania	64.5	34.5	30.0	19	26.3	47.5	18.2	30.1	13.4
Rhode Island	64.6	37.3	27.3	31	26.9	48.5	19.2	32.9	14.9
South Carolina	66.5	34.7	31.7	10	26.9	48.2	17.7	25.5	12.5
South Dakota	67.0	37.1	29.9	21	23.9	53.2	18.0	26.4	11.6
Tennessee	68.4	34.7	33.7	4	37.2	37.0	11.8	17.6	11.2
Texas	66.1	35.3	30.9	15	30.1	41.7	17.2	23.5	14.9
Utah	59.2	35.0	24.1	46	20.6	54.4	21.5	33.4	17.2
Vermont	61.9	37.2	24.7	44	20.5	58.5	22.5	34.7	18.1
Virginia	64.0	36.8	27.2	32	25.5	51.3	21.8	31.3	16.4
Washington	61.4	34.3	27.2	32	20.0	55.7	21.0	28.3	16.4
West Virginia	68.8	33.7	35.1	1	31.4	47.1	12.2	19.0	11.7
Wisconsin	66.5	36.7	29.8	22	23.8	52.3	19.3	31.0	13.0
Wyoming	64.4	36.6	27.8	30	25.1	53.6	20.0	27.3	16.3
United States (median)	64.8	35.4	29.4		25.3	50.1	20.0	29.8	15.1
Range	53.8 - 69.9	30.9 - 38.6	21.3 - 35.1		17.9 - 38.1	36.5 - 63.2	11.8 - 25.7	17.6 - 39.8	10.6 - 22.7

*Based on % obese (30kg/m² or greater). †Includes 150 minutes of moderate intensity activity or 75 minutes of vigorous intensity activity each week. ‡Includes 150 minutes of moderate intensity or 75 minutes of vigorous intensity aerobic activity each week and moderate or high intensity muscle strengthening activity involving all major muscle groups at least two days each week. §Vegetables included cooked or canned beans, dark green vegetables, orange colored vegetables or other vegetables (excludes fried potatoes). Note: BRFSS 2013 data results are not directly comparable to BRFSS data prior to 2011 because of the changes in weighting methodology and the addition of the cell phone sampling frame. 2012 American Cancer Society Guidelines for Physical Activity and 2008 Federal Guidelines for Physical Activity are consistent with regards to recommendations for aerobic activity.

Source: Centers for Disease Control and Prevention. Behavioral Risk Factor Surveillance System, 2013. Public use data file. See Survey Sources (page 53) for complete citation. American Cancer Society, Inc., Surveillance Research, 2015

Figure 2B. Obesity* Trends, Adolescents 12 to 19 Years, by Gender and Race/Ethnicity†, US, 1976-2012



*Body mass index (BMI) at or above the sex- and age-specific 95th percentile BMI cutoff points from the 2000 sex-specific BMI-for-age CDC Growth Charts. †Persons of Mexican origin may be of any race. Whites, blacks, and Asians are all non-Hispanic (NH). Data estimates for NH white and NH black 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. Hispanic includes all Hispanics, not just Mexican American Hispanic persons. ‡Data for Mexican Americans are for 1982-84. §Estimate is considered unreliable. ¶NH Asian persons and all Hispanic persons were over-sampled in the 2011-12 National Health and Nutrition Examination Survey sample, NH Asian persons for the first time. #Number of cases <10. Relative standard errors >30% but <40%. Note: Rates are not age adjusted.

Source: National Center for Health Statistics. Health, United States, 2013: With Special Feature on Prescription Drugs. Hyattsville, MD, 2014. Complete trend data available at: <<http://www.cdc.gov/nchs/hus/contents2013.htm#070>> Accessed: May 20, 2014. Insert: Ogden, CL, et al. *JAMA*. 2014;311(8):806-814.

American Cancer Society, Inc., Surveillance Research, 2015

Types of Physical Activity and Recommendations

Adults: Usual physical activity during a person’s daily routine is generally low intensity and includes mostly short bouts of activity. Intentional physical activities (done in addition to usual activities) and activities associated with exercise or active transportation (e.g., bike riding, brisk walking) generally require the expenditure of more energy; engage large muscle groups; and cause a noticeable increase in heart rate, breathing depth and frequency, and sweating (see sidebar, page 21, for examples).

Walking is an accessible and inexpensive form of physical activity and is the most commonly reported type of physical activity among US adults, according to 2010 data.¹⁰⁹ Walking is an important component of total physical activity as it necessitates use of large skeletal muscles and confers health benefits of physical activity with few adverse effects.¹¹⁰

Although the optimal intensity, duration, and frequency of physical activity needed to reduce cancer risk is not fully known, studies suggest that higher amounts of physical activity (e.g., 300 minutes of moderate-intensity activity per week or 150 minutes of vigorous-intensity activity per week or more) likely provide even greater reductions in cancer risk than lower physical activity levels.⁸⁷ Other studies have shown that being active at these high levels of physical activity helps to prevent weight gain and obesity.^{90, 91} By helping to maintain a healthy weight,

this amount of physical activity may have an effect on reducing the risk of developing obesity-related cancers.⁸⁷ Despite the evidence, the majority of US adults are not meeting recommended levels of aerobic and muscle-strengthening activity, though levels of these activities have improved over time (Figure 2C, page 21).

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 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 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) and replacing them, when possible, with light to moderate activity (such as incidental walking and “moving about”). There is accumulating evidence that long periods of sitting, independent of levels of

Table 2B. Overweight and Obesity, High School Students, by State and City/County*, US, 2013

	Overweight [†]	Obese [‡]	Rank [§] (1=high)
United States	16.6	13.7	
State			
Alabama	15.8	17.1	3
Alaska	13.7	12.4	23
Arizona	12.7	10.7	35
Arkansas	15.9	17.8	2
California¶	–	–	–
Colorado¶	–	–	–
Connecticut	13.9	12.3	24
Delaware	16.3	14.2	10
District of Columbia	17.5	14.8	9
Florida	14.7	11.6	28
Georgia	17.1	12.7	18
Hawaii	14.9	13.4	14
Idaho	15.7	9.6	40
Illinois	14.4	11.5	31
Indiana¶	–	–	–
Iowa¶	–	–	–
Kansas	16.3	12.6	20
Kentucky	15.4	18.0	1
Louisiana	16.4	13.5	12
Maine	14.2	11.6	28
Maryland	14.8	11.0	34
Massachusetts	12.9	10.2	39
Michigan	15.5	13.0	16
Minnesota#	–	–	–
Mississippi	13.2	15.4	7
Missouri	15.5	14.9	8
Montana	12.9	9.4	41
Nebraska	13.8	12.7	18
Nevada	14.6	11.4	32
New Hampshire	13.8	11.2	33
New Jersey	14.0	8.7	42
New Mexico	15.0	12.6	20
New York	13.8	10.6	38
North Carolina	15.2	12.5	22
North Dakota	15.1	13.5	12
Ohio	15.9	13.0	16
Oklahoma	15.3	11.8	27
Oregon#	–	–	–
Pennsylvania¶	–	–	–
Rhode Island	16.2	10.7	35
South Carolina	16.8	13.9	11
South Dakota	13.2	11.9	26
Tennessee	15.4	16.9	4
Texas	15.6	15.7	5
Utah	11.0	6.4	43
Vermont	15.8	13.2	15
Virginia	14.7	12.0	25
Washington#	–	–	–
West Virginia	15.5	15.6	6
Wisconsin	13.0	11.6	28
Wyoming	12.8	10.7	35
City/County*			
Baltimore, MD	18.4	17.0	
Boston, MA	18.2	13.8	
Broward County, FL	13.1	8.2	
Charlotte-Mecklenburg, NC	14.1	11.8	
Chicago, IL	15.6	14.5	
Detroit, MI	22.8	22.9	
Duval County, FL	17.4	11.8	
Houston, TX	16.3	17.9	
Los Angeles, CA	17.8	13.6	
Memphis, TN	18.0	19.2	
Miami-Dade County, FL	13.9	9.4	
Milwaukee, WI	15.3	19.3	
New York City, NY	16.6	11.8	
Orange County, FL	13.8	10.1	
Palm Beach County, FL	15.3	9.5	
Philadelphia, PA	18.1	14.6	
San Bernardino, CA	14.5	15.6	
San Diego, CA	16.4	11.4	
San Francisco, CA	13.2	7.7	
Seattle, WA	12.2	7.7	

*Representative of large urban school districts. †Body mass index (BMI) at or above 85th percentile but below 95th percentile of age- and sex-specific 2000 CDC growth chart. ‡BMI at or above 95th percentile of age- and sex-specific 2000 CDC growth chart. §Based on % obese. ¶Youth Risk Behavior Surveillance System (YRBSS) does not report unweighted state survey data. #State did not participate in the YRBSS 2013 cycle. Participation in YRBSS is a voluntary collaboration between a state's departments of health and education.

Source: Kann L, Kinchen S, Shanlin SL, et al., Youth Risk Behavior Surveillance - US, 2013. *MMWR Surveill Summ* 2014;63(SS04): 1-168.

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physical activity, increase the likelihood of becoming obese and developing type-2 diabetes, cardiovascular disease, and various types of cancers, and increase overall mortality.^{111,112} Therefore, breaking up sitting time is likely to be beneficial.

Children and Adolescents: Physical activity plays an important role in the health and well-being of children and adolescents. Therefore, children and adolescents should be encouraged to be physically active at moderate- to vigorous-intensity activities for at least 60 minutes daily.^{87, 113} The availability of routine, high-quality physical education (PE) programs is a recognized and critically important way of increasing physical activity among youth. Daily PE 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.^{114, 115} The American Cancer Society Cancer Action Network (ACS CAN) recommends that states and school districts require high-quality PE for a minimum of 150 minutes per week in elementary schools and 225 minutes per week in middle and high school.¹¹⁶ Some states have already established such requirements (Table 2C, page 22). High-quality PE engages students in physical activity for at least half of the class time and teaches students the skills and information they need to be physically active for the rest of their lives. Other forms of school-based physical activity, such as recess and classroom breaks, should supplement but not replace PE. Outside of school-based PE classes, in 2012, the most common physical activity among boys ages 12 to 15 years was basketball (48.0%), followed by running (33.5%) and football (27.4%).¹¹⁷ For girls the most common physical activity outside of school-based PE classes was running (34.9%), followed by walking (27.6%) and basketball (21.4%).¹¹⁷



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, power yoga	Jogging or running, fast bicycling, circuit weight training, aerobic dance, martial arts, jumping rope, swimming
Sports	Volleyball, golfing (without a cart), 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)

Current Physical Activity Levels

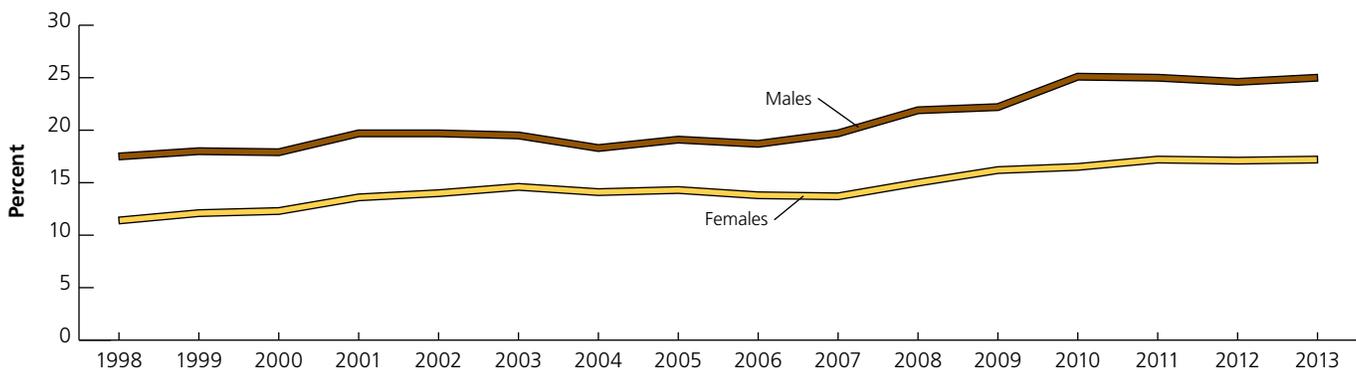
Adults

- In 2013, 30.5% of adults reported no leisure-time physical activity during an average week (Table 2D, page 23).
- About one-half (50.1%) of adults reported engaging in at least 150 minutes of moderate or 75 minutes of vigorous activity per week (men: 54.3%, women: 46.2%) (Table 2D, page 23).
- The percentage of adults reporting no leisure-time physical activity in the past 30 days ranged from 17.9% in Colorado to 38.1% in Mississippi (Table 2A, page 18).
- Oregon (63.2%) had the highest proportion of adults who reported meeting recommended levels of aerobic activity (engaging in at least 150 minutes of moderate or 75 minutes of vigorous aerobic activity per week), while Mississippi (36.5%) had the lowest (Table 2A, page 18).

Children and Adolescents

- In 2012, 24.8% of youth ages 12 to 15 years met recommended levels of physical activity (being physically active for at least 60 minutes daily).¹¹⁷
- In 2013, 27.1% of US high school students met recommended levels of physical activity, and 29.4% attended PE classes daily (Table 2C, page 22).
- In 2013, the the proportion of high school students meeting recommended physical activity levels varied by state, ranging from 16.4% in the District of Columbia to 38.5% in Oklahoma (Table 2C, page 22).
- In 2013, 32.5% of US high school students reported watching three or more hours of television per day, and 41.3% played video games or used a computer for something that was not school work for three or more hours a day (Table 2C, page 22).

Figure 2C. Trends in Physical Activity*, Adults 18 Years and Older, US, 1998-2013



*Met both aerobic and muscle-strengthening federal 2008 Physical Activity Guidelines for Americans. Note: Estimates are age adjusted; see Statistical Notes (page 52) for further information.

Source: 1998-2012: National Center for Health Statistics. Health, United States, 2013: With Special Feature on Prescription Drugs. Hyattsville, MD. 2014. Complete trend data available at: <<http://www.cdc.gov/nchs/hus/contents2013.htm#068>> Accessed: May 21, 2014. 2013: Centers for Disease Control and Prevention. National Health Interview Survey, 2013. Public use data file. See Survey Sources (page 53) for complete citation.

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Table 2C. Factors Related to Physical Activity and Nutrition, High School Students, by State and City/County*, US, 2013

	Played video or computer games or used a computer [†] three or more hours/day [‡]	Watched three or more hours/day of TV [‡]	Played on one or more sports teams [§]	Met recommended levels of physical activity [¶]	Attend PE daily [#]	Time requirements for PE ^{**}	Consumed fruit or 100% fruit juice two or more times / day ^{††}	Ate vegetables three or more times/day ^{‡‡}
United States	41.3	32.5	54.0	27.1	29.4	–	33.2	15.7
State								
Alabama	39.8	33.1	54.1	24.8	35.7	C	24.0	11.0
Alaska	33.5	20.5	60.3	20.9	16.0	C	29.3	15.5
Arizona	36.9	27.1	50.5	21.7	23.0	C	–	–
Arkansas	29.3	32.8	52.9	27.5	23.0	C	25.7	13.8
California ^{§§}	–	–	–	–	–	B	–	–
Colorado ^{§§}	–	–	–	–	–	C	–	–
Connecticut	36.7	24.1	–	26.0	–	C	31.0	14.6
Delaware	39.8	33.9	56.6	23.7	13.1	C	34.1	–
District of Columbia	40.4	40.1	54.5	16.4	–	C	29.1	13.6
Florida	40.9	31.2	50.5	25.3	24.2	C	34.1	15.1
Georgia	35.5	32.2	55.7	24.7	33.6	C	29.1	11.4
Hawaii	42.1	29.3	52.1	22.0	7.3	C	27.1	–
Idaho	27.7	19.6	61.3	27.9	22.4	C	28.4	13.1
Illinois	36.7	29.1	58.9	25.4	63.6	B	32.6	12.4
Indiana ^{§§}	–	–	–	–	–	C	–	–
Iowa ^{§§}	–	–	–	–	–	C	–	–
Kansas	33.8	25.0	61.2	28.3	27.9	C	26.8	12.4
Kentucky	34.5	26.7	50.8	22.5	19.3	C	25.7	11.6
Louisiana	30.9	33.7	60.3	–	33.6	C	–	–
Maine	36.8	23.1	–	22.3	4.5	C	32.0	–
Maryland	36.3	31.4	–	21.6	18.2	C	31.9	13.8
Massachusetts	38.8	25.0	60.2	23.0	16.7	C	–	–
Michigan	34.1	27.0	–	26.7	26.8	C	29.2	11.9
Minnesota ^{¶¶}	–	–	–	–	–	C	–	–
Mississippi	46.2	39.5	50.9	25.9	28.7	C	25.4	14.4
Missouri	32.7	25.6	55.2	27.2	30.9	C	24.6	11.5
Montana	29.7	22.6	63.7	27.7	34.9	C	28.2	13.2
Nebraska	28.1	22.8	65.2	32.3	34.9	C	26.4	11.7
Nevada	38.0	29.3	50.9	24.0	25.9	B	29.4	11.6
New Hampshire	–	–	–	22.9	18.2	C	–	–
New Jersey	36.6	28.5	–	27.6	45.2	B	30.8	11.8
New Mexico	35.3	26.4	–	31.1	25.1	C	29.9	17.5
New York	39.5	27.4	–	25.7	18.9	B	33.2	–
North Carolina	42.4	33.0	–	25.9	–	C	27.1	12.5
North Dakota	34.4	21.0	–	24.7	–	B	28.9	12.0
Ohio	37.3	28.2	62.2	25.9	–	C	30.1	12.0
Oklahoma	43.0	31.9	60.1	38.5	32.2	C	24.1	11.2
Oregon ^{¶¶}	–	–	–	–	–	C	–	–
Pennsylvania ^{§§}	–	–	–	–	–	C	–	–
Rhode Island	38.5	27.1	54.9	23.2	25.7	C	32.6	13.8
South Carolina	37.7	33.3	53.8	23.8	–	C	27.5	9.7
South Dakota	33.2	23.6	–	27.7	18.5	C	30.5	12.5
Tennessee	36.2	34.1	53.5	25.4	22.3	C	27.5	12.3
Texas	38.0	32.9	54.7	30.0	38.3	C	29.4	10.8
Utah	25.1	14.9	63.5	19.7	18.6	B	34.3	14.2
Vermont	–	–	–	25.4	14.5	C	–	–
Virginia	38.0	28.2	60.7	23.8	13.3	C	31.4	12.9
Washington ^{¶¶}	–	–	–	–	–	A	–	–
West Virginia	41.6	32.9	52.1	31.0	30.7	C	31.2	15.3
Wisconsin	34.2	22.5	–	24.0	39.4	C	33.9	–
Wyoming	31.3	22.1	60.2	28.2	23.7	C	31.3	16.4
City/County*								
Baltimore, MD	35.7	43.5	48.0	17.7	15.7	–	25.6	12.1
Boston, MA	41.5	34.8	44.9	15.3	9.0	–	28.4	10.5
Broward County, FL	37.3	31.0	48.2	23.2	27.2	–	33.3	12.8
Charlotte-Mecklenburg, NC	39.5	36.8	50.6	25.8	19.3	–	36.7	14.8
Chicago, IL	45.0	36.9	50.0	19.6	38.9	–	29.8	11.0
Detroit, MI	33.3	37.7	–	13.3	16.5	–	21.3	12.8
Duval County, FL	38.9	37.4	47.8	18.8	7.8	–	27.2	11.6
Houston, TX	34.2	32.7	43.9	18.1	21.7	–	28.4	12.7
Los Angeles, CA	37.0	33.7	49.2	22.5	33.9	–	32.0	13.4
Memphis, TN	42.6	47.5	50.3	18.5	34.0	–	33.8	12.8
Miami-Dade County, FL	43.6	34.2	44.3	23.8	8.3	–	33.5	14.8
Milwaukee, WI	36.5	35.8	–	15.8	28.0	–	30.2	–
New York City, NY	41.7	31.3	–	18.7	40.9	–	29.2	–
Orange County, FL	40.5	31.5	49.7	23.9	27.2	–	31.3	9.6
Palm Beach County, FL	35.5	30.0	50.9	24.0	14.5	–	31.3	13.9
Philadelphia, PA	46.7	40.5	44.8	20.9	17.4	–	25.9	11.9
San Bernardino, CA	43.2	36.8	54.7	25.7	38.2	–	36.6	17.4
San Diego, CA	40.2	27.9	52.9	26.9	40.1	–	33.9	14.1
San Francisco, CA	41.5	21.5	–	16.4	–	–	32.9	15.9
Seattle, WA	29.1	19.3	57.9	22.1	15.4	–	34.8	17.5

PE- physical education. *Representative of large urban school districts. †For something that was not school work. ‡On an average school day. §Operated by school or community group, during 12 months preceding survey. ¶Physical activity that increased heart rate and made breathing difficult some of the time for a total of at least 60 minutes/day on all 7 days preceding the survey. #Five days/week when in school. **A-State requires at least 225 minutes of PE/week for high school students. B-State requires between 90 and 225 minutes of PE/week for high school students. C-State requires less than 90 minutes of PE/week or does not require PE at all. California, Nevada, & Utah: PE required for ≥2 years in HS, but not all 4 years, or an exemption from PE permitted for up to 2 years in HS. Illinois: PE required for ≥2 years in HS, but not all 4 years, or an exemption from PE permitted for up to 2 years in HS. Daily PE required at all school levels, but specific number of minutes has not been set. New Jersey: Required number of minutes also includes time for health and safety education. ††During 7 days preceding survey. ‡‡Vegetables include: green salad, potatoes (excluding French fries, fried potatoes, or potato chips), carrots, or other vegetables, during the 7 days preceding the survey. §§Youth Risk Behavior Surveillance System (YRBSS) does not report unweighted state survey data. ¶¶State did not participate in the YRBSS 2013 cycle. Participation in YRBSS is a voluntary collaboration between a state's departments of health and education.

Source: PE Time Requirements: American Cancer Society Cancer Action Network, *How Do You Measure Up? A Progress Report on State Legislative Activity to Reduce Cancer Incidence and Mortality*, 2014. All other data: Kann L, Kinchen S, Shanlin SL, et al., Youth Risk Behavior Surveillance - US, 2013. *MMWR Surveill Summ* 2014;63(SS04): 1-168.

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Consume a healthy diet with an emphasis on plant sources.

The scientific study of the human diet is highly complex, and the food supply is constantly changing. In addition, cancers develop over a number of years, 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 remains a research priority for the Society and other research organizations. The evidence relating certain dietary factors and patterns to cancer prevention is consistent and provides a strong basis for guidelines.⁸⁷

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, added sugar, and refined carbohydrates, as well as sugar-sweetened beverages.¹¹⁸ 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 diet that emphasizes plant foods may help to displace these calorie-dense foods. Limiting portion sizes (see sidebar, page 24), especially of calorie-dense foods and beverages, will also reduce total caloric intake.

Processed and Red Meats

Numerous studies have examined the relationship between the consumption of processed meats (e.g., lunch meats, bacon, hot dogs) and red meats (e.g., beef, lamb, pork) and cancer risk. High intake of processed or red meat has been convincingly associated with increased risk of colorectal cancer¹¹⁹ and limited, but suggestive evidence for pancreatic cancer.¹²⁰ Consumption of meat is also associated with modest but significant increases in overall cancer incidence and mortality, as well as death from other causes.^{86, 121} Substances such as nitrates or nitrites used to preserve processed meats can contribute to the formation of nitrosamines, which are involved in carcinogenesis.¹²¹ Although all types of meat are good sources of high-quality protein and can supply vitamins and minerals, fatty meats and fried meat are major sources 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 and smaller portions (e.g., served as a side dish rather than the focus of a meal) and by choosing fish or poultry. Legumes, which are rich in nutrients that may protect against cancer, can serve as a healthier source of protein than red meats.

Table 2D. Physical Activity (%)*, Adults 18 Years and Older, US, 2013

	No leisure-time physical activity	Met recommended levels of aerobic activity [†]	Met recommended levels of aerobic & muscle-strengthening activity [‡]
Overall	30.5	50.1	21.0
Sex			
Males	28.5	54.3	25.0
Females	32.2	46.2	17.2
Age (years)			
18-24	23.7	61.5	30.3
25-44	25.6	55.1	24.0
45-64	32.7	46.7	18.2
65+	43.4	35.0	11.3
Race/Ethnicity			
White (non-Hispanic)	26.9	53.6	22.9
Black (non-Hispanic)	38.4	41.8	18.1
Hispanic	39.7	42.9	16.6
American Indian / Alaska Native	32.7	49.1	17.4
Asian (non-Hispanic) [§]	29.7	49.0	17.9
Sexual Orientation			
Gay/lesbian [¶]	23.0	53.9	26.8
Straight [#]	30.5	50.1	20.9
Bisexual	26.2	52.8	21.7
Education Level**			
Some high school or less	52.2	30.5	7.9
High school diploma or GED	40.3	39.7	13.6
Some college/Assoc. degree	29.9	49.5	19.6
College graduate	17.3	61.5	28.6
Insurance Status			
Uninsured	39.9	41.7	14.2
Insured	28.4	52.0	22.6
Immigration Status			
Born in US	28.8	51.8	22.4
Born in US territory ^{††}	43.7	37.8	14.1
In US fewer than 10 yrs	43.6	40.6	14.0
In US 10+ years	36.6	43.7	15.7
Region^{††}			
Northeast	32.7	49.2	22.2
Midwest	28.9	50.0	21.7
South	33.1	47.3	18.2
West	26.1	55.4	23.8

GED-General Educational Development high school equivalency. *Estimates are age adjusted to the 2000 US standard population; see Statistical Notes (page 52) for further information. †Includes 150 minutes of moderate intensity activity or 75 minutes of vigorous intensity activity each week. ‡Includes 150 minutes of moderate intensity or 75 minutes of vigorous intensity aerobic activity each week and moderate or high intensity muscle strengthening activity involving all major muscle groups at least two days each week. §Does not include Native Hawaiians or other Pacific Islanders. ¶Response option provided on the NHIS was "gay" for men and "gay or lesbian" for women. #Response option provided on the NHIS was "straight, that is, not gay" for men and "straight, that is not gay or lesbian" for women. **Among persons ages 25 years or older. ††Have been in the US for any length of time. †††Northeast: CT, ME, MA, NH, NJ, NY, PA, RI, and VT. Midwest: IL, IN, IA, KS, MI, MN, MO, NE, ND, OH, SD, and WI. South: AL, AR, DE, DC, FL, GA, KY, LA, MD, MS, NC, OK, SC, TN, TX, VA, and WV. West: AK, AZ, CA, CO, HI, ID, MT, NV, NM, OR, UT, WA, and WY.

Source: Centers for Disease Control and Prevention. National Health Interview Survey, 2013. Public use data file. See Survey Sources (page 53) for complete citation.

American Cancer Society, Inc., Surveillance Research, 2015

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. There is probable evidence that greater consumption of non-starchy vegetables (such as broccoli, green beans, lettuce and squash) and fruits is associated with lower risk of mouth, pharynx, larynx, esophageal and stomach cancers.¹²² Evidence also suggests that consuming non-starchy vegetables lowers the risk of hard-to-treat estrogen-receptor negative breast tumors.¹²³ The potential benefits of vegetable and fruit consumption on cancer risk may also stem from their replacement of other, more calorie-dense foods and associated maintenance of a healthy weight.⁹²

For these reasons, consumption of low-calorie, whole vegetables and fruits has been encouraged by a number of health organizations, including the American Cancer Society.^{87, 90, 108} However, the consumption of these foods remains lower than is recommended among US adults and children,⁹² due to lack of affordable produce, preparation time and taste preferences, and the abundance of relatively inexpensive options (e.g., processed snacks, sugared sodas, and fast food) that compete with healthier choices.¹²⁴

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, 2010.⁹⁰ Consumers are encouraged to fill half of their plate with vegetables and fruits for meals and snacks.

Current Prevalence of Vegetable and Fruit Consumption

Adults

- In 2013, 15.1% of adults consumed three or more servings of vegetables per day and ranged from 10.6% in Oklahoma to 22.7% in California. (Table 2A, page 18).
- A median of 29.8% of adults reported eating two or more servings of fruits daily in 2013, ranging from 17.6% in Tennessee to 39.8% in California (Table 2A, page 18).

Adolescents

- Only 15.7% of high school students reported consuming vegetables three or more times per day, the lowest proportion of students in South Carolina (9.7%), the highest in New Mexico (17.5%) (Table 2C, page 22).
- In 2013, about one in three (33.2%) US high school students consumed 100% fruit juice or fruit two or more times a day, ranging from 24.0% of high school students in Alabama to 34.3% in Utah (Table 2C, page 22).

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 compared to refined flour products.⁹⁰ Although evidence of the association between whole-grain foods and different types of cancer is limited, studies support a role for high intake of whole-grain foods and a diet high in fiber in reducing the risk of colorectal cancer.¹¹⁹ Furthermore, epidemiological evidence shows that overall healthier diet patterns, including more whole grains (and fewer refined grains), fruits, vegetables, fish, poultry, and healthy oils, are associated with a lower risk of death, including death from cardiovascular disease and cancer.¹²⁵

Limit alcohol consumption, if you drink at all.

People who drink alcohol should limit their intake to no more than two drinks per day for men and one drink per day for women.⁹⁰ 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 risk factor for cancers of the mouth, pharynx, larynx, esophagus, liver, colorectum, and female breast, and there is some evidence of an association with pancreatic cancer.^{86, 87, 126, 127} Combined with tobacco use, alcohol consumption increases the risk of cancers of the mouth, larynx, and esophagus far more than the independent effect of either drinking or smoking alone.⁸⁶ Breast cancer risk increases with increasing intake of alcohol, and studies suggest a modest increased risk at even a few drinks per week.¹²⁸ Therefore, reducing

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 alternatives 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 vegetables and fruits; choose 100% juice if you drink vegetable or fruit juices.
- Limit consumption of creamy sauces, dressings, and dips with vegetables and fruits.

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.

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.¹²⁹ There is no compelling reason for non-drinkers 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 and high in a variety of plant foods, maintaining a healthy weight, staying physically active, and controlling blood pressure and lipids.¹³⁰ 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.

Current Prevalence and Trends in Alcohol Consumption

- According to 2012 nationwide data, the prevalence of heavier drinking (defined as 2 or more and 1 or more drinks per day for men and women, respectively), was around 5% for adults ages 18 years and older.¹⁰⁶
- Annual per capita alcohol consumption decreased from 2.8 gallons in 1980 to less than 2.1 gallons in 1998. Since 1998, per capita consumption has been increasing and rose to 2.3 gallons in 2011.¹³¹

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.¹⁰⁸ In 2012, it was estimated that treating obesity-related illness in the US cost \$190.2 billion per year.¹³² Experience in tobacco control and other public health initiatives has shown that public policies and environmental strategies may be powerful tools to impact structural socioenvironmental change to alter population-level behavior.

Policies and programs that support healthy behaviors throughout a person's life cycle are needed to address the prevailing socioenvironmental factors contributing to increased obesity.^{87, 108} These factors include lack of access to full-service grocery stores, wide availability of unhealthy foods and heavily marketed, relatively high costs of healthy foods compared to processed foods, and lack of access to safe places to play and exercise.¹¹⁷ Historical changes that likely contributed to the obesity epidemic include shifts from using walking as a mode of transportation to increased reliance on automobiles, increased sedentary work, more meals eaten away from home, increased availability of cheap but energy-dense processed foods, increased consumption of larger portion sizes, and increased consumption of sugar-sweetened beverages.^{87, 92, 117, 124}

Many experts as well as governmental and nongovernmental organizations recognize that obesity is a complex problem that requires a broad range of effective approaches.^{87, 108} The American Cancer Society believes that while educating the public

Community Action at Work to Reduce Obesity

A Communities Putting Prevention to Work (CPPW) initiative to prevent childhood obesity was implemented in low-income school districts within King County, Washington, from 2010–2012.¹³⁴ The CPPW initiative aimed to prevent youth obesity by implementing strong nutrition standards for school meals, student-led efforts focused on healthy eating and physical activity, and getting involved with community health coalitions, among other initiatives. The prevalence of obesity significantly decreased among students in CPPW schools over the intervention period while there was no significant change in obesity prevalence among students in non-CPPW schools. The results of these efforts suggest that modifications in policy, systems, and the environment can play an important role in reducing obesity among youth.

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.^{87, 133} 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. Schools and child care facilities, workplaces, and health care facilities are important settings for the implementation of policies and programmatic initiatives (see sidebar, above, for an example). 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 so behaviors transfer outside the setting through linkage with community-based prevention programs.¹⁰⁸

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.^{95, 96}

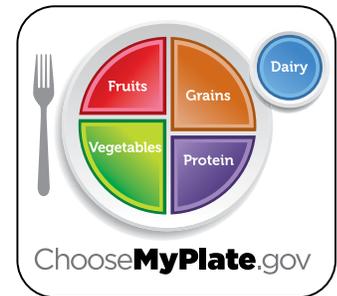
- States, school districts, and schools can require that students receive the recommended amount of quality PE, as well as set and implement science-based nutrition standards for all foods and beverages sold and served in schools.
- Employers can implement worksite health promotion programs^{95, 96} but should not tie health insurance premiums to health behaviors or health status.
- Health care professionals can assess weight status and advise and assist their patients on effective weight loss and weight management programs.^{135, 136} The US Preventive Services Task Force recommends behavioral counseling to promote a healthy lifestyle among people at high risk for cardiovascular disease¹³⁷ and behavioral counseling for weight loss among youth and adults who are obese.^{138, 139}

- 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 to bring food stores that carry fresh vegetables and fruits into poor neighborhoods, and the creation of safe spaces that promote physical activity.⁹³

The Centers for Disease Control and Prevention (CDC), the Institute of Medicine, the WHO, and others have outlined a variety of evidenced-based approaches for schools, worksites, and communities to halt and ultimately reverse obesity trends.^{86, 95, 129, 133}

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 (USDA) and the US Department of Health and Human Services (HHS)



Dietary Guidelines for Americans, 2010 recommend for the first time that Americans eat smaller portions in order to achieve and maintain a healthy weight.⁹⁰ They also recommend that Americans consume nutrient-dense foods and beverages and increase their consumption of vegetables and fruits, whole grains, and low-fat dairy, and vary protein sources, while decreasing added sugars, refined grains, solid fats, and sodium.⁹⁰ The complementary MyPlate¹⁴⁰ icon has replaced MyPyramid as the visual symbol of what a healthy meal should look like. The Dietary Guidelines for Americans, 2010 and MyPlate are generally consistent with the Society's nutrition guidelines for cancer prevention (see image). Importantly, the Dietary Guidelines for Americans, 2010 provide the basis for all federal nutrition policies and programs.

These guidelines are updated every five years, with the next report to be released in 2015. As part of the development of the Dietary Guidelines for Americans, the USDA and HHS appoint an advisory committee that reviews the scientific literature and makes recommendations to the federal government. ACS CAN has been monitoring and providing input on the development of the Dietary Guidelines for Americans, 2015 to ensure they are 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. These provisions include setting minimum nutrition standards for school meals and snacks, providing increased funding to schools that meet the updated standards, and strengthening school district-level wellness policies. In January 2012, the USDA released final updated nutrition



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

- To reduce the risk of cancer and other chronic diseases, the Society works to: promote weight control, increase physical activity, improve diet, and help facilitate changes in schools, worksites, and communities – all of which make it easier for people to make healthier choices.⁸⁷
- 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 advocates for improved school nutrition standards and PE requirements in schools on the state and local level. In collaboration with partner organizations, the Society and ACS CAN recently developed a new policy statement on PE in schools recommending that states and school districts improve the quality and increase the quantity of PE in schools, supplemented by additional school-based physical activity opportunities.

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

- 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 and ACS CAN support the creation of school environments that promote 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. ACS CAN advocates for evidence-based nutrition standards for all foods and beverages that are sold, served, and marketed in schools and for improvements in the quality and quantity of PE. The Society supports the Joint Committee on National Health Education Standards, which published the National Health Education Standards and has been a leader in professional development to advance the implementation of the standards by states and local school districts.

standards for school meals. The updated nutrition standards began to encompass school breakfasts in the fall of 2013.¹⁴¹ The Smart Snacks in School standards, which set evidence-based nutrition standards for snacks and beverages sold a la carte, in vending machines, and in school stores, were implemented in the fall of 2014. Schools certified as meeting the updated nutrition standards for school meals receive increased federal reimbursement.¹⁴¹ In June 2014, the USDA reported that more than 90% of schools were meeting the updated school meal standards.¹⁴²

The Affordable Care Act (ACA) provides funding and support for obesity prevention initiatives. It 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-promotion strategies to reduce obesity and tobacco use and strengthen the public health infrastructure.

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. In fiscal year 2014, the CDC created 193 awards totaling \$212 million to prevent and control chronic disease in the US.¹⁴³ They currently are funding a state-based program to prevent and control diabetes, heart disease, obesity, and related risk factors in all 50 states and the District of Columbia. Large and small cities and counties, tribes and tribal organizations, and national and community organizations are also being funded by the CDC to implement similar initiatives focused on making policy and systems changes that improve diet, increase physical activity, and reduce tobacco use as some of the primary goals.

In November 2014, the USDA issued a final rule regarding menu labeling in retail food establishments and vending machines.¹⁴⁴ The menu/menu board labeling rule for retail food establishments will enable consumers to make educated, healthful food choices by viewing calorie information for food items before they are purchased. The rule mandates that by November 2015 facilities that are part of a chain with 20 or more locations must post calorie information for the food items they serve. Such facilities include fast-food, sit-down, and take-out/delivery restaurants, as well as grocery stores and coffee shops. By November 2016, foods sold in vending machines operated by a person owning or operating at least 20 machines must display calorie information.

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.^{145, 146} Stratospheric ozone depletion has exacerbated these health effects by allowing more UVR to reach the Earth's surface.¹⁴⁷ The three main types of skin cancer are: melanoma, basal cell, and squamous cell carcinoma. Basal cell and squamous cell carcinomas are the most frequent and highly curable forms of skin cancer.¹⁴⁸ Melanoma is a less common but more serious form of skin cancer. The American Cancer Society estimates that 73,870 people will be diagnosed with melanoma and 9,940 will die from the disease in 2015.³ Melanoma primarily afflicts non-Hispanic whites; incidence rates are 20 times higher in non-Hispanic whites than in blacks. The incidence of melanoma in the US has been increasing for at least 30 years, in part due to changes in behavior that have resulted in increased exposure to solar UVR, use of indoor tanning devices by young adult non-Hispanic white women, and increased detection.¹⁴⁹⁻¹⁵¹

Solar Ultraviolet Exposure

Everyone is exposed to naturally occurring solar UVR, which is an invisible kind of radiation that can penetrate, change, and damage skin cells. UVR is also a primary source of vitamin D, which is important for bone health. Vitamin D is naturally present in a few foods (e.g., oily fish, eggs), added to others (e.g., milk, cereal), and available as a dietary supplement.¹⁵² The current national recommended daily intake of vitamin D is 400 international units

(IU) to 800 IU and varies based on age, gender, and pregnancy status.¹⁵³ The amount of sunlight exposure it takes to make enough vitamin D depends on many environmental factors (i.e., latitude, season, etc.). Research is underway to improve the understanding of vitamin D levels and its positive effects on health, including its protective association against some cancers.^{152, 153}

The extent of an individual's exposure to sunlight is determined by personal behaviors (e.g., sunbathing, sunscreen use), as well as occupational circumstances. Environmental factors such as time of day, season, geographic location, altitude, and other weather conditions also affect people's solar radiation exposure. The Environmental Protection Agency (EPA) has developed the "UV Index," taking into account these environmental factors to help inform the public about UVR risk on a daily basis.¹⁵⁴ The UV Index scale ranges from 0 to 11 indicating the harm from the sun's UV rays to an average person, with 0 representing the lowest risk and 11 representing the highest risk.¹⁵⁴

Exposure to UVR, the sensitivity of a person's skin to UVR, and the duration and intensity of exposure are important risk factors for skin cancers.¹⁵⁵ People whose skin tans poorly or burns easily after UVR exposure are particularly susceptible to skin cancer.¹⁵⁶ 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.¹⁵⁷ The negative effects of UVR are cumulative over a lifetime.¹⁵⁸

Risk Factors and Preventive Measures for Melanoma and Other Skin Cancers

Risk factors for melanoma^{146, 159-163}

- Exposure to ultraviolet rays, including use of indoor tanning booths
- History of excessive sun exposure, including severe sunburn especially in children
- Fair skin, freckling, light hair
- Presence of moles
- Personal or family history of skin cancer
- Older age
- Weakened immune system

Risk factors for basal cell and squamous cell cancers^{146, 163-166}

- Exposure to ultraviolet rays, including use of indoor tanning booths
- History of excessive sun exposure
- Light skin color
- Personal or family history of skin cancer

- Older age
- Weakened immune system
- Exposure to high amounts of certain chemicals, including arsenic
- Smoking
- Rare inherited conditions, including Xeroderma pigmentosum and basal cell nevus syndrome
- Long-term skin conditions and certain treatments for psoriasis

Measures to prevent skin cancer^{167, 168}

- Seek the shade when outdoors in the sun, especially between the hours of 10 a.m. and 4 p.m.
- 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. Wear UV protective sunglasses to protect the eyes, as well as to prevent skin cancer in that area.
- 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.

Sunburns typically occur as a result of excessive UVR exposure on insufficiently protected skin.^{146, 158} They are characterized by skin redness (erythema), which occurs three to five hours after UVR exposure. Sunburns during childhood and intense intermittent sun exposure increase the risk of melanoma and other skin cancers later in life.^{169, 170, 160} 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, or a history of severe sunburns.^{146, 169} 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.

UVR Exposure Behaviors

UVR damage of unprotected skin can be minimized by limiting the amount of UVR exposure by: timing outdoor activities when UVR rays are less intense, wearing protective clothing, applying adequate amounts of sunscreen, and avoiding tanning devices^{171, 172} (see sidebar, page 28).

In an effort to provide consumers better information on the value and limits of sunscreen use, the Food and Drug Administration (FDA) has announced changes to the labeling of over-the-counter sunscreen, such as adding broad spectrum labels to products protecting against both UVA and UVB rays. For more information on how to select and use sunscreen visit: 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 and application techniques. Sunscreen should be applied in accordance with label directions. Visit cancer.org/healthy/besafeinthesun/ for additional information.

Current Patterns in Skin Protection

- Studies show that many adults and adolescents in the US do not regularly protect themselves when outdoors on sunny days.¹⁷³
- In 2010, according to NHIS data, 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 wearing hats (12.8%) or long-sleeved shirts (11.5%).¹⁷⁴
- In 2013, only 10.1% of US high school students reported using sunscreen routinely (Table 3A); this was the only sun-protection practice assessed at the time in this population.

Table 3A. Sunscreen* and Indoor Tanning Device† Use (%), High School Students, US, 2013

	Males	Females	Overall
Sunscreen use			
Overall	6.9	13.2	10.1
Race/Ethnicity			
White (non-Hispanic)	7.9	15.1	11.5
Black (non-Hispanic)	3.3	6.0	4.7
Hispanic	6.2	11.7	9.0
Indoor tanning device use			
Overall	5.3	20.2	12.8
Race/Ethnicity			
White (non-Hispanic)	6.1	30.7	18.3
Black (non-Hispanic)	3.2	2.5	2.8
Hispanic	4.4	7.9	6.2

*Most of the time or always wore sunscreen with an SPF of 15 or higher when outside for more than 1 hour on a sunny day. †Such as a sunlamp, sunbed, or tanning booth (not including getting a spray-on tan) one or more times during the 12 months before the survey.

Source: Kann L, Kinchen S, Shanlin SL, et al., Youth Risk Behavior Surveillance – US, 2013. *MMWR Surveill Summ* 2014;63(SS04): 1-168.

American Cancer Society, Inc., Surveillance Research, 2015

Artificial UVR Exposure (Indoor Tanning)

A second source of UVR exposure is through the use of indoor tanning booths or lamps, which emit artificial UVR.¹⁷⁵ These devices are increasingly available for cosmetic use and heavily promoted by the indoor tanning industry.^{172, 175} The International Agency for Research on Cancer lists UV-emitting indoor tanning devices as carcinogenic to humans.¹⁴⁹ The risk of melanoma is about 60% higher for people who began using indoor tanning devices before the age of 35,¹⁷² and melanoma risk increases with the number of total hours, sessions, or years that indoor tanning devices are used.¹⁷⁶

Patterns of Indoor Tanning in the US

- In 2013, 4.4% of US adults reported using an indoor tanning device in the past year; use was highest among women (6.9%), non-Hispanic whites (6.6%), adults ages 18 to 29 years (8.6%), and those living in the Midwest (7.5%) (Table 3B, page 30).
- In a 2013 survey of US high school students, 20.2% of girls and 5.3% of boys reported using an indoor tanning booth in the previous year (Table 3A).

Because UVR exposure in childhood and teenage years can be so damaging, policy makers in some states are regulating the use of tanning devices by minors.

- Forty-two states have enacted legislation limiting minors' access to indoor tanning facilities, including restricting access by age or requiring parental permission and/or a physician's order.¹⁷⁷

Table 3B. Use (%) of an Indoor Tanning Device*, Adults 18 Years and Older, US, 2013

	Males	Females	Overall
Overall	1.8	6.9	4.4
Age (years)			
18-29	2.9	14.2	8.6
30-39	2.2	8.5	5.5
40-49	1.8	6.8	4.3
50-64	1.3	3.2	2.3
65+	††	0.4	0.4
Race/Ethnicity			
White (non-Hispanic)	2.5	10.6	6.6
Black (non-Hispanic)	††	††	††
Hispanic	0.7	2.3	1.5
Asian (non-Hispanic) [†]	††	1.1	0.8
Sexual Orientation			
Gay/lesbian [‡]	††	††	4.7
Straight [§]	1.7	7.1	4.4
Bisexual	††	††	5.6
Education[¶]			
Some high school or less	††	2.1	1.3
High school diploma or GED	1.4	6.0	3.5
Some college/Assoc. degree	2.5	7.2	5.1
College graduate	1.7	4.7	3.3
Region[#]			
Northeast	1.2	6.8	4.1
Midwest	3.3	11.8	7.5
South	1.0	5.6	3.4
West	1.7	4.6	3.2
Insurance Status			
Uninsured	1.0	5.3	3.0
Insured	2.0	7.6	4.9
Immigration status			
Born in US	2.1	8.1	5.2
Born in US territory ^{**}	††	††	††
In US fewer than 10 yrs	††	††	††
In US 10+ years	††	2.5	1.4

GED-General Educational Development high school equivalency. *Used an indoor tanning device such as a sunlamp, sunbed, or tanning booth at least once in the 12 months preceding the survey (does not include spray-on tan). Estimates are age adjusted to the 2000 US standard population; see Statistical Notes (page 52) for more information. †Does not include Native Hawaiians or other Pacific Islanders. ‡Response option provided on the NHIS was “gay” for men and “gay or lesbian” for women. §Response option provided on the NHIS was “straight, that is, not gay” for men and “straight, that is, not gay or lesbian” for women. ¶Among persons aged 25 years or older. #Northeast: CT, ME, MA, NH, NJ, NY, PA, RI, and VT. Midwest: IL, IN, IA, KS, MI, MN, MO, NE, ND, OH, SD, and WI. South: AL, AR, DE, DC, FL, GA, KY, LA, MD, MS, NC, OK, SC, TN, TX, VA, and WV. West: AK, AZ, CA, CO, HI, ID, MT, NV, NM, OR, UT, WA, and WY. **In the US for any length of time. ††Estimate not presented due to unreliability.

Source: Centers for Disease Control and Prevention. National Health Interview Survey, 2013. Public use data file. See Survey Sources (page 53) for complete citation.

American Cancer Society, Inc., Surveillance Research, 2015

- Two states (Washington and Oregon) have implemented an under-18 ban, but still allow for a teen to get a physician’s prescription to tan.¹⁷⁷
- Nine states (California, Nevada, Texas, Louisiana, Minnesota, Illinois, Delaware, Vermont, and Hawaii) prohibit tanning for minors under the age of 18 with no exceptions (Figure 3A).
- During 2009-2011, indoor tanning use was higher among high school students living in states without indoor tanning laws (30.1%) than in states with any form of indoor tanning laws (21.2%).¹⁷⁸

Both compliance with and enforcement of laws restricting the access of minors to indoor tanning facilities are low.^{179, 180} One survey of indoor tanning facilities 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 than the government’s recommended limit of three times per week.¹⁷⁹ Additionally, 32% of 28 US cities surveyed with indoor tanning laws did not conduct annual inspections of indoor tanning facilities.¹⁸¹ Lack of enforcement undermines indoor tanning regulation, and more comprehensive enforcement is needed.¹⁸⁰ Additionally, 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.

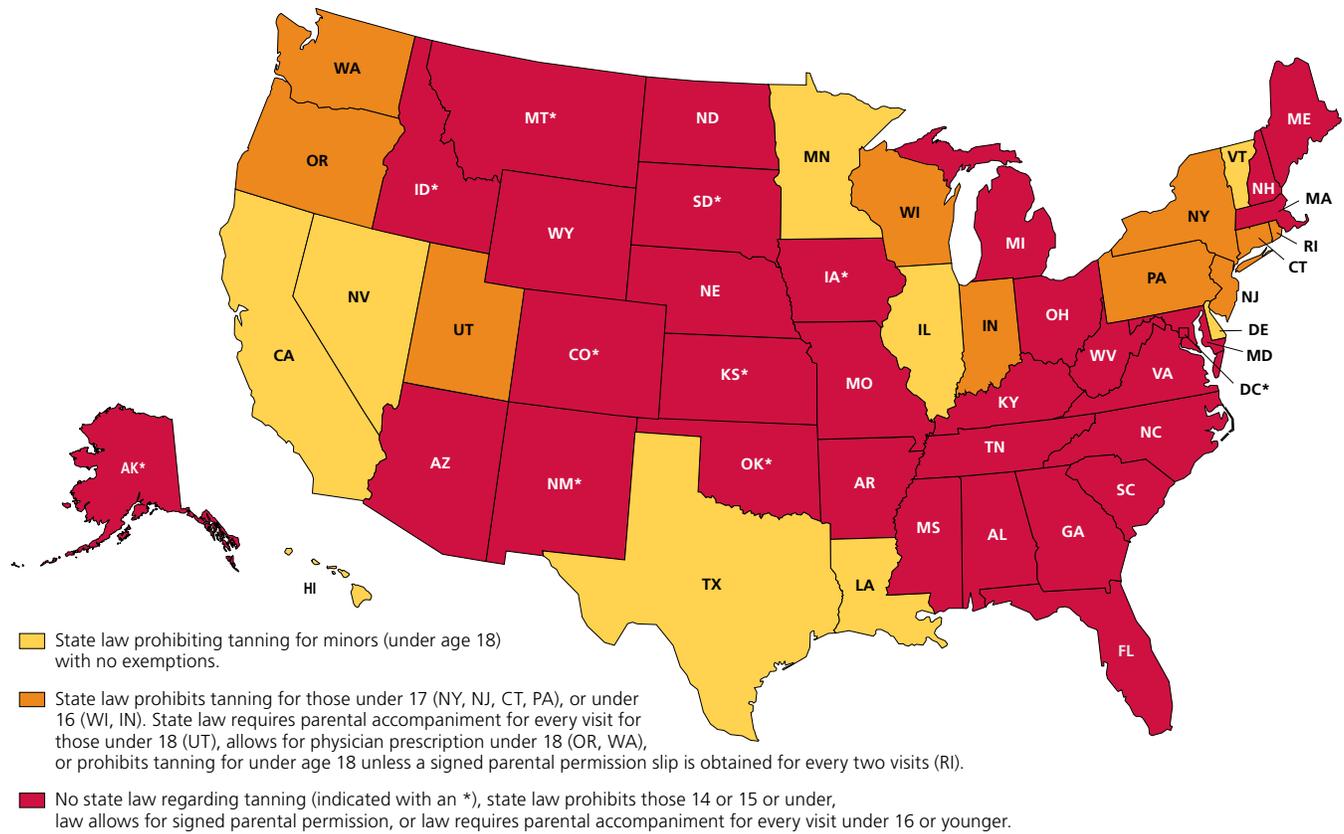
Prevention Strategies in Skin Cancer

Sun protection practices among adults and youth have improved little during the past decades despite efforts to educate the public about the harms of excessive sun exposure and the benefits of sun protection.^{173, 182} As a result of the growing public health burden of UVR and skin cancer, the Surgeon General released a Call to Action to Prevent Skin Cancer in 2014 to strengthen

Don’t Fry Day

Since 2008, the American Cancer 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 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 2014, 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. Visit the NCSCP website at skincancerprevention.org to access these materials.

Figure 3A. Indoor Tanning Restrictions for Minors, by State, US, 2014



Note: Legislation signed by governor, reported as of November 11, 2014.

Source: American Cancer Society Cancer Action Network, Health Policy Tracking Services & Individual state bill tracking services.

preventive strategies to reduce skin cancer incidence and mortality.¹⁵⁶ The call to action presented the following goals:

- Increase opportunities for sun protection in outdoor settings by: increasing shade in outdoor areas, increasing sun-protective behaviors, and increasing the availability of sun protection in educational settings and for outdoor workers.
- Provide individuals with the information they need to make informed, healthy choices about UV exposure by: developing effective messages, supporting skin cancer prevention in schools, integrating sun safety in workplaces, and partnering with health care systems to increase provider counseling on skin cancer prevention.
- Promote policies that advance the national goal of preventing skin cancer by: supporting inclusion of sun protection in school and workplace policies, promoting electronic reporting of reportable skin cancers, and supporting shade in community development.
- Reduce harms from indoor tanning by: monitoring indoor tanning attitudes and beliefs, continuing to raise awareness of the harms of indoor tanning, supporting policies aimed at reducing access to indoor tanning, and increasing warning labels on indoor tanning devices.

- Strengthen research, surveillance, monitoring, and evaluation related to skin cancer prevention by: further understanding the relationship between UV exposure and skin cancer, increasing surveillance of UV exposure, and evaluating interventions.

To promote individual sun protection behaviors, the American Cancer Society supports the annual Don't Fry Day campaign (see sidebar, page 30), as well as its Slip! Slop! Slap![®] and Wrap! awareness campaign, which highlights four ways that individuals can protect themselves from harmful UV rays.

Since children and adolescents are an important target group for skin cancer prevention, the Centers for Disease Control and Prevention (CDC) recommends developing comprehensive community programs that include school intervention components, including physical, social, and organizational environments that promote UVR protection, and educating young people about sun safety.¹⁸³ However, a CDC assessment of the School Health Policies and Programs indicated low adoption of sun-safety policies (e.g., scheduling outdoor activities at times when the sun is not at peak intensity) in elementary, middle, or high schools.^{184, 185}

There are several evidence-based community- and school-based programs to increase awareness and use of preventive strategies for skin cancer. The SunWise Program for schools and community groups (e.g., camps, scouts, museums) is an example of a cost-effective, school-based education program established by the EPA. To facilitate program adoption, the organization provides educators with free resources to teach children and their families to protect themselves from overexposure to the sun. Visit epa.gov/sunwise/ for more information.

As noted in the Surgeon General's Call to Action to Prevent Skin Cancer goals, health care professionals play an important role in educating their patients on the importance of skin cancer prevention.¹⁵⁶ Physician communication to practice sun safety was associated with increased use of sunscreen and proper sunscreen application practices among adolescents.¹⁸⁶ However, according to a study by the American Cancer Society, only about one-half of US adolescents and their parents reported being told by a physician to practice sun protection.¹⁸⁶

The perception that having a tan makes you look healthy and attractive is a barrier to sun protective behaviors. Therefore, another important approach to promoting individual protection against UVR exposure focuses on appearance, emphasizing the harms of sun exposure (i.e., age spots and wrinkles) to physical appearance and increasing the perceived attractiveness of untanned skin. There is evidence that appearance-based inter-

ventions can lead to behavior change in certain groups (e.g., college-age women).^{175, 182, 187}

Early Detection of Skin Cancer

One of the best ways to diagnose skin cancers early is to educate individuals about how to examine their skin and what signs to look for. The use of a skin self-exam to detect skin cancer early when it is most treatable is important and supported by some organizations such as the American Academy of Dermatology (AAD). In fact, a recent study indicated an increasing number of individuals are performing a total body skin examination at least once in their lifetime (from 14.5% in 2000 to 19.8% in 2010).¹⁸⁸ Any new suspicious growths (or lesions) or anything changing, itching, or bleeding on the skin should be evaluated promptly by a physician. Other early signs of skin cancer include changes to an existing lesion or mole on the skin, such as its size, shape, or color. Visit the AAD website (spotskincancer.org) to learn the ABCDEs of melanoma and how to perform a skin self-exam and for more information.

Individuals at high risk for skin cancer should undergo periodic screening by a trained health care 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. Visit cancer.org/docroot/SPC/content/SPC_1_Sun_Safety_101.asp for more information.

Infectious Agents

There are several cancers, including cervix, oropharynx, liver, stomach, and lymphomas, associated with or caused by infectious agents.¹⁸⁹ Fortunately, there are opportunities to prevent and treat many of these infections.

Human Papillomavirus

Human papillomavirus (HPV) is the most common sexually transmitted infection in the US, with approximately 14 million people becoming newly infected annually.¹⁹⁰ Although most HPV infections are transient and do not cause cancer, virtually all cervical cancers are causally related to persistent HPV infections. Further, persistent infection with HPV causes 90% of all anal cancers, about 60% of certain types of oropharyngeal cancers (a larger percentage than in other regions of the world), and 40% of vaginal, vulvar, and penile cancers.^{191, 192} Cervical cancer is the most common HPV-related cancer in females, and oropharyngeal cancer is the most common HPV-related cancer in males.¹⁹³ Incidence rates for several HPV-related cancers, including oropharyngeal, anal, and vulvar cancers, have increased in recent years; however, cervical cancer incidence

rates have continued to decline because of widespread screening that can prevent this cancer.¹⁹³

There are more than 100 types of HPV, only about 13 of which cause cancer.¹⁹² HPV types 16 and 18 account for about 70% of all cervical cancer cases and almost all other HPV-related cancers.¹⁹² Three vaccines have been approved by the Food and Drug Administration (FDA) for the prevention of HPV. HPV4 provides protection against four HPV types (6, 11, 16, and 18) and is recommended for use in both males and females; HPV2 protects against two HPV types (16 and 18) and is recommended for use in females only. A third vaccine (HPV9) was approved by the FDA in December 2014 for both males and females and protects against nine HPV types. All three HPV vaccines require three doses to be administered over the course of six months. To be most effective, the vaccination series should be completed before a person becomes sexually active. The sidebar on page 33 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.¹⁹⁴ In 2014, the World Health

Organization endorsed a two-dose HPV vaccination regimen, aiming to improve the cost-effectiveness of HPV vaccination.¹⁹⁵

Based on ongoing assessments of vaccine safety information, the FDA and the Centers for Disease Control and Prevention (CDC) continue to find that the HPV vaccines are safe and that the side effects, which include pain or tenderness at the injection site, are mild.^{192, 198} In January 2007, the American Cancer 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.¹⁹⁹

HPV Prevention and Control

The cost of the HPV vaccine in the US is approximately \$130 per dose (or \$390 for the entire three-dose series), excluding the cost of administering the injections and any physician's charge. However, despite the relatively high cost, systems are in place to help make this important vaccine more accessible. The Affordable Care Act (ACA) requires Medicare, as well as all new and renewed private insurance plans, to cover HPV vaccination without cost-sharing for eligible adults and children.²⁰⁰ The HPV vaccine is also available 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.²⁰¹

The CDC established the Vaccines for Preteens and Teens communication campaign to educate parents and clinicians about immunizations recommended for adolescents ages 11 to 18 years. The ongoing goals of the CDC's adolescent vaccine campaign include efforts to 1) inform parents about adolescent vaccines and the diseases the vaccines prevent; 2) educate health care providers about the adolescent immunization recommendations, including awareness of missed opportunities for HPV vaccination at the recommended ages of 11 or 12 years; and, 3) provide communication tools and resources for public health professionals, immunization programs, and immunization providers to improve awareness and knowledge of the vaccines that should be given during health care appointments during adolescence.¹⁹⁴

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 services.^{202, 203} Therefore, the American Cancer Society Cancer Action Network (ACS CAN) supports and advocates for the widespread availability and use of the vaccine consistent with published guidelines. Lawmakers in at least 41 states and the District of Columbia have introduced legislation to require,

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 HPV2 or HPV4
- 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 HPV4
- 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 (including those with HIV infection) and for men who have sex with men

**The Advisory Committee on Immunization Practices issues national 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 October 2014 and do not reflect the December 2014 FDA approval of HPV9.^{196, 197}*

fund, or educate the public about the HPV vaccine; to date, 25 states have enacted such legislation.²⁰⁴

To improve vaccine coverage, there should be expanded implementation of proven intervention strategies. Such strategies include education of potential age-eligible vaccine recipients and their parents or guardians; 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.^{202, 205, 206}

Even with more widespread vaccination coverage throughout the population, it is important to remember that the HPV vaccination supplements rather than replaces cervical cancer screening because the vaccines 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.¹⁹⁹ For more information about cervical cancer screening, see page 45.

HPV Vaccination Prevalence in the US

- Among girls ages 13 to 17 years, 37.6% received the complete three-dose HPV vaccination series in 2013, up from 5.9% in 2007; among adolescent boys, complete vaccination increased from 1.3% in 2011 to 13.9% in 2013.²⁰⁷

Table 4A. Vaccination Coverage (%), Adolescents 13 to 17 Years, by Race/Ethnicity* and Poverty Status†, US, 2013

	Human Papillomavirus						Hepatitis B
	Females			Males			Overall
	≥ 1 dose	≥ 3 doses	Series Completion‡	≥ 1 dose	≥ 3 doses	Series Completion‡	≥ 3 doses
Overall	57.3	37.6	70.4	34.6	13.9	48.3	93.2
Race/Ethnicity*							
White (non-Hispanic)	53.1	34.9	71.8	26.7	11.1	51.1	93.8
Black (non-Hispanic)	55.8	34.2	63.7	42.2	15.7	44.8	93.2
Hispanic	67.5	44.8	69.5	49.6	20.3	47.4	92.8
American Indian/Alaska Native (non-Hispanic)	73.3	43.2	60.1	38.6	–	48.4	93.4
Asian (non-Hispanic)	57.0	40.4	77.2	26.3	9.1	40.0	87.8
Poverty Status†							
Below poverty level	66.8	41.5	66.2	46.7	16.7	44.3	93.2
At or above poverty level	54.6	36.4	71.9	30.8	13.0	50.4	93.1

*Reported by parent or guardian. Those identified as Hispanic might be of any race. Native Hawaiian or other Pacific Islanders were not included due to small sample sizes.
 †Adolescents were classified as below poverty if their total family income was less than the federal poverty level. ‡Percentage who completed the 3-dose vaccination series among those who had at least 1 dose.

Source: Elam-Evans LD, Yankey D, Jeyarajah J, et al. *MMWR Morb Mortal Wkly Rep.* 2014; 63(29): 625-633. Complete data tables available at: <<http://www.cdc.gov/vaccines/imz-managers/coverage/nis/teen/data/tables-2013.html>> Accessed: September 2, 2014.

American Cancer Society, Inc., Surveillance Research, 2015

- In 2013, an estimated two-thirds (70.4%) of girls who had initiated vaccination completed the three-shot vaccine series (Table 4A).
- A CDC report based on analysis of the 2013 National Immunization Survey of Teens (NIS-Teen) noted that despite the increasing trend, HPV vaccine utilization among adolescent females lags behind other recommended vaccines, such as tetanus, diphtheria, and acellular pertussis.²⁰⁸
- Among US girls ages 13 to 17 years, 57.3% initiated the HPV vaccine (at least one of the three-dose HPV vaccination series) (Table 4A).
- Among US boys ages 13 to 17 years, 34.6% initiated the HPV vaccine (Table 4A).
- Initiation of HPV vaccination for adolescent girls ranged from 39.9% in Kansas to 76.6% in Rhode Island. Utah had the lowest proportion (20.5%) of adolescent girls receiving all three doses of the vaccine, and Rhode Island had the highest (56.5%) (Table 4B).
- For adolescent boys, initiation of HPV vaccination ranged from 11.0% in Utah to 69.3% in Rhode Island. The lowest proportion of boys ages 13 to 17 years receiving all three doses of the vaccine was reported in Nevada (7.3%); the highest was reported in Rhode Island (43.2%) (Table 4B).

Helicobacter Pylori

Chronic infection with *Helicobacter pylori* (*H. pylori*) bacteria causes stomach cancer and gastric lymphoma.^{209, 210} *H. pylori* is a bacteria that grows in the stomach and with continued infec-

tion, causes inflammation and damage to the stomach lining, which can eventually lead to stomach cancer.²⁰⁹ Approximately half of the world's population is infected with *H. pylori*, and most will remain unaware of their infection because they do not experience symptoms or develop stomach cancer.²¹¹

Stomach cancer was a leading cause of cancer death in the US in the early part of the 20th century; however, stomach cancer is not even among the top 10 causes of cancer death currently. This large decline in stomach cancer incidence is thought to be related to improvements in hygiene and changes in dietary patterns (increased consumption of fresh fruits and vegetables as opposed to preserved foods).²¹²⁻²¹⁴ In other parts of the world, particularly in low- and middle-income countries, stomach cancer is still one of the leading causes of cancer death.²¹⁵

H. pylori transmission is thought to occur from person to person through fecal-oral and oral-oral routes and is facilitated by crowded living conditions and relatively poor sanitation. There are several *H. pylori* treatment options, including antibiotics and medications to reduce stomach acid that are relatively inexpensive and effectively eliminate the bacteria.²¹⁶ Additionally, a recent study reported a reduction in gastric cancer incidence and mortality among people with *H. pylori* infection who were treated with antibiotics compared to those who were not.²¹⁷ In 2014, the International Agency for Research on Cancer recommended that countries with high gastric cancer incidence (including China, Japan, Chile, Argentina, and several central Asian countries) should incorporate *H. pylori* screening and treatment into their cancer control programs.²¹⁸ Some countries and regions, including Japan and regions of Taiwan, have

Table 4B. Vaccination Coverage (%), Adolescents 13 to 17 Years, by State, US, 2013

	Human Papillomavirus						Hepatitis B
	Females			Males			Overall
	≥ 1 dose	≥ 3 doses	Series Completion*	≥ 1 dose	≥ 3 doses	Series Completion*	≥ 3 doses
United States	57.3	37.6	70.4	34.6	13.9	48.3	93.2
Alabama	54.7	39.6	73.4	18.4	–	–	93.9
Alaska	52.2	27.1	59.2	27.6	8.5	46.6	92.6
Arizona	64.1	37.4	59.4	44.4	19.5	56.2	85.3
Arkansas	44.3	24.4	57.0	17.7	–	–	91.2
California	67.6	45.8	71.5	50.9	16.6	38.7	92.6
Colorado	58.2	39.1	70.9	33.5	9.9	39.4	92.3
Connecticut	56.0	40.1	76.3	52.3	23.4	51.0	96.4
Delaware	68.7	51.7	81.6	37.1	18.1	62.1	95.6
District of Columbia	55.6	30.2	61.8	67.7	24.5	46.6	83.9
Florida	49.7	34.3	78.8	27.8	13.2	61.7	94.3
Georgia	53.7	33.2	65.1	40.5	15.3	40.9	96.5
Hawaii	52.7	34.4	70.3	39.7	15.1	47.2	90.2
Idaho	55.0	31.3	58.1	34.5	–	–	91.5
Illinois	53.2	33.8	69.3	34.8	16.5	56.6	95.7
Indiana	54.1	34.6	71.2	18.2	8.1	–	95.6
Iowa	57.0	41.9	81.3	30.3	13.7	53.6	93.9
Kansas	39.9	21.0	58.5	25.1	–	–	89.5
Kentucky	47.6	26.8	62.1	19.0	–	–	94.7
Louisiana	59.8	42.1	74.8	27.0	13.5	59.8	98.5
Maine	60.2	45.8	81.0	42.2	17.6	48.0	88.8
Maryland	50.0	33.4	71.5	34.2	–	39.4	93.8
Massachusetts	62.3	39.3	73.5	52.8	21.8	63.8	95.8
Michigan	66.0	34.5	53.3	30.0	7.7	31.8	94.5
Minnesota	59.3	37.6	70.2	22.0	8.6	48.8	95.8
Mississippi	53.1	25.2	54.1	13.6	–	–	95.9
Missouri	46.1	28.8	64.5	20.5	–	–	88.1
Montana	45.8	28.3	65.3	23.8	9.4	48.5	91.6
Nebraska	65.1	41.5	68.0	38.2	19.7	60.0	93.8
Nevada	53.8	27.4	56.5	31.9	7.3	31.8	95.1
New Hampshire	68.0	43.2	67.2	41.4	17.8	54.5	95.7
New Jersey	45.8	31.4	72.4	32.4	14.2	51.3	97.5
New Mexico	67.1	44.3	69.7	31.4	19.2	62.5	93.4
New York	61.7	45.4	78.5	38.6	19.1	62.0	94.4
North Carolina	59.3	32.8	56.8	33.2	12.4	41.3	93.6
North Dakota	57.5	41.1	76.7	36.1	18.4	65.6	94.9
Ohio	54.8	35.0	69.4	26.5	14.7	64.2	93.9
Oklahoma	54.8	35.4	68.2	45.2	17.3	43.9	92.6
Oregon	66.3	39.5	66.3	35.8	12.2	43.8	90.9
Pennsylvania	59.5	45.9	83.1	44.1	15.4	42.2	92.9
Rhode Island	76.6	56.5	78.4	69.3	43.2	69.5	96.2
South Carolina	60.4	40.7	72.3	22.2	–	–	94.2
South Dakota	56.0	42.3	79.1	22.1	8.4	45.7	95.7
Tennessee	48.9	35.9	75.7	28.9	–	38.0	93.5
Texas	56.2	38.9	74.4	34.1	15.0	48.1	89.8
Utah	44.3	20.5	48.8	11.0	–	–	88.6
Vermont	60.2	42.7	78.8	41.3	21.7	63.9	93.1
Virginia	51.9	27.6	66.7	26.4	–	–	94.3
Washington	60.7	45.3	79.5	29.8	12.5	49.6	89.4
West Virginia	49.7	38.4	81.0	29.4	15.1	66.2	84.5
Wisconsin	59.4	36.8	65.4	31.7	13.7	62.7	92.8
Wyoming	54.3	42.1	83.0	16.6	8.4	–	90.8
Range	39.9 - 76.6	20.5 - 56.5	48.8 - 83.1	11.0 - 69.3	7.3 - 43.2	31.8 - 69.5	83.9 - 98.5

*Percentage who completed the 3-dose vaccination series among those who had at least 1 dose.

Source: Elam-Evans LD, Yankey D, Jeyarajah J, et al. *MMWR Morb Mortal Wkly Rep.* 2014; 63(29): 625-633.

Complete data tables available at: <<http://www.cdc.gov/vaccines/imz-managers/coverage/nis/teen/data/tables-2013.html>> Accessed: September 2, 2014.

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developed programs to reduce the burden of *H. pylori*. In the US, there is no recommendation to screen asymptomatic people for *H. pylori* because of the low gastric cancer incidence among Americans.

H. Pylori in the US

- According to 1999-2000 National Health and Nutrition Examination Survey (NHANES) data, approximately 30.7% of adults in the US were seropositive for *H. pylori*.²¹⁹
- *H. pylori* infection is higher among Mexican Americans (64.0%) and non-Hispanic blacks (52.0%), compared to non-Hispanic whites (21.2%).²¹⁹ *H. pylori* prevalence is higher among those who recently immigrated to the US.²²⁰
- *H. pylori* prevalence is five to nine times higher in adults over the age of 50 compared to adults in their 20s.²¹⁹

Hepatitis B Virus

Chronic infection with hepatitis B virus (HBV) causes cirrhosis and liver cancer.²²¹ It accounts for 58% and 23% of liver cancers in developing and developed countries, respectively.²²² HBV is also increasingly recognized as a risk factor for non-Hodgkin lymphoma.²²³ The virus is transmitted through blood or mucosal contact with infectious blood or body fluids (e.g., semen, saliva), and most new HBV infections occur in unvaccinated adults with risk behaviors that include injection drug use, men who have sex with men, and having multiple sex partners.²²⁴ ²²⁵ Although mother-to-child transmission and infection in the health care setting due to needle sticks is possible, these are less common transmission routes in the US.²²⁶ Most (95%) of newly infected adults will clear the virus within six months of infection, whereas the majority of infected infants will become chronically infected.²²⁶ Although HBV infection is usually asymptomatic, one-third to one-half of adults experience symptoms, including fever, fatigue, jaundice, joint pain, and digestive symptoms, within the first several months of infection.²²⁶

Vaccination against HBV has been the primary prevention strategy in reducing prevalence of the virus.^{227, 228} In 1991, the CDC outlined a nationwide strategy aimed at reducing HBV²²⁹ that is similar to the current CDC strategy which includes a three-dose HBV vaccination series for all infants at birth, children ages 0 to 18 years who were not previously vaccinated, and high-risk adults (e.g., health care workers, injection drug users, and individuals with multiple sexual partners).^{225, 230} Pregnant women should be screened for evidence of HBV infection, and if positive, newborn infants should receive both hepatitis B immune globulin and HBV vaccine within 12 hours of birth.²³¹ In 2014, the US Preventive Services Task Force (USPSTF) updated their HBV screening guidelines, concluding that people at high risk, including those born in HBV endemic areas, people who are human immunodeficiency virus (HIV) positive, injection drug users, men who have sex with men, and household or sexual

contacts of HBV positive people, should be tested for HBV.²²⁴ There are several drugs that are effective at treating HBV; some of these drugs are antiviral medications and others are immune system-modulators.²³² If infection progresses to liver disease, liver transplantation is also a treatment option.

HBV Prevalence and Trends in the US

- Approximately 700,000 to 2.2 million people are living with chronic HBV infection in the US, and an estimated 38,000 people are newly infected each year.^{227, 233, 234}
- Most new HBV cases (95%) in the US are among people who emigrated from countries where HBV infection is more common.²³⁵
- According to 1999-2008 NHANES data, 4.6% of Americans had past or present HBV infection, and approximately 0.3% had prevalent chronic HBV infection.²²⁸
- Past or present HBV infection was higher among non-Hispanic blacks (10.4%) and other race/ethnicities (17.6%), compared to non-Hispanic whites (2.8%) and Hispanics (3.5%).²²⁸
- In general, HBV prevalence was much higher in foreign-born Americans.^{228, 234} Virus prevalence among people born outside of Mexico or the US ranged from 11.0-31.3%.²²⁸ HBV prevalence is particularly high among those born in Asia.²³⁶
- HBV prevalence was also higher among people who are HIV positive, injection drug users, and men who have sex with men.^{228, 233}
- According to the 2013 NIS-Teen, 93.2% of adolescents ages 13 to 17 years received at least three HBV vaccine doses; HBV vaccination did not vary across levels of poverty, but was slightly lower among Asians compared to other racial/ethnic groups (Table 4A, page 34).
- The lowest prevalence of adolescent HBV vaccination coverage was reported in the District of Columbia (83.9%), and the highest was in Louisiana (98.5%) (Table 4B, page 35).

Hepatitis C Virus

Chronic infection with hepatitis C virus (HCV) also causes cirrhosis and liver cancer.²³⁷ More recently, HCV has been shown to increase the risk of non-Hodgkin lymphoma.²³⁸ Liver cancer incidence and mortality have increased in the US in recent years, and HCV-related mortality is also increasing.²³⁹ These trends have been attributed to the HCV epidemic that began in the late 1960s primarily through injection drug use.²⁴⁰ Transmission may also occur through needle stick injuries in health care settings, mother-to-child transmission during birth, and sexual contact with an infected partner (though this is rare). People receiving donated blood, blood products, or organs prior to 1992 are also at risk for HCV infection as these items were not screened for HCV prior to this time.²²⁶ Most people infected

with HCV will become chronically infected (75-85%) but will not experience symptoms for many years and are not aware of their infection until their liver is significantly damaged.²²⁶ About 60-70% of people with chronic HCV will develop liver disease, and risk of liver disease is higher among heavy alcohol drinkers and people also infected with HBV and HIV.²⁴¹

In contrast to HBV infection, there is no vaccine to protect against HCV infection, and HCV infections often become chronic regardless of age at infection. Primary prevention strategies include both educating uninfected individuals who are at high risk for infection about exposure prevention and counseling infected individuals about how to avoid transmission to others. In the health care setting, workers should be educated about the importance of infection control techniques when handling all blood products.

In 2013, the USPSTF updated their guidelines recommending one-time screening among men and women born between 1945 and 1965 because people born during this time period represent about three-fourths of the HCV infections in the US.²⁴² The USPSTF also recommends that people with high-risk behaviors, such as injection drug users, be tested periodically.²⁴² Those who test positive for HCV are advised to begin antiviral treatment in order to reduce health effects related to HCV infection, including liver cancer.²⁴²

Until recently, HCV was treated with a combination of drugs (peginterferon and ribavirin) that initiated the body's immune response and helped prevent HCV replication. However, these drugs only cured a fraction of HCV infections and required patients to receive weekly injections for up to 48 weeks.^{243,244} In the past five years, the treatments available for HCV have rapidly changed. Since 2011, the FDA has approved several direct-acting antivirals (sofosbuvir, ledipasvir, sofosbuvir and simeprevir), which can be taken orally in combination with other drugs, have higher cure rates of HCV, and only require 12 weeks of treatment.²⁴³⁻²⁴⁶ In late 2014, the FDA approved a new oral drug (ledipasvir-sofosbuvir) that can be taken alone and also requires only 12 weeks of treatment.²⁴⁷ Despite the advancements in HCV treatment, there is some concern about the affordability and accessibility of these drugs, which may cost \$64,000-84,000 for a course of treatment.^{248,249}

HCV Prevalence and Trends in the US

- According to 2003-2010 NHANES data, 3.6 million or 1.3% of the US population had past or present HCV infection and 2.7 million or 1.0% had chronic HCV infection.²⁵⁰
- HCV infection was more common among males, non-Hispanic blacks, and those with lower socioeconomic status.²⁵⁰
- HCV prevalence was higher in certain sub-groups, including the homeless (22.2-52.5%), the incarcerated (23.1-41.2%), and veterans (5.4-10.7%).²⁵¹

Human Immunodeficiency Virus

There are several acquired immunodeficiency syndrome (AIDS)-defining cancers, including Kaposi sarcoma (KS), several types of lymphoma, and cervical cancer. The term AIDS-defining means that if people who are HIV-positive develop one of these cancers, HIV has progressed to AIDS.²⁵² HIV is a virus that may be present in the body for a long period of time without resulting in symptoms; however, as HIV progresses, the immune system is weakened and AIDS develops.

The weakened immune system of people with HIV/AIDS increases their risk of several cancers. The incidence of KS is about 500 times higher in HIV-positive people than those who are HIV-negative.²⁵³ The risk of non-Hodgkin lymphoma is about seven times higher, and cervical cancer is about three times higher among people who are HIV-positive compared to those who are HIV-negative.^{253,254} People infected with HIV are at an increased risk for other cancer-causing infectious agents (such as HCV, HBV, HPV, and Epstein-Barr virus [EBV]) and have higher incidence of cancers (including liver, anal, oropharyngeal, and Hodgkin lymphoma) associated with these infectious agents.²⁵⁵⁻²⁵⁷ People infected with HIV also have higher rates of lung cancers; however, this is thought to be related to factors other than HIV infection, such as higher smoking rates and immunosuppression in this population.²⁵⁴

HIV is primarily transmitted through sexual intercourse and injection drug use, though other infection routes are possible. There are several primary prevention strategies for HIV, such as safer sex practices and using sterile needles. There is no vaccine against HIV, but pre-exposure prophylaxis (PrEP) may be taken preventively in high-risk groups to reduce HIV transmission. Post-exposure prophylaxis (PEP) may also be taken to reduce risk among people who think they have become infected shortly after their potential exposure to the virus. HIV is treated with highly active antiretroviral therapy (HAART), which is a combination of several drugs that target HIV replication and must be taken over the life course to avoid drug resistance. HAART therapy reduces cancer risk,²⁵⁸ and has led to life expectancy that approaches the general population.²⁵⁹ However, in order for HAART to be most effective, patients must adhere to treatment protocols; research shows that many people do not adhere to HAART therapy, particularly lower socioeconomic persons.²⁶⁰ Visit cdc.gov/hiv for more information about HIV.

HIV Prevalence and Trends in the US

- In 2010, there were an estimated 1.1 million people ages 13 years and older living with HIV.²⁶¹
- Since the mid-1990s, the prevalence of HIV infection has increased due to improvements in survival among those with HIV while incidence has remained stable.^{261,262}
- The majority of people living with HIV are males (75.9%) and males who have sex with males (65.7%).²⁶¹

- There are approximately 446.4 people living with HIV per 100,000 people. Prevalence rates among blacks were eight times higher than whites. The prevalence among Hispanics was about 2½ times that of whites.²⁶¹
- Further, HIV prevalence varies by geographic region, with higher concentration in urban areas and higher prevalence in the South compared to other parts of the country.²⁶³

Epstein-Barr Virus

EBV causes Burkitt lymphoma, Hodgkin lymphoma, some types of nasopharyngeal carcinoma and non-Hodgkin lymphoma, including diffuse large B cell lymphoma in immunocompromised people.²³⁷ The vast majority of people with EBV do not develop cancer.²⁶⁴ However, people who are HIV-positive are

at an increased risk of EBV-related non-Hodgkin and Hodgkin lymphoma.²⁵⁵⁻²⁵⁷ Burkitt lymphoma, a type of non-Hodgkin lymphoma, is rare in the US and Europe, but is the most common cancer among children in sub-Saharan Africa. Approximately 50% of Hodgkin lymphoma cancers¹⁸⁹ are related to EBV, though the mechanism through which EBV might be associated with Hodgkin lymphoma is unclear and may be influenced by genetic factors.^{265, 266} Most EBV-associated cancers can be treated with immunotherapies that increase survival.²⁶⁴

EBV is very common, infecting more than 90% of the world's adult population. EBV is transmitted through body fluids, primarily saliva.²⁶⁴ People with EBV may develop mononucleosis or experience flu-like symptoms followed by a period of dormancy.²⁶⁴ Currently, there are no primary prevention strategies for EBV and no treatments to eradicate EBV.²⁶⁷

Environmental Cancer Risks

Two major classes of factors influence the incidence of cancer: hereditary and acquired (environmental). Hereditary factors come from our parents and cannot be modified while environmental factors, which include behavioral choices, are potentially modifiable. These include tobacco use, poor nutrition, physical inactivity, obesity, certain infectious agents and medical treatments, excessive sun exposure, and exposure to cancer-causing agents (carcinogens) that exist as pollutants in our air, food, water, and soil. Some carcinogens occur naturally, and others are created or concentrated by human activity. For example, radon is a naturally occurring carcinogen present in soil and rock; however, occupational radon exposure occurs in underground mines, and substantial exposures also occur in poorly ventilated basements in regions where radon soil emissions are high.

Exposure to carcinogenic agents in occupational, community, and other settings is thought to account for a relatively small percentage of cancer deaths – about 4% from occupational exposures and 2% from environmental pollutants (synthetic and naturally occurring).¹ Although the estimated percentage of cancers related to occupational and environmental carcinogens is small compared to the cancer burden from tobacco smoking and the combination of poor nutrition, physical inactivity, and obesity, the relationship between such agents and cancer is important for several reasons. First, even a small percentage of cancers can represent many deaths: for example, 6% of cancer deaths in the US in 2015 correspond to approximately 35,370 deaths.³ Second, the exposure to occupational and environmental carcinogens disproportionately affects lower-income workers and communities, contributing to disparities in the cancer burden across the US population. Third, although much is known about the relationship between occupational and environmental exposure and cancer, some important research questions

remain. These include the role of exposures to certain classes of chemicals (such as hormonally active agents) during critical periods of human development and the potential for pollutants to interact with each other, as well as with genetic and other risk factors for cancer including smoking.

How Environmental Carcinogens Are Identified

The term carcinogen refers to an exposure that can increase the incidence of cancer. The term can apply to a single chemical such as benzene; fibrous minerals such as asbestos; metals and physical agents such as x-rays or ultraviolet light; or exposures linked to specific occupations or industries such as nickel refining. Carcinogens are usually identified on the basis of epidemiological studies or by testing in animals. Studies of occupational groups have also played an important role in understanding many chemical carcinogens – as well as radiation – because exposures are often higher among workers, who can be followed for long periods of time. Some information has also come from studies of people exposed to carcinogens during medical treatments (such as radiation and estrogen), as well as from studies conducted among individuals who experienced high levels of short-term exposure to a chemical or physical agent due to an accidental or intentional release (such as survivors of the atomic bomb explosions of Hiroshima and Nagasaki). It is more difficult to study the relationship between exposure to potentially carcinogenic substances and cancer risk in the general population because of uncertainties in exposure assessment and the challenge of long-term follow-up of study participants.

Thus, for the past 40 years, the US and many other countries have developed methods for identifying carcinogens through

animal testing using the gold standard of a 2-year or lifetime biological experiment in rodents. Such tests are expensive and time-consuming, but they can provide information about potential carcinogens so that human exposure can be reduced or eliminated. Many substances that are carcinogenic in rodent biological experiments have not been adequately studied in humans, usually because an acceptable study population has not been identified. Among the substances that have proven carcinogenic in humans, all have shown results in animals when tested in well-conducted two-year biological experiments.²⁶⁸ Since animal tests necessarily use high-dose exposures, human risk assessment usually requires extrapolation or modeling of the exposure-response relationship observed in rodent biological experiments to predict effects in humans at lower doses. Typically, regulatory agencies in the US and abroad have adopted the default assumption that no threshold level (level below which there is no increase in risk) of exposure exists for carcinogenesis.

Evaluation of Carcinogens

Two groups, the US National Toxicology Program (NTP) and the World Health Organization's International Agency for Research on Cancer (IARC), are the lead agencies for evaluation and classification of substances regarding their potential as carcinogens. These agencies only establish whether a substance is likely to be a carcinogen and do not assign quantitative risk values. The NTP was established in 1978 to coordinate toxicology testing programs within the federal government, including tests for carcinogenicity. The NTP is also responsible for producing the *Report on Carcinogens*, an informational scientific and public health document that identifies agents, substances, mixtures, or exposure circumstances that may increase the risk of developing cancer.²⁶⁹ The 13th *Report on Carcinogens*, which was published in 2014, classifies 56 substances that are known to be and 187 substances as reasonably anticipated to be human carcinogens.²⁷⁰ It is important to note that while these listed substances are carcinogenic, they may not cause cancer in an individual as there are many factors – such as duration of exposure, intensity, and susceptibility – that influence cancer risk. With the exception of people exposed to very high doses of very strong carcinogens, such as long-term smokers and those exposed to high doses of radiation from atomic bombs, the large majority of people exposed to occupational or environmental carcinogens do not get cancer. For example, exposure to a particular carcinogen might be expected to cause five people out of 100,000 to develop a particular cancer, as opposed to two people out of a 100,000 in an unexposed population. Although the risk for any individual associated with a specific carcinogen is usually small, identifying such hazards and preventing exposure is important to reduce preventable cancers and deaths in the population. Visit ntp.niehs.nih.gov/pubhealth/roc/roc13/index.html to see the full *Report on Carcinogens*.

The IARC regularly convenes scientific consensus groups to review published data from laboratory, animal, and human research. These committees reach consensus about whether the evidence should be designated sufficient, limited, or inadequate to conclude that the substance is a carcinogen. There are currently 114 agents classified by the IARC as Group 1 (i.e., carcinogenic to humans) and 69 agents classified as Group 2A (i.e., probably carcinogenic to humans).²⁷¹ Visit monographs.iarc.fr/ENG/Classification/index.php for more information about these agents. Although the American Cancer Society does not have a formal program to systematically review and evaluate carcinogens, information on selected topics can be found on the cancer.org website. For more information on environmental cancer risks, see the article published by Fontham et al. in *CA: A Cancer Journal for Clinicians*.²⁷²

Managing Cancer Risk from Environmental Factors

Increased exposure to environmental carcinogens is a public health concern since even modest increases in cancer risk can become larger when experienced by the whole US population. The burden of exposure to occupational and environmental carcinogens is known to be borne disproportionately by lower-income workers and their communities, contributing to disparities in the cancer burden across the US population.

Although the relatively small risks associated with low-level exposure to carcinogens in air, food, or water are difficult to detect in epidemiological studies, scientific and regulatory bodies worldwide have accepted the principle that it is reasonable and prudent to reduce human exposure to substances shown to be carcinogenic at higher levels of exposure. Even though much public concern about the influence of synthetic pesticides and industrial chemicals has focused on cancer, pollution may adversely affect the health of humans and ecosystems in many other ways.

Further, not all exposures carry the same level of cancer risk, hence the need to be strategic in focusing environmental exposure reduction (e.g., risk management) efforts. While cancer control priorities for the general public focus on factors that have a large impact on cancer risk and can be modified by individual actions – such as smoking, physical inactivity, and obesity – research, public policy, and regulation are necessary to safeguard the public from exposure to carcinogens and other toxic substances in pesticides, industrial chemicals, and consumer products. Research to understand the short- and long-term impact of environmental pollutants on a broad range of outcomes, as well as regulatory actions to reduce exposure to recognized hazards, has contributed to the protection of the public and the preservation of the environment for future generations. It is important that this progress be recognized and sustained.

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 individuals who are asymptomatic for a particular disease (i.e., they have no symptoms that indicate the presence of disease). In addition to detecting cancer early, screening for colorectal and cervical cancers can prevent these cancers by identifying precancerous lesions that can be removed.²⁷³ 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 Society's screening guidelines for the early detection of cancer are on page 41.

Breast Cancer Screening

In the US, female breast cancer death rates have been declining since 1989, due to early detection by mammography screening and improvements in treatment.³ Mammography screening reduces breast cancer mortality by detecting cancers at an earlier stage; a recent review found a 38% decline in breast cancer mortality among women who were screened with mammography.²⁷⁴ Currently, 61% of breast cancers are diagnosed at a localized stage for which the five-year relative survival rate is 99%.²⁷⁵ 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.²⁷⁶

Despite the relatively high prevalence of mammography screening in the US (for example, in 2013 65.9% of women reported use of mammography within the past two years, Table 6A), studies suggest that many women are initiating mammography later than recommended, are not having mammography at recommended intervals,²⁷⁷ or are not receiving appropriate and timely follow-up of abnormal results, when indicated.²⁷⁸⁻²⁸⁰ These indicators of inadequate screening and follow-up are associated with more advanced tumor size and stage at diagnosis.²⁷⁶ Additionally, some women, such as average-risk women under the age of 40²⁸¹ and elderly women with limited life expectancy,²⁸² receive screening even though it is not recommended.

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 age at which mammography screening should be discontinued. Rather, the decision to stop regular mammography screening should be made on an individual basis given the potential benefits and risks of screening, within the context of a patient's overall health status and estimated longevity. Women should be informed of the limitations as well as the benefits of mammography. Women should be informed that mammography will

not detect all breast cancers; some breast cancers detected with mammography 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, which are most common when a woman has her first screening, and the possibility of undergoing a biopsy for abnormalities that are benign.²⁷³ On average, about 1 in 20 women who are recalled because of an

Table 6A. Mammography (%), Women 40 Years and Older, US, 2013

	Within the past year*	Within the past two years*
Overall	51.3	65.9
Age (years)		
40-49	46.6	59.6
50-64	55.8	71.4
65+	51.7	66.9
Race/Ethnicity		
White (non-Hispanic)	52.1	66.4
Black (non-Hispanic)	52.6	66.1
Hispanic	45.9	61.6
American Indian/Alaska Native	48.5	63.0
Asian (non-Hispanic) [†]	50.3	66.9
Education		
Some high school or less	38.7	52.7
High school diploma or GED	47.7	61.4
Some college/Assoc. degree	51.9	67.3
College graduate	59.5	74.8
Sexual Orientation		
Gay/lesbian [‡]	56.8	71.1
Straight [§]	51.4	65.9
Bisexual	#	#
Insurance Status		
Uninsured	22.3	38.0
Insured	54.8	69.6
Immigration status		
Born in US	51.8	66.1
Born in US territory [¶]	47.2	59.3
In US fewer than 10 years	27.0	39.9
In US 10+ years	50.0	66.0

GED-General Educational Development high school equivalency. *Percentages are age adjusted to the 2000 US standard population; see Statistical Notes (page 52) for further information. †Does not include Native Hawaiians or other Pacific Islanders. ‡Response option provided on the NHIS was "gay or lesbian." §Response option provided on the NHIS was "straight, that is not gay or lesbian." ¶Have been in the US for any length of time. #Estimate not provided due to instability.

Source: Centers for Disease Control and Prevention. National Health Interview Survey, 2013. Public use data file. See Survey Sources (page 53) for complete citation.

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

Cancer Site	Population	Test or Procedure	Frequency
Breast	Women, ages 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 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 exam (CBE)	For women in their 20s and 30s, it is recommended that CBE be part of a periodic health examination, preferably at least every 3 years. Asymptomatic women ages 40+ 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 ages 65+ who have had ≥3 consecutive negative Pap tests or ≥2 consecutive negative HPV and Pap tests within the past 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 DRE in the health care setting 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	Every 3 years, 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 guaiac-based FOBT 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 the risks and symptoms of endometrial cancer and strongly encouraged to report any unexpected bleeding or spotting to their physicians.	
Lung	Current or former smokers (quit within past 15 years) 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 aged 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 10-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.	

CT-computed tomography *Beginning at age 40, annual clinical breast exam should ideally be performed prior to mammography.

abnormality end up with a cancer diagnosis.²⁸³ The American Cancer Society supports breast cancer screening as the benefits outweigh the potential harms.²⁸⁴

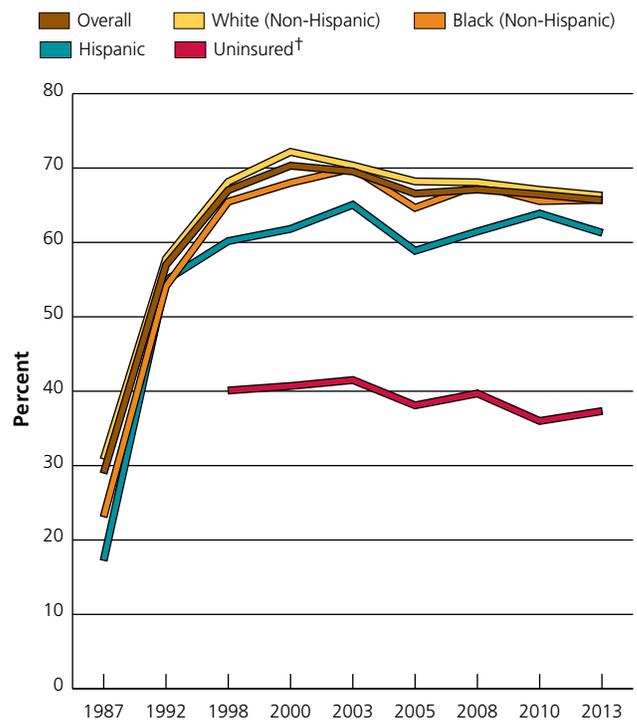
Improving scientific knowledge about how to identify women at increased risk of breast cancer is enabling the development of tools for risk assessment for clinical practice.^{273, 285} For some women who are at high risk for breast cancer, the Society recommends annual screening using magnetic resonance 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 mainly based on family history and includes the presence of mutations in the breast cancer susceptibility genes *BRCA1* and *BRCA2*; a first-degree relative (parent, sibling or child) with a *BRCA1* or *BRCA2* gene mutation; a strong family history of breast and/or ovarian cancer; or prior chest radiation therapy (e.g., for Hodgkin lymphoma).²⁸⁶ In addition to MRI screening as an adjunct to mammography and screening at an earlier age, interventions offered to women at high risk of breast cancer include chemoprevention with tamoxifen or raloxifene (two Food and Drug Administration [FDA]-approved drugs), genetic counseling, and among women with certain genetic mutations, surgical options.²⁸⁷ Women with mammographically dense breast tissue (tissue that is fibrous and glandular as opposed to fatty tissue) are at a moderately increased risk for breast cancer (15-20%), and mammography for these women is not as sensitive as it is for women without mammographically dense breasts. However, at this time there is not enough evidence to recommend MRI screening for women with significant mammographic breast density.^{288, 289}

The American Cancer Society played an important role in advancing breast cancer screening after findings from the Health Insurance Plan of Greater New York randomized controlled trial of breast cancer screening showed reduced breast cancer mortality associated with an invitation to screening in the 1970s. In collaboration with the National Cancer Institute, the Society launched the Breast Cancer Detection Demonstration Project to determine whether women and health care professionals would participate in breast cancer screening with mammography. Public education campaigns further contributed to the uptake of mammography. Please see *Breast Cancer Facts and Figures* (www.cancer.org/research/cancerfactsstatistics/) for more information on breast cancer statistics.

Mammography Screening in the US

- According to the 2013 National Health Interview Survey (NHIS), 51.3% of women 40 years of age and older reported having a mammogram within the past year (Table 6A, page 40). The proportion of women 40 years of age and older receiving mammography within the past two years was higher (65.9%).
- The percentage of women 40 years of age and older who reported having a mammogram within the past two years

Figure 6A. Mammography within the Past Two Years*, Women 40 Years and Older, among Racial/Ethnic Categories and the Uninsured†, US, 1987-2013



*Estimates for racial/ethnic categories are age adjusted to the 2000 US standard population; see Statistical Notes (page 52) for further information. †At time of interview, among women ages 40 to 64 years; not age adjusted.

Sources: Racial/ethnic categories 1987-2010: Cancer Trends Progress Report – 2011/2012 Update, National Cancer Institute, NIH, DHHS, Bethesda, MD, August 2012, <http://progressreport.cancer.gov>. Accessed August 22, 2014. Uninsured 1998-2010: National Center for Health Statistics. Health, United States, 2013: With Special Feature on Prescription Drugs. Hyattsville, MD. 2014. Complete trend data available at: <<http://www.cdc.gov/nchs/hus/contents2013.htm#083>> Accessed: August 22, 2014. 2013: Centers for Disease Control and Prevention. National Health Interview Survey, 2013. Public use data file. See Survey Sources (page 53) for complete citation.

American Cancer Society, Surveillance Research, 2015

increased from 29% in 1987 to 70% in 2000, although this percentage declined by 3.4% between 2000 and 2005 and has remained relatively stable since then. While mammography prevalence has improved over time in all racial and ethnic groups, they remained persistently low in uninsured women (Figure 6A).

- In 2013, the prevalence of a mammogram in the past two years was similar among non-Hispanic white, black, and Asian women (66-67%), but was slightly lower in Hispanic (61.6%) and American Indian/Alaskan Native women (63.0%) (Table 6A, page 40).
- The lowest prevalence of mammography use in the past two years was reported among uninsured women (38.0%), followed by recent immigrants (living in the US <10 years) (39.9%) (Table 6A, page 40).

Table 6B. Mammography and Clinical Breast Exam (%) within the Past Year, Women 40 Years and Older, by State, US, 2012

	Mammogram					Mammogram and Clinical Breast Exam*				
	40 years and older	40 to 64 years	65 years and older	No usual source of medical care†	No health insurance‡	40 years and older	40 to 64 years	65 years and older	No usual source of medical care†	No health insurance‡
Alabama	59.0	58.3	60.4	28.4	31.3	49.0	51.1	44.4	21.4	26.9
Alaska	53.6	52.5	57.5	35.3	29.7	47.7	47.4	48.5	29.0	27.8
Arizona	53.0	49.6	59.7	26.7	22.4	43.2	41.9	45.8	21.1	15.5
Arkansas	49.8	47.3	54.4	29.0	25.0	39.6	40.2	38.5	20.4	21.3
California	58.5	57.0	62.0	28.8	33.4	46.9	48.8	42.4	22.7	28.7
Colorado	52.3	50.8	56.2	22.3	23.0	43.1	43.3	42.6	17.7	17.1
Connecticut	65.9	66.9	63.8	27.9	39.3	58.2	61.5	51.4	23.4	31.7
Delaware	67.6	66.3	70.0	30.0	40.9	58.4	59.0	57.1	25.0	32.0
District of Columbia	62.6	61.7	64.5	25.1	§	55.6	56.8	53.3	18.9	§
Florida	59.0	55.4	65.2	28.3	28.7	47.2	46.2	48.8	21.2	20.9
Georgia	62.1	58.8	70.3	32.6	27.2	53.3	52.6	55.0	26.8	22.6
Hawaii	58.6	58.6	58.7	35.7	30.2	44.5	47.8	37.9	23.1	22.6
Idaho	49.1	46.3	55.2	20.5	16.2	43.5	42.1	46.5	18.1	15.0
Illinois	57.7	56.9	59.7	30.4	36.6	47.8	48.9	45.2	25.5	33.3
Indiana	52.4	50.2	57.0	18.1	23.0	42.0	42.8	40.1	13.4	13.4
Iowa	61.0	60.1	62.8	34.8	30.1	51.5	53.8	47.2	30.8	25.1
Kansas	60.0	59.5	61.0	29.5	29.6	50.5	52.8	45.8	25.1	26.1
Kentucky	57.3	56.4	59.1	25.8	29.4	46.8	49.2	41.7	17.3	23.3
Louisiana	60.0	59.8	60.5	36.6	40.8	50.0	51.5	46.6	29.4	31.6
Maine	65.0	64.6	65.8	24.1	34.0	55.4	57.0	52.1	19.3	26.7
Maryland	64.8	64.3	65.9	37.6	35.6	56.1	57.3	53.3	27.1	26.9
Massachusetts	72.1	72.3	71.6	39.9	43.8	62.7	64.2	59.5	30.3	36.8
Michigan	59.2	57.9	61.9	20.5	28.9	50.9	51.7	49.1	17.7	25.2
Minnesota	63.4	61.4	67.7	38.8	35.2	56.0	55.8	56.7	34.7	34.6
Mississippi	52.4	51.3	54.8	27.4	27.1	43.5	44.7	41.1	23.7	22.1
Missouri	58.4	55.5	64.4	25.3	28.5	46.6	47.4	45.2	20.2	20.6
Montana	50.4	49.2	52.6	19.4	26.5	42.6	42.6	42.7	14.9	24.3
Nebraska	54.4	53.9	55.3	26.0	35.3	45.4	47.6	40.8	22.4	30.3
Nevada	49.6	47.8	53.6	27.7	23.2	39.9	40.8	37.7	24.6	19.8
New Hampshire	64.6	63.5	67.1	24.0	36.3	54.8	55.9	52.1	21.0	30.6
New Jersey	61.2	61.9	59.7	41.4	44.4	53.3	55.7	47.9	34.9	35.1
New Mexico	49.9	48.2	53.4	24.9	28.2	41.3	41.9	39.9	18.2	25.4
New York	62.0	62.5	61.0	41.6	37.1	53.6	54.3	52.1	31.3	28.4
North Carolina	61.5	59.1	66.9	28.7	27.4	53.4	53.0	54.3	23.8	22.9
North Dakota	58.2	56.4	61.4	31.0	27.2	50.1	50.6	49.4	27.7	27.6
Ohio	60.3	58.9	63.2	28.0	29.3	50.0	51.7	46.5	24.7	26.6
Oklahoma	52.4	51.3	54.8	24.1	25.0	41.9	43.5	38.7	20.4	20.7
Oregon	53.9	50.1	61.8	22.1	25.2	40.7	40.2	41.8	19.5	22.7
Pennsylvania	59.8	58.6	61.9	28.1	31.2	49.4	50.9	46.6	21.9	25.2
Rhode Island	67.0	65.7	69.6	27.7	44.1	58.5	58.9	57.8	23.8	36.4
South Carolina	54.3	51.6	59.8	24.7	22.5	43.3	42.2	45.5	18.6	16.1
South Dakota	61.5	61.3	61.9	37.3	28.8	53.0	55.6	48.1	31.6	25.8
Tennessee	56.5	54.7	60.3	27.9	25.2	49.1	48.5	50.5	26.4	23.1
Texas	53.6	51.0	60.1	22.5	21.3	44.9	45.0	44.7	19.4	18.1
Utah	50.1	49.1	52.8	29.8	27.8	37.9	38.4	36.5	21.6	21.6
Vermont	61.2	60.7	62.5	23.6	30.8	51.9	52.9	49.6	16.4	26.1
Virginia	64.3	64.0	65.2	41.7	43.5	56.1	57.4	52.8	36.5	39.8
Washington	55.6	53.4	60.5	28.3	26.9	44.1	44.0	44.3	20.8	22.3
West Virginia	58.3	58.0	59.0	25.0	36.4	47.8	49.2	45.1	20.2	33.3
Wisconsin	63.4	61.1	68.1	21.8	36.2	56.8	56.1	58.4	20.0	35.8
Wyoming	47.3	45.9	50.7	26.6	25.6	39.5	40.8	36.6	24.0	24.1
United States (median)	58.6	57.9	61.0	27.9	29.4	49.0	49.2	46.5	22.4	25.3
Range	47.3-72.1	45.9-72.3	50.7-71.6	18.1-41.7	16.2-44.4	37.9-62.7	38.4-64.2	36.5-59.5	13.4-36.5	13.4-39.8

*Both a mammogram and clinical breast exam within the past year. †Among women 40 years and older with no personal doctor or health care provider. ‡Among women ages 40 to 64 years. §Sample size is insufficient to provide a stable estimate. Note: BRFSS 2012 data results are not directly comparable to BRFSS data prior to 2011 because of the changes in weighting methodology and the addition of the cell phone sampling frame.

Source: Centers for Disease Control and Prevention. Behavioral Risk Factor Surveillance System, 2012. Public use data file. See Survey Sources (page 53) for complete citation.

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State-level Mammography Screening

- According to the 2012 Behavioral Risk Factor Surveillance System (BRFSS), the percentage of women 40 years of age and older who reported having a mammogram in the past year ranged from 47.3% in Wyoming to 72.1% in Massachusetts (Table 6B, page 43).
- In 2012, among women ages 40-64 years without health insurance, 16.2% of those in Idaho reported having a mammogram in the past year compared to 44.4% in New Jersey (Table 6B, page 43).

Table 6C. Pap Test Use (%), Women 21 to 65 Years, US, 2013

	Within the past three years*
Overall	80.8
Age (years)	
21-30	79.9
31-40	83.1
41-50	82.2
51-65	77.6
Race/Ethnicity	
White (non-Hispanic)	82.8
Black (non-Hispanic)	82.3
Hispanic	77.1
American Indian/Alaska Native	80.7
Asian (non-Hispanic) [†]	70.6
Education[‡]	
Some high school or less	68.5
High school diploma or GED	75.7
Some college/Assoc. degree	83.4
College graduate	87.3
Sexual Orientation	
Gay/lesbian [§]	72.9
Straight [¶]	81.1
Bisexual	65.7
Insurance Status	
Uninsured	60.6
Insured	85.2
Immigration status	
Born in US	82.5
Born in US territory [#]	76.8
In US fewer than 10 years	65.9
In US 10+ years	76.0

GED-General Educational Development high school equivalency. *Among women with intact uteri. Percentages are age adjusted to the 2000 US standard population; see Statistical Notes (page 52) for further information. †Does not include Native Hawaiians or other Pacific Islanders. ‡Among women ages 25-65 years. §Response option provided on the NHIS was "gay or lesbian." ¶Response option provided on the NHIS was "straight, that is not gay or lesbian." #Have been in the US for any length of time.

Source: Centers for Disease Control and Prevention. National Health Interview Survey, 2013. Public use data file. See Survey Sources (page 53) for complete citation.

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Table 6D. Pap Test Use (%), Women 21 to 65 Years, by State, US, 2012

	Within the past three years*		
	Overall	No usual source of medical care [†]	No health insurance [‡]
Alabama	84.0	69.7	69.6
Alaska	83.5	71.9	69.5
Arizona	78.8	62.9	64.0
Arkansas	79.0	66.8	70.8
California	85.6	72.1	74.9
Colorado	85.5	69.0	72.4
Connecticut	88.0	66.7	67.4
Delaware	88.9	74.6	73.4
District of Columbia	88.1	81.7	77.8
Florida	80.4	66.0	62.7
Georgia	84.4	71.9	71.8
Hawaii	82.2	57.2	61.0
Idaho	74.6	62.7	63.6
Illinois	85.7	69.3	75.9
Indiana	80.4	58.7	58.2
Iowa	87.0	71.7	73.0
Kansas	84.8	72.3	72.7
Kentucky	81.6	68.6	68.6
Louisiana	85.0	71.1	74.7
Maine	87.9	53.5	71.3
Maryland	88.2	79.4	75.2
Massachusetts	89.6	68.6	72.6
Michigan	86.2	65.7	64.1
Minnesota	87.8	74.4	74.1
Mississippi	80.9	73.1	69.5
Missouri	82.3	67.0	64.6
Montana	82.2	68.2	68.0
Nebraska	83.9	69.9	72.1
Nevada	77.4	66.4	66.2
New Hampshire	86.9	58.6	65.1
New Jersey	84.9	70.4	71.5
New Mexico	83.0	71.3	70.5
New York	82.6	65.5	70.8
North Carolina	86.3	70.9	70.6
North Dakota	84.3	71.1	68.5
Ohio	84.5	69.2	65.6
Oklahoma	81.0	67.0	69.5
Oregon	80.3	53.8	64.4
Pennsylvania	83.2	61.6	64.3
Rhode Island	88.7	66.5	76.8
South Carolina	82.1	65.2	66.3
South Dakota	86.7	74.6	63.9
Tennessee	85.8	72.6	71.9
Texas	80.6	68.5	71.5
Utah	79.1	63.4	68.2
Vermont	86.8	60.2	61.2
Virginia	87.4	78.0	74.4
Washington	83.0	68.0	68.8
West Virginia	80.9	66.5	69.8
Wisconsin	85.2	67.8	70.4
Wyoming	79.9	70.0	69.3
United States (median)	84.3	68.6	69.6
Range	74.6 - 89.6	53.5 - 81.7	58.2 - 77.8

*Among women with intact uteri. †Among women with no personal doctor or health care provider. ‡Among women ages 21-64 years. Note: BRFSS 2012 data results are not directly comparable to BRFSS data prior to 2011 because of the changes in weighting methodology and the addition of the cell phone sampling frame.

Source: Centers for Disease Control and Prevention. Behavioral Risk Factor Surveillance System, 2012. Public use data file. See Survey Sources (page 53) for complete citation.

American Cancer Society, Inc., Surveillance Research, 2015

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 screening with the Papanicolaou (Pap) test, which can detect both cervical cancer and precancerous lesions.^{275, 290} For women in whom precancerous lesions are detected, the likelihood of survival is nearly 100% with appropriate evaluation, treatment, and follow-up. Women diagnosed with localized cervical cancer also have high survival rates (five-year relative survival of 91%).²⁷⁵ However, almost half of all cervical cancers are diagnosed at a regional or distant stage for which the five-year survival rate is 57% or 16%, respectively,²⁷⁵ and most (60-80%) women diagnosed at these later stages have not had a Pap test in the past five years.²⁹¹

The American Cancer Society played a critical role in developing and promoting the use of cervical cancer screening. In March 2012, the Society, along with the American Society for Colposcopy and Cervical Pathology and the American Society for Clinical Pathology, released updated cervical cancer screening guidelines²⁹² (see page 41). In brief, the Society recommends Pap testing every three years for women ages 21-29 years, and the preferred method of screening for women ages 30-65 years is human papillomavirus (HPV) testing with Pap testing every five years, though Pap testing without HPV testing every three years is acceptable for women in this age group. Screening after the age of 65 depends on previous Pap and HPV test results.²⁹² In April 2014, the FDA approved the first HPV test for primary cervical cancer screening, which the Society is considering and may

update its screening guidelines in the near future. In addition to screening, there is potential to further reduce the occurrence of cervical cancer with the HPV vaccine, which is discussed in detail in the Infectious Agents chapter beginning on page 32. It is important to realize that women who receive the HPV vaccine should still follow recommended screening guidelines because the vaccines do not protect against all types of HPV.

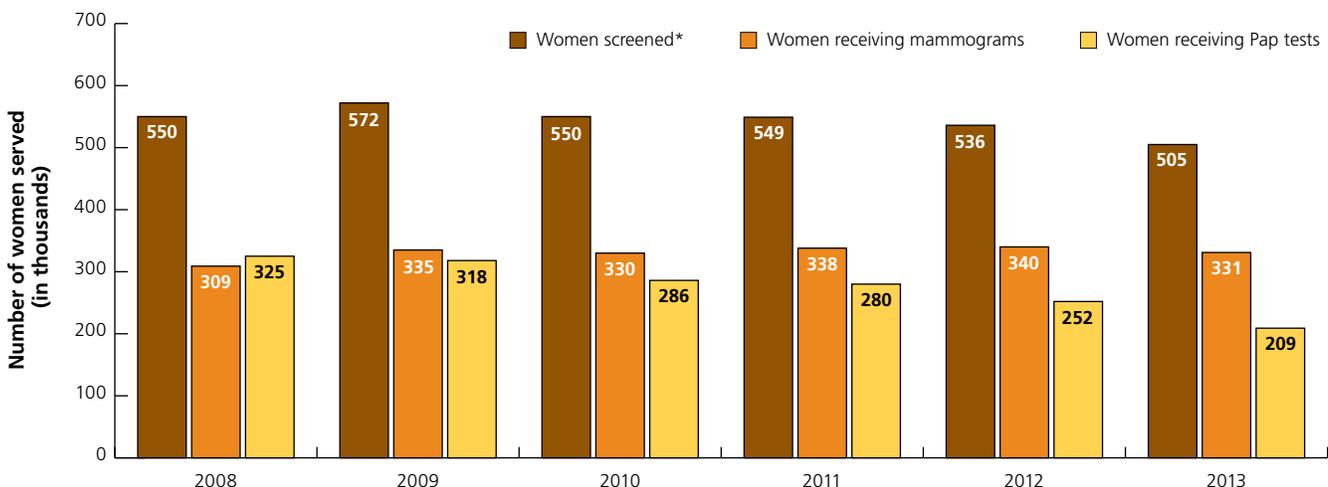
Pap Test Screening in the US

- According to the 2013 NHIS, 80.8% of women 21 to 65 years of age reported having had a Pap test within the past three years (Table 6C).
- In 2013, the prevalence of Pap test use was similar among non-Hispanic whites, non-Hispanic blacks, and Native Americans (80.7-82.8%). Pap testing within the past three years was lower among Hispanic (77.1%) and Asian (70.6%) women (Table 6C).
- In 2013, the prevalence of recent Pap test use was lowest among women with no health insurance (60.6%) and recent immigrants (living in the US <10 years) (65.9%) (Table 6C).

State-level Pap Test Screening

- According to the 2012 BRFSS, uptake of recent Pap testing among women 21 to 65 years of age ranged from 74.6% in Idaho to 89.6% in Massachusetts (Table 6D).
- Among women with no health insurance, screening ranged from 58.2% in Indiana to 77.8% in the District of Columbia (Table 6D).

Figure 6B. Number of Women Screened in the National Breast and Cervical Cancer Early Detection Program (NBCCEDP), 2008-2013



*Screening includes mammogram, clinical breast exam, or Pap test. Some women were screened for both breast and cervical cancer so total number of women screened is less than the sum of the number screened for each cancer type. Note: These data represent calendar years. Data presented for the NBCCEDP in *Cancer Prevention & Early Detection 2013* and prior represented program years.

Source: National Breast and Cervical Cancer Early Detection Program, Centers for Disease Control and Prevention, 2014.

American Cancer Society, Surveillance Research, 2015

Programs to Increase Breast and Cervical Cancer Screening

The Centers for Disease Control and Prevention's (CDC) National Breast and Cervical Cancer Early Detection Program (NBC-CEDP) provides low-income, uninsured, and underinsured women with access to timely, high-quality screening exams for breast and cervical cancers and diagnostic services.²⁹³ The program is currently in all 50 states, the District of Columbia, five US territories, and 11 American Indian/Alaska Native organizations. Approximately 50% of the women screened are from racial/ethnic minority groups. Since 1991, the NBCCEDP has served more than 4.6 million women, provided more than 11.6 million screening examinations, and diagnosed more than 64,718 breast cancers, 167,169 precancerous cervical lesions, and 3,576 cases of invasive cervical cancers.²⁹³ Among women with abnormal screening results, 90% receive complete diagnostic evaluation.²⁹⁴

In order to locate women eligible to receive services, state programs funded by the 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 be difficult and costly and requires ongoing coordination with community partners and health care providers;²⁹³ however, this targeted approach is most effective for reducing the burden of these cancers and the associated disparities associated with their diagnosis and treatment.²⁹⁵ According to the CDC, about 10% of US women are eligible for cervical cancer screening, and the program serves about 8.2% of them. About 9% of US women are eligible for breast cancer screening, and the program serves about 12% of them.²⁹³ In the most recent period (2008-2013), figures indicate a slight decrease in the number of eligible women served by the NBCCEDP (Figure 6B, page 45).

The Society and the American Cancer Society Cancer Action Network (ACS CAN) support efforts to increase funding for the NBCCEDP 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 aimed at strengthening the NBCCEDP. In addition, the Society and ACS CAN work to guarantee that every woman has access to proven screening exams through the Affordable Care Act (ACA).

Colorectal Cancer Screening

In 2015, 132,700 men and women will be diagnosed with colorectal cancer (CRC), and 49,700 will die from the disease.³ CRC is the third leading cause of cancer death in the US in both men and women.³ Promoting CRC screening is a major priority for the Society because screening can reduce CRC death rates both by preventing the disease and by detecting it at earlier, more treatable stages. CRC may also be prevented through endoscopic screening (sigmoidoscopy or colonoscopy) that can detect cancer

and advanced lesions.^{296, 297} The relative five-year survival rate is 90% for CRC patients diagnosed at an early, localized stage; however, only 40% of cases are diagnosed with this stage.²⁷⁵ In the past decade, there has been progress in reducing CRC incidence and death rates; these declines can be attributed to improved CRC screening utilization, risk-factor reduction (e.g., declining tobacco use), and improved treatments.²⁹⁸ However, CRC screening prevalence has stabilized in more recent years and still lags behind breast and cervical screening prevalence (Tables 6A, page 40; 6C, page 44; and 6E).

The American Cancer Society and other organizations have developed and promoted CRC screening guidelines for more than three decades. The most recent Society guidelines, which were in collaboration with the American College of Radiology and the US Multi-Society Task Force on Colorectal Cancer (a consortium representing the American College of Gastroenterology, the American Society of Gastrointestinal Endoscopy, and the American Gastroenterological Association), were released in 2008. These guidelines categorize screening methods into two distinct groups: tests that primarily detect cancer, and structural exams that detect both cancer and precancerous polyps. 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 factors required to attain optimal benefits from screening. There are several recommended methods for CRC screening (see page 41). The methods for structural examinations, which detect both cancer and advanced lesions, include flexible sigmoidoscopy, colonoscopy, computed tomography (CT) colonography, and double-contrast barium enema.²⁹⁶ Methods in the cancer detection group consist of home-collection stool kits – the guaiac-based fecal occult blood test (gFOBT) and the fecal immunochemical test (FIT). In the latest (2008) Society CRC screening guidelines, stool DNA (sDNA) was among the recommended high-sensitivity stool tests, however, shortly after the guidelines were issued the test was withdrawn from the market. In 2010, the Society guideline was amended to reflect that sDNA was no longer available. In 2014, a more advanced sDNA received FDA clearance to be marketed as a CRC screening test.²⁹⁹ The American Cancer Society will conduct a full evaluation of the evidence supporting the test when the CRC guidelines are updated.

Colorectal Cancer Screening in the US

- According to the 2013 NHIS, among adults 50 years of age and older, 58.6% were up-to-date with screening (either an FOBT within the past year or a sigmoidoscopy within the past five years or a colonoscopy within the past 10 years). The US Preventive Services Task Force (USPSTF) only recommends routine screening for CRC up to age 75; for this population (ages 50-75 years), 57.2% were up-to-date with USPSTF screening recommendations (Table 6E).

Table 6E. Colorectal Cancer Screening (%), Adults, US, 2013

	Fecal occult blood test*		Endoscopy†		Combined FOBT/Endoscopy‡	
	50 to 75 years	50 years and older	50 to 75 years	50 years and older	50 to 75 years	50 years and older
Overall	7.8	7.8	54.4	55.9	57.2	58.6
Gender						
Males	8.0	7.8	53.6	56.1	56.3	58.8
Females	7.7	7.7	55.2	55.8	58.1	58.6
Age (years)						
50-64	6.7	6.8	48.9	50.4	51.6	53.1
65+, 65-75	10.2	8.8	65.9	62.3	69.0	65.1
Race/Ethnicity						
White (non-Hispanic)	7.5	7.4	56.8	58.0	59.4	60.5
Black (non-Hispanic)	8.7	8.5	55.1	56.5	58.1	59.4
Hispanic	8.2	8.4	39.5	41.5	42.9	44.9
American Indian / Alaska Native	††	††	44.8	45.0	47.3	48.0
Asian (non-Hispanic)§	10.1	10.9	46.2	48.6	50.6	53.2
Education						
Some high school or less	7.0	6.8	38.4	40.0	41.8	43.1
High school diploma or GED	7.2	7.3	50.1	52.6	52.7	55.2
Some college/Assoc. degree	8.8	8.6	56.3	58.0	59.0	60.7
College graduate	7.9	7.9	63.6	65.4	66.4	68.0
Sexual Orientation						
Gay/Lesbian¶	9.0	10.7	68.5	69.4	73.5	73.8
Straight#	7.8	7.8	54.2	55.8	57.0	58.5
Bisexual	††	††	††	††	††	††
Insurance Status						
Uninsured	2.7	2.2	22.7	20.3	24.6	21.9
Insured	8.2	8.1	57.9	58.8	60.8	61.6
Immigration Status						
Born in US	7.9	7.8	56.4	57.7	59.1	60.4
Born in US territory**	10.9	11.1	48.3	49.4	54.4	55.0
In US fewer than 10 years	††	††	18.0	17.3	20.2	20.2
In US 10+ years	7.6	7.7	45.5	47.2	48.7	50.4

FOBT-fecal occult blood test. GED-General Educational Development high school equivalency. *A home fecal occult blood test within the past year. †50-75: A sigmoidoscopy within the past five years with FOBT in the past three years OR a colonoscopy within the past 10 years. 50+: A sigmoidoscopy within the past five years OR a colonoscopy within the past 10 years. ‡50-75: Either a fecal occult blood test within the past year, sigmoidoscopy within the past five years with FOBT in the past three years, or a colonoscopy within the past 10 years. 50+: Either a fecal occult blood test within the past year, sigmoidoscopy within the past five years, or a colonoscopy within the past 10 years. §Does not include Native Hawaiians or other Pacific Islanders. ¶Response option provided on the NHIS was "gay" for men and "gay or lesbian" for women. #Response option provided on the NHIS was "straight, that is, not gay" for men and "straight, that is not gay or lesbian" for women. **Have been in the US for any length of time. ††Estimate not provided due to instability. Note: The colorectal cancer screening prevalence estimates do not distinguish between examinations for screening and diagnosis. The 2013 estimates for endoscopy and combined FOBT/endoscopy are not comparable to estimates from 2008 and prior because of changes in questions assessing endoscopy use. Percentages are age adjusted to the 2000 US standard population; see Statistical Notes (page 52) for further information.

Source: Centers for Disease Control and Prevention. National Health Interview Survey, 2013. Public use data file. See Survey Sources (page 53) for complete citation.

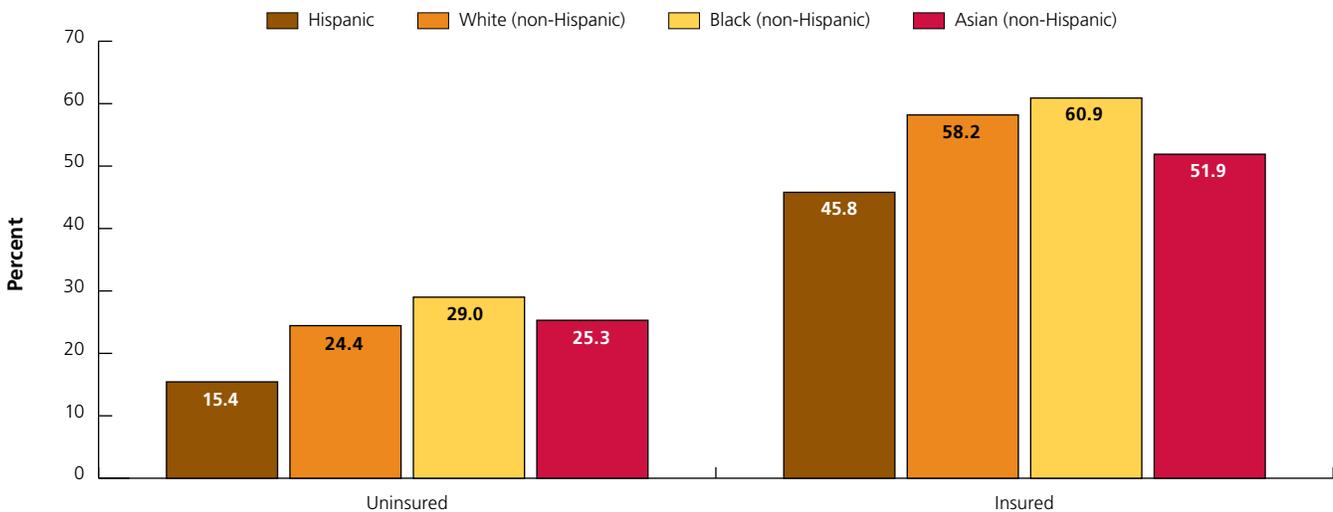
American Cancer Society, Inc., Surveillance Research, 2015

- Although endoscopic screening, primarily colonoscopy, was much more common (55.9%) than FOBT (7.8%) (Table 6E), fecal tests (home-based FOBT or FIT) remain important screening options.
- Screening prevalence was highest among non-Hispanic blacks and whites (59.4-60.5%), followed by Asians (53.2%), American Indian/Alaska Natives (48.0%), and Hispanics (44.9%) (Table 6E).
- CRC screening prevalence was also low among recent immigrants (living in the US <10 years) (20.2%) and individuals without a high school diploma (43.1%) (Table 6E).
- Regardless of race/ethnicity, people without health insurance had much lower CRC screening (15.4-29.0%) compared to people with insurance (45.8-60.9%) (Figure 6C, page 48).

State-level Colorectal Cancer Screening

- According to 2012 BRFSS data, the percentage of adults 50 years of age and older who were up-to-date with screening (home-based FOBT in the past year, sigmoidoscopy in the past five years, or colonoscopy in the past 10 years) ranged from 56.8% in Alaska to 75.8% in Massachusetts (Table 6F, page 49).

Figure 6C. Colorectal Cancer Screening*, Adults 50 to 64 Years, by Race/Ethnicity and Insurance Status†, US, 2013



*Either a fecal occult blood test within the past year or sigmoidoscopy within the past 5 years or colonoscopy within the past 10 years. †At the time of the interview. Note: The 2013 estimates for combined FOBT/endoscopy are not comparable to estimates from 2008 and prior because of changes in questions assessing endoscopy use. Percentages are age adjusted to the 2000 US standard population; see Statistical Notes (page 52) for further information.

Source: Centers for Disease Control and Prevention. National Health Interview Survey, 2013. Public use data file. See Survey Sources (page 53) for complete citation..

American Cancer Society, Inc., Surveillance Research, 2015

- Home-based FOBT use ranged from 3.5% in Utah to 19.5% in California. CRC screening with endoscopy ranged from 54.6% in Alaska to 73.2% in New Hampshire (Table 6F).
- Among adults ages 50-64 without insurance, only 20.0% of those in Texas reported CRC screening compared to 48.4% in Massachusetts (Table 6F).

Programs to Increase Colorectal Cancer Screening

As part of the goal to lower cancer incidence and mortality overall and among medically underserved populations, ACS CAN is 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. The Society, along with the CDC, and many other organizations form The National Colorectal Cancer Roundtable, which recently launched the 80% by 2018 initiative (see sidebar for more information).³⁰⁰

Starting in 2009, the CDC funded the Colorectal Cancer Control Program (CRCCP), which awarded grants (totaling about \$27 million) to 25 states and four tribal organizations for a five-year period. The goal of the program is to increase population-level CRC screening among everyone 50 years and older in the participating states and tribes and to reduce health disparities in CRC screening among those underinsured and uninsured. Since the program began, about 34,000 people have been screened,

and adenomatous polyps have been identified in 4,880 people.³⁰¹ Additionally, the CDC has funded a Screen for Life media campaign aimed at increasing knowledge and awareness of CRC screening benefits.³⁰² The Society has developed an educational video and an information resource kit explaining the various CRC screening options to help consumers talk with their physicians and decide what is best for them. More information on these and other programs and resources can be found at cancer.org/colonmd. Please see the *Colorectal Cancer Facts & Figures 2014-2016* (<http://www.cancer.org/research/cancerfactsstatistics/>) for more information on CRC statistics.

80% by 2018 Initiative³⁰⁰

The National Colorectal Cancer Roundtable (NCCRT) is a coalition of public, private, and nonprofit organizations and experts dedicated to reducing CRC incidence and mortality in the US. The 80% by 2018 initiative is the common goal of the NCCRT members, which is that 80% of US adults ages 50 years and older are up-to-date with screening for CRC by 2018. Tens of thousands of lives could be saved each year with a national screening rate of 80%. Further, by working with multiple components in the health care arena, including payers, purchasers, patients, providers, and community health centers, members of the NCCRT aim to increase screening rates and reduce disparities in screening utilization and access to care.

Table 6F. Colorectal Cancer Screening (%), Adults, by State, US, 2012

	Fecal occult blood test*		Endoscopy†		Combined FOBT/Endoscopy‡			
	50 to 75 years	50 years and older	50 to 75 years	50 years and older	50 to 75 years	50 years and older	No usual source of medical care§	No health insurance¶
Alabama	9.6	9.7	62.3	63.6	66.0	66.6	26.4	32.7
Alaska	7.0	6.8	53.1	54.6	56.2	56.8	34.3	27.7
Arizona	9.6	9.9	55.2	56.9	58.7	60.0	26.3	27.3
Arkansas	8.4	9.1	53.6	56.3	57.0	59.5	28.4	32.0
California	20.1	19.5	56.5	59.9	67.2	68.6	27.8	26.7
Colorado	10.0	10.0	60.1	61.2	65.4	65.8	26.9	30.8
Connecticut	10.3	10.8	69.5	70.1	72.3	72.8	27.4	29.9
Delaware	7.2	7.8	69.9	71.2	71.6	72.6	40.1	41.6
District of Columbia	14.1	14.9	63.1	65.4	67.3	69.1	32.8	33.5
Florida	12.9	13.6	61.5	63.8	66.1	68.0	29.2	29.2
Georgia	11.7	12.3	64.1	65.1	67.7	68.5	32.1	33.7
Hawaii	14.6	13.1	56.2	57.8	65.0	64.2	29.8	30.3
Idaho	7.2	7.7	57.7	59.9	60.6	62.2	29.5	25.2
Illinois	5.9	6.9	58.9	60.0	61.1	62.2	26.5	41.3
Indiana	8.8	9.0	56.8	57.8	60.6	61.1	20.7	28.1
Iowa	8.6	9.0	63.6	64.8	66.2	67.3	38.0	39.3
Kansas	10.7	11.1	60.8	62.6	64.8	66.2	35.6	34.4
Kentucky	8.6	9.0	60.2	61.6	63.1	64.3	28.6	29.9
Louisiana	10.7	10.8	56.0	58.3	60.3	62.3	32.0	33.6
Maine	8.4	9.0	70.8	71.0	73.5	73.2	34.0	38.2
Maryland	11.3	11.8	67.3	68.3	70.8	71.2	32.6	41.3
Massachusetts	9.8	10.9	73.2	72.8	76.5	75.8	38.7	48.4
Michigan	9.3	9.6	66.8	67.3	69.5	69.6	28.5	33.3
Minnesota	4.7	5.3	68.5	69.4	70.9	71.2	44.5	39.9
Mississippi	11.1	11.4	55.2	56.5	58.4	59.5	35.1	31.3
Missouri	7.6	8.0	60.6	61.7	64.2	64.9	30.1	25.0
Montana	6.5	6.4	53.2	54.7	56.5	57.5	26.0	28.1
Nebraska	7.3	7.5	57.8	59.3	61.1	62.2	27.5	32.3
Nevada	11.6	12.6	54.3	55.3	58.7	59.5	29.8	28.5
New Hampshire	7.6	8.0	72.9	73.2	75.2	75.2	36.8	40.6
New Jersey	7.7	8.4	59.8	61.2	62.4	63.6	32.0	34.6
New Mexico	8.6	8.6	54.0	56.0	57.8	59.3	27.2	24.9
New York	8.3	8.7	67.0	68.0	69.6	70.3	36.2	46.3
North Carolina	11.1	11.6	65.0	66.5	68.7	69.9	34.2	32.5
North Dakota	8.1	8.3	54.2	56.5	58.3	59.4	34.7	28.2
Ohio	9.2	9.4	59.2	60.6	63.5	64.2	33.5	31.6
Oklahoma	8.0	7.9	55.1	57.1	58.6	60.3	25.9	22.7
Oregon	9.8	10.1	60.3	61.6	65.5	66.0	23.4	26.7
Pennsylvania	9.0	9.2	63.3	64.3	66.9	67.6	36.7	39.6
Rhode Island	8.0	8.9	70.4	71.3	73.0	73.8	27.2	41.0
South Carolina	7.0	7.5	62.6	63.6	65.2	65.8	27.9	25.8
South Dakota	8.4	8.4	59.2	60.8	62.6	63.5	32.3	33.8
Tennessee	10.2	10.9	62.0	63.7	65.0	66.4	28.8	29.9
Texas	8.6	8.8	55.2	57.2	58.4	60.3	22.5	20.0
Utah	3.4	3.5	66.4	66.9	68.0	68.3	37.8	33.2
Vermont	7.7	8.6	68.8	68.8	71.5	71.6	36.6	33.4
Virginia	9.4	9.5	65.5	66.0	68.0	68.4	32.5	36.6
Washington	10.0	10.4	62.9	64.8	67.5	68.5	30.2	34.4
West Virginia	12.8	12.9	59.2	59.7	63.3	63.8	27.4	31.0
Wisconsin	6.2	7.2	68.2	70.0	71.5	72.6	36.1	44.2
Wyoming	5.3	5.4	53.2	55.2	55.9	57.4	31.3	31.7
United States (median)	8.6	9.0	60.6	61.7	65.2	66.0	30.2	32.3
Range	3.4-20.1	3.5-19.5	53.1-73.2	54.6-73.2	55.9-76.5	56.8-75.8	20.7-44.5	20.0-48.4

*A fecal occult blood test within the past year. †50-75: Sigmoidoscopy within the past five years with FOBT within the past three years or colonoscopy within the past 10 years. 50+: Sigmoidoscopy within the past five years or colonoscopy within the past 10 years. ‡50-75: A fecal occult blood test within the past year or sigmoidoscopy within the past five years with FOBT within the past three years or colonoscopy within the past 10 years. 50+: A fecal occult blood test within the past year or sigmoidoscopy within the past five years or colonoscopy within the past 10 years. §Among adults ages 50 years and older with no personal doctor or health care provider. ¶Among adults ages 50 to 64 years. Note: The colorectal cancer screening prevalence estimates do not distinguish between examinations for screening and diagnosis. BRFSS 2012 data results are not directly comparable to BRFSS data prior to 2011 because of the changes in weighting methodology and the addition of the cell phone sampling frame.

Source: Centers for Disease Control and Prevention. Behavioral Risk Factor Surveillance System, 2012. Public use data file. See Survey Sources (page 53) for complete citation.

American Cancer Society, Inc., Surveillance Research, 2015

Prostate Cancer Screening

Among men in the US, cancer of the prostate is the most common type of cancer (other than skin cancer) and the second leading cause of cancer death.³ Mortality trends for prostate cancer have been declining, which is thought to be in part due to early detection using the prostate-specific antigen (PSA) test (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.³⁰³⁻³⁰⁵ Further analyses of these studies are underway. Most experts agree that the current evidence is insufficient to recommend for or against routine testing for early prostate cancer detection given concerns about frequent overdiagnosis (diagnosis of cancer that would not have caused harm) and substantial risk for serious side effects from prostate cancer treatment.³⁰⁶⁻³⁰⁸

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 or not to be screened for prostate cancer. The decision should be made only after receiving information about the uncertainties, risks, and potential benefits associated with PSA screening.³⁰⁶ Men at average risk should receive this information beginning at age 50; men at higher risk should receive this information at age 40 or 45, depending on their particular risk profile.³⁰⁶ 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.³⁰⁹ In an effort to address these shortcomings, the 2010 American Cancer Society screening guideline provided detailed recommendations to clinicians on the core factors related to prostate cancer screening and treatment, which should be shared with men to enable them to make an informed decision about whether to be screened. The guidelines also include 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.³⁰⁶ Visit cancer.org/cancer/prostatecancer for additional information about informed decision making and the potential benefits, limitations, and uncertainties associated with prostate cancer early detection and treatment.

Prostate Cancer Testing in the US

- According to the 2013 NHIS, the prevalence of having a PSA test within the past year was 34.5% in men 50 years of age and older (Table 6G).
- Those who had no health insurance, Hispanic men, those with less than a high school education, and recent immigrants (living in the US <10 years) were the least likely to have had a recent PSA test (Table 6G).

Table 6G. Prostate Cancer Test Use (%), Men 50 Years and Older, US, 2013

	PSA within the past year*
Overall	34.5
Age (years)	
50-64	26.6
65+	43.9
Race/Ethnicity	
White (non-Hispanic)	36.5
Black (non-Hispanic)	32.9
Hispanic	24.3
American Indian/Alaska Native	#
Asian (non-Hispanic)†	26.3
Education	
Some high school or less	23.7
High school diploma or GED	28.6
Some college/Assoc. degree	35.7
College graduate	43.1
Sexual Orientation	
Gay‡	54.3
Straight§	34.3
Bisexual	#
Insurance Status	
Uninsured	20.2
Insured	36.2
Immigration Status	
Born in US	35.4
Born in US territory¶	37.2
In US fewer than 10 years	25.3
In US 10+ years	29.2

GED-General Educational Development high school equivalency. *A prostate-specific antigen test within the past year for men ages 50 years and older who did not report that they had ever been diagnosed with prostate cancer. †Does not include Native Hawaiians or other Pacific Islanders. #Response option provided on the NHIS was "gay." §Response option provided on the NHIS was "straight, that is, not gay." ¶Have been in the US for any length of time. #Estimate not provided due to instability. Note: The 2013 estimates for PSA screening are not comparable to estimates from 2003 and prior years because of changes in the population surveyed. Estimates are age adjusted to 2000 US standard population, see Statistical Notes (page 52) for further information.

Source: Centers for Disease Control and Prevention. National Health Interview Survey, 2013. Public use data file. See Survey Sources (page 53) for complete citation.

American Cancer Society, Inc., Surveillance Research, 2015

Lung Cancer Screening

Among men and women in the US, lung cancer is the leading cause of cancer death, with an estimated 158,040 deaths in 2015.³ Whereas lung cancer incidence and mortality rates have been declining over the past two decades in men, rates only recently began to decrease after a long period of increasing in women. These trends reflect historical differences in smoking initiation and cessation by gender.⁵

Until recently, studies evaluating the efficacy of early detection tests for lung cancer (chest x-ray, analysis of cells in sputum, and fiberoptic examination of the bronchial passages) did not find a reduced risk of lung cancer death with screening.³¹⁰ However, 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 clinical trials among former and current smokers were initiated in the US and Europe. The US trial showed 20% fewer lung cancer deaths in the group that received an invitation to LDCT screening compared to the group invited to receive annual chest X-ray group after eight years of follow-up.^{311, 312} After examining the evidence of the National Lung Screening Trial and others, the American Cancer Society issued guidelines for lung cancer screening in 2013 (see page 41).³¹³

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. Patients should be informed of the potential benefits, limitations, and harms associated with LDCT screening for lung cancer before any decision is made to initiate screening. For current smokers, the discussions should also include information about the health risks associated with continuing to smoke. Providing current smokers with smoking cessation counseling and information on their continued risk of lung cancer remains an important priority for health care providers. Screening should not be viewed as an alternative to smoking cessation.³¹³

Approximately 8.6 million former and current smokers are eligible for lung cancer screening, and an estimated 12,250 lung cancer deaths could be averted annually if this population adopted the Society's lung cancer screening guidelines.³¹⁴ In 2010, a study using NHIS data estimated that 1.8% of current high-risk smokers (high risk was defined as those with a smoking history of 30 or more pack-years) and 4.4% of former high-risk smokers who quit in the past 15 years had undergone LDCT for lung cancer screening within the past year.³¹⁵

Current evidence suggests that screening for lung cancer is most beneficial among people at highest risk for developing lung cancer. At this time, it is unclear whether the benefits of lung cancer

screening for adults with lighter smoking history outweigh the harms.³¹⁶ Results of a recent study indicated that the greatest benefit of annual CT screening for lung cancer could be achieved with the least amount of harm by screening individuals ages 55 to 80 years with a smoking history of 30 or more pack-years.³¹⁷ The 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, some studies have shown higher rates of smoking cessation among those choosing to be screened by LDCT than are seen in unscreened groups.³¹³

Cancer Screening Obstacles and Opportunities to Improve Cancer Screening Utilization

Improving access to affordable, quality health care continues to be a priority for the American Cancer Society and ACS CAN. 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 and extensive.^{279, 318} These patients often face much more difficult and more extensive medical treatments, as well as a diminished quality of life.

The ACA, which became law in March 2010, aims to improve health delivery systems, prevention efforts, and access to care. Since open enrollment under ACA began, the number of uninsured adults ages 18-64 has decreased by 26%.³¹⁹ For the privately insured, beginning in 2011, the ACA eliminated cost-sharing for all USPSTF A and B recommended services, including screening for breast, cervical, and colorectal cancers; starting in 2015, lung cancer screening tests will also be covered.^{320, 321} The Centers for Medicare and Medicaid Services (CMS) also removed cost-sharing for breast and cervical cancers, as well as certain CRC screenings for Medicare beneficiaries under its authority. In February 2015, CMS determined annual LDCT would be covered for Medicare beneficiaries meeting screening criteria.³²² One issue that the Society and ACS CAN, as well as other organizations, have raised concerns about is the cost imposed on private and Medicare beneficiaries who had a polyp removed during their screening colonoscopy as it was deemed "diagnostic" as opposed to a "screening" colonoscopy by insurers. CMS still imposes cost-sharing on beneficiaries who have a polyp removed during a screening colonoscopy. This policy has been addressed for individuals enrolled in private health insurance coverage, and legislation currently is pending before Congress to ensure that Medicare beneficiaries are not assessed cost-sharing in connection with a colonoscopy screening regardless of whether a polyp is removed.³²³

While the ACA has reduced the number of uninsured Americans, there is still a significant proportion (14%) of adults

without health insurance.³²⁴ 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. Even among the employed, changes in employment status can also affect health care coverage.³²⁵ 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.^{325, 326}

Visit action.acscan.org/site/DocServer/Affordable_Care_Act_Through_the_Cancer_Lens_Final.pdf?docID=18421 to find an online resource titled *The Affordable Care Act: How It Helps People With Cancer and Their Families*, which includes more information about ACS CAN's efforts in support of meaningful health care reform.

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.^{327, 328} Studies have shown that people who have more recent routine checkups and receive a clinician's recommendation for cancer screening are more likely to be screened than those who do not receive a recommendation.³²⁷⁻³²⁹ 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.³²⁸ Though there is substantial evidence supporting the use of these strategies, the utilization of some, such as patient and provider reminders, remains low.³³⁰ To help primary care practices increase their screening rates, the National Colorectal Cancer Roundtable produced an evidence-based toolkit for primary care clinicians recommending four essential components to improve cancer screening rates.³³¹ Visit <http://nc crt.org/about/provider-education/crc-clinician-guide/> for more information on this toolkit.

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 definition of standard error on page 53).

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 (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 of 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 school district, 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 nation. At times, population-based surveys will oversample a particular age, race, ethnic, or gender group. This oversampling provides enough responses to make valid estimates for a particular population of interest.

Weighted data: Data that are representative of an entire city, state, or nation. Once the sample of the population has completed the survey, statistical analyses are conducted to extrapolate the surveyed group's responses to the entire population (city, state, or nation). For example, BRFSS data in this publication 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 included in this report are subject to three limitations. First, with regard to phone-based surveys such as the BRFSS, the participants are those from households with either a landline telephone or cell phone. 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 readers to changes in survey questions or methodology 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

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% confidence interval.

US definition for state tables: In previous editions of *Cancer Prevention & Early Detection Facts & Figures*, the state-based BRFSS data were aggregated to represent the US. However, beginning with the 2014 set of tables and figures, median BRFSS values are reported for the US. Due to the differences in sampling methodology and survey methods, the median BRFSS value reported will most likely not be the same as the US estimate reported using the National Health Interview Survey (NHIS) data.

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 designs vary; 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): This survey of the US states and territories is conducted by the Centers for Disease Control and Prevention and the National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP). Since 1996, all 50 states, the District of Columbia, and Puerto Rico have participated in this annual survey. 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 methods are generally comparable from state to state and from year to year, which allows states to monitor the effects of interventions over time. The prevalence estimates prior to 2011 are only applicable to adults living in households with a residential telephone line. However, beginning in 2011, data collection was 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 despite declining response rates and the incorporation of cellular telephone interviews.

BRFSS website: cdc.gov/brfss/

Complete citation: Centers for Disease Control and Prevention (CDC). *Behavioral Risk Factor Surveillance System Survey Data*. Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2012 and 2013.

National Adult Tobacco Survey (NATS): This national survey of the CDC's NCCDPHP is conducted on an annual basis. It is designed to provide estimates of tobacco use prevalence and other factors supporting the use and avoidance of tobacco among adults, and is representative at both the national and state levels. Adults ages 18 years and older who live in households in the US are interviewed over the telephone (landline or cellular).

NATS website: cdc.gov/tobacco/data_statistics/surveys/nats/

National Health and Nutrition Examination Survey (NHANES): The CDC's NHANES is a national survey that assesses the health and nutritional status of adults and children in the US. Three cycles of the survey were conducted between 1971 and 1994; the most recent and third cycle (NHANES III) was conducted from 1988 to 1994. Beginning in 1999, the NHANES was implemented as a continuous annual survey. The survey is designed to provide 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 of diseases. 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.

NHANES website: cdc.gov/nchs/nhanes.htm

Complete citation: National Center for Health Statistics. National Health and Nutrition Examination Survey, 2011-2012. Public-use data file and documentation. http://www.n.cdc.gov/nchs/nhanes/search/nhanes11_12.aspx. 2013.

National Health Interview Survey (NHIS): The CDC's NHIS has monitored the health of the nation since 1957. 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.

NHIS website: cdc.gov/nchs/nhis.htm

Complete citation: National Center for Health Statistics. National Health Interview Survey, 2013. Public-use data file and documentation. <http://www.cdc.gov/nchs/nhis.htm>.

National Immunization Survey-Teen (NIS-Teen): Sponsored by the National Center for Immunizations and Respiratory Diseases (NCIRD), this annual survey is conducted jointly by the NCIRD, NCHS, and CDC. It is designed to monitor national, state, and selected local area vaccination coverage among children ages 13-17 years in the US. Data are provided by both surveyed

households and immunization providers. Telephone interviews are conducted in all 50 states and the District of Columbia, with oversampling in select areas. Beginning in 2011, the NIS-Teen sample was expanded to include cellular telephones in addition to landlines. 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.

NIS-Teen website: cdc.gov/nchs/nis/about_nis.htm

National Youth Tobacco Survey (NYTS): This national survey was first conducted in the fall of 1999. Beginning in 2011, the CDC's Office on Smoking and Health and the US Food and Drug Administration's (FDA) Center for Tobacco Products began collaborating on the NYTS. Now an annual survey, it is designed to provide national data for public and private students in grades six through 12. The survey includes detailed tobacco-related questions, including topics 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.

NYTS website: cdc.gov/TOBACCO/data_statistics/surveys/NYTS/

Youth Risk Behavior Surveillance System (YRBSS): This biennial survey of the CDC's NCCDPHP began in 1991. It 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. Data are gathered through a self-administered questionnaire completed during a required subject or class period. The state and local surveys are of variable data quality, and caution should be used when 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 are no longer publicly available through the CDC.

YRBSS website: cdc.gov/HealthyYouth/yrbs/index.htm

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