# Cancer Disparities: *A Chartbook*

Cancer Action Network℠
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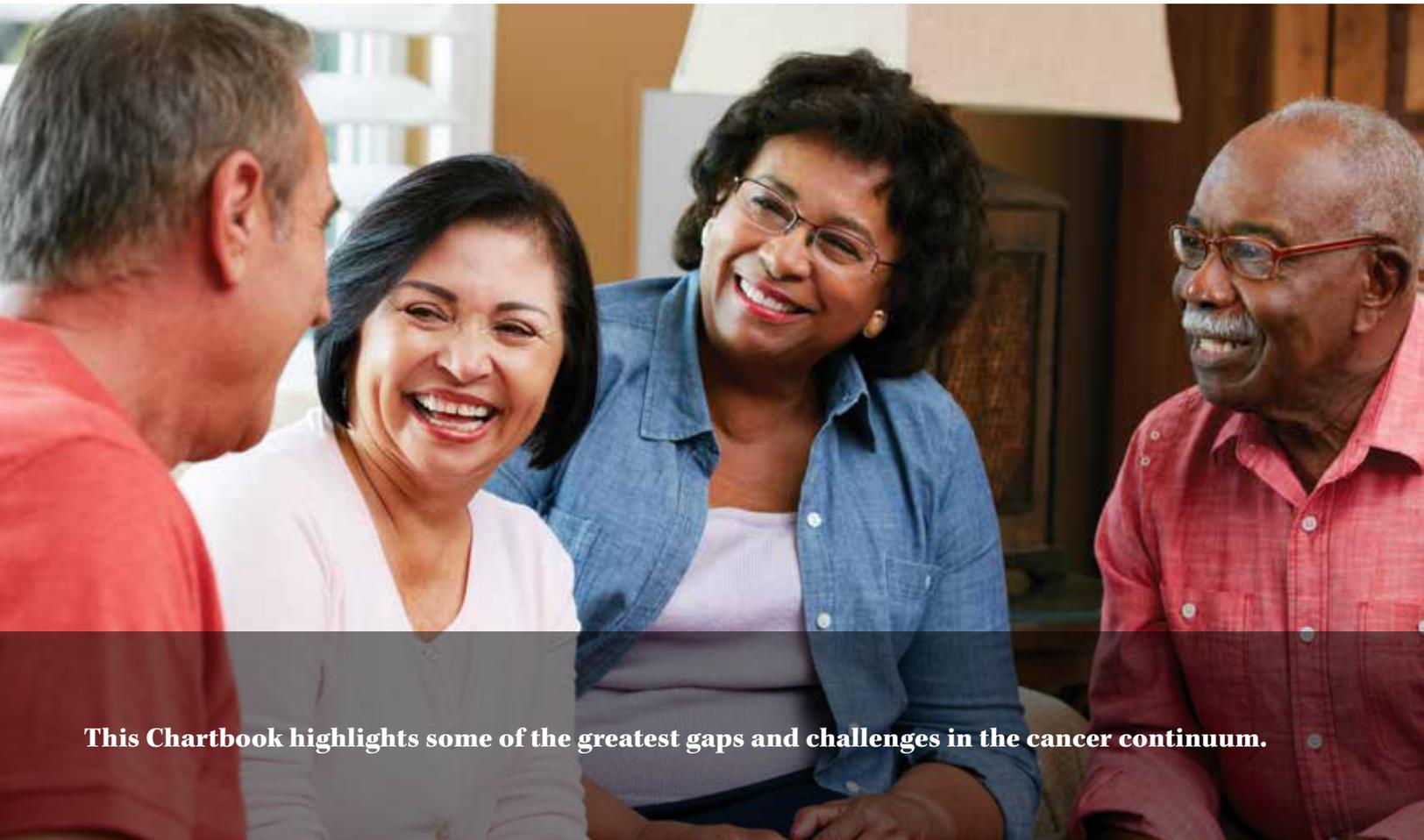
This Chartbook highlights some of the greatest gaps and challenges in the cancer continuum.

American Cancer Society Cancer Action Network (ACS CAN)

ACS CAN, the nonprofit, nonpartisan advocacy affiliate of the American Cancer Society, supports evidence-based policy and legislative solutions designed to eliminate cancer as a major health problem. ACS CAN works to encourage elected officials and candidates to make cancer a top national priority. ACS CAN gives ordinary people extraordinary power to fight cancer with the training and tools they need to make their voices heard. For more information, visit: http://www.fightcancer.org/.

Report Authors and Acknowledgements

Despite the fact that US cancer death rates have decreased by 26 percent from 1991 to 2015,[1] not all Americans have benefited equally from the advances in prevention, early detection, and treatments that have helped achieve these lower rates. Significant differences persist in cancer incidence, survival, morbidity, and mortality among specific populations in the US. Research shows that racial/ethnic minorities and other medically underserved groups continue to have higher cancer rates and are less likely to be diagnosed early or receive optimal treatment compared to other groups.[2] Individuals of lower socioeconomic status (SES – income, education, occupation, etc.) also suffer disproportionately from cancer and other disease burdens compared to individuals with higher SES, regardless of demographic factors such as race/ethnicity.[3]

The underlying causes of disparities in cancer care are complex and include interrelated social, economic, cultural, environmental, and health system factors. Geographic location (e.g. rural versus urban areas or northern states versus southern states) also contributes to disparities in cancer care.[4]

This Chartbook illustrates health disparities found throughout the cancer continuum, including cancer incidence, mortality, and survival; access to insurance coverage; screening and early detection; and the behaviors that may increase risk. Data is included on six major cancer types — lung and bronchus; colon and rectum; breast; melanoma; prostate; and uterine cervix. The Chartbook also includes measures from six racial/ethnic groups, where data was available: White; Black; Hispanic/Latino; Asian; American Indian and Alaska Native (AIAN); and Native Hawaiian and Other Pacific Islander (NHOPI).* Information is provided by race/ethnicity,* geographic location, sex, sexual orientation, and multiple SES factors when available. Finally, the Chartbook highlights some

of the greatest gaps and challenges in the cancer continuum, which will aid the American Cancer Society Cancer Action Network (ACS CAN) in its public policy efforts.

For additional information, please reference the American Cancer Society's (ACS or the Society's) recently published article *An Assessment of Progress in Cancer Control.* It is the first in a series of articles describing the Society's vision for how cancer prevention, early detection, and treatment can be transformed to lower the cancer burden in the United States and sets the stage for a national cancer control plan, or blueprint, for

the American Cancer Society goals for reducing cancer mortality by the year 2035.

* Important Note: The broadly defined racial/ethnic groups discussed herein are heterogeneous with substantial variations in cancer burden within each group. In addition, cancer information for several racial and ethnic groups, especially American Indians/Alaska Natives (AIANs) and Hispanics/Latinos, are known to be incomplete due to misclassification on medical and dental records. Although efforts are being made to collect more accurate information, rates presented for AIANs (in particular) likely do not represent the true cancer burden in these populations. Hispanic ethnicity was specified when possible. Race/ethnicity terminology may change from chart to chart, reflecting the terminology used in the underlying data source for each chart.

Health Disparity vs. Health Equity

A **health disparity** is "[a] particular type of health difference that is closely linked with social or economic disadvantage. Health disparities adversely affect groups of people who have systematically experienced greater social and/or economic obstacles to health and/or a clean environment based on their racial or ethnic group; religion; socioeconomic status; gender; age; mental health; cognitive, sensory, or physical disability; sexual orientation; geographic location; or other characteristics historically linked to discrimination or exclusion."[4]

Health equity is the "attainment of the highest level of health for all people. Achieving health equity requires valuing everyone equally with focused and ongoing societal efforts to address avoidable inequalities, historical and contemporary injustices, and the elimination of health and health care disparities."[4]

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4   National Cancer Institute. *Cancer disparities.* Updated March 29, 2018. https://www.cancer.gov/about-cancer/understanding/disparities.

Public policy interventions are an important strategy for substantially reducing, and ultimately eliminating, cancer disparities. In order to address gaps in health outcomes, a multi-prong approach must include enhanced prevention and early detection, increased access to coverage and treatment across all populations; and delivery of care in a culturally and linguistically competent manner. Continued research – particularly on ways to collect disparities data, implement public health interventions, and better prevent, detect, and cure many cancers that disproportionately affect medically underserved populations – is also critical.

The data included in this chartbook illustrate the scope of cancer disparities that exists across our nation. ACS CAN is actively pursuing evidence-based public policies at the local, state, and federal levels that seek to reduce these disparities and improve health outcomes for all US population groups regardless of race, ethnicity, gender, age, sexual orientation, socioeconomic status (SES), or zip code.

Cancer Prevention and Early Detection

A substantial proportion of cancers can be prevented through healthy behaviors and access to cancer screenings and vaccines. Evidence shows that early detection of cancer through screening saves lives and reduces health care costs.[1] Yet, access to these services and the resources needed to prevent cancer are not equitably available, creating significant disparities in cancer outcomes. Through its public policy advocacy agenda, ACS CAN is working to guarantee access to cancer prevention and early detection by:

- ensuring all health insurance – regardless of payer – provides coverage for essential, evidence-based early detection and preventive services with no additional patient cost sharing;

- expanding Medicaid coverage for all Food and Drug Administration (FDA)-approved tobacco cessation medications, counseling, and state quit lines to aid individuals of lower SES who have higher smoking rates than other populations;[2]

- increasing funding for community health centers and the National Breast and Cervical Cancer Early Detection Program (NBCCEDP) which provides community-based breast and cervical cancer screening and treatment services through the Medicaid program to low-income, uninsured, and underinsured women – a majority of whom are from racial/ethnic minority groups;[3]

- increasing funding for the Colorectal Cancer Control Program (CRCCP), which has the potential to significantly improve screening rates for high-need, disparate populations and reduce the burden of colorectal cancer across the US;

- advocating for evidence-based policies proven to reduce tobacco use, including in disparate populations, such as increases of tobacco taxes; comprehensive smoke-free and tobacco-free policies; prohibiting flavors (including menthol) in tobacco products; and tobacco prevention and cessation program funding;[4, 5]

- ensuring funding for the federal Prevention and Public Health Fund, including the Racial and Ethnic Approaches to Community Health (REACH) program, which helps to reduce health disparities by providing funds to state and local health departments, universities, tribes, and community-based organizations to administer culturally appropriate programs; and

- advocating for local, state, and federal evidence-based policies proven to improve nutrition and physical activity by making information more accessible for healthy choices (i.e., food menu labeling); promoting healthy schools for our youths; ensuring that healthy food choices (i.e., fruits and vegetables) are available in all neighborhoods; and building healthy, walkable communities for all.

Improving Access to Care

Individuals of racial/ethnic minority groups are more likely to be uninsured with limited access to care.[6] Uninsured and racial/ethnic minorities are more likely to be diagnosed with an advanced stage of disease and less likely to receive early detection services and recommended treatment (see Access to Coverage section, beginning on page 54). A study by the American Cancer Society shows that people without insurance are more likely to be diagnosed with cancer at later stages when the prognosis is not as good.[7] This disparity likely reflects unequal treatment, generally poorer underlying health, and physical barriers to care, such as transportation to health facilities. Another important factor in disparities is language barriers - it is crucial that patients have access to health care that is delivered in a language they understand. Of the more than 63 million individuals aged five years and over in the US who speak a language other than English, approximately 40 percent report that they speak English "less than very well."[8] To address all of these disparities, ACS CAN is advocating to improve access to care by:

- ensuring key provisions of the Affordable Care Act (ACA) that are critical to our cancer mission and specifically aid lower SES and racial/ethnic minorities are preserved. These include Medicaid expansion; marketplace subsidies; patient protections (i.e., banning pre-existing condition exclusions and elimination of annual and lifetime caps on coverage); access to affordable prescription drugs; non-emergency medical transportation services; and preventive services without patient cost sharing;

- ensuring that cancer patients on Medicaid have adequate access and coverage and that no proposed requirements included in state waivers - including work requirements - create unintentional barriers to care for low-income cancer patients and survivors;

- increasing funding for and access to patient navigation programs that help patients in medically underserved communities work their way through the health care system; provide outreach and education for patients to encourage preventive screenings; and eliminate barriers to compliance with screening and treatment;[9]

- increasing education, awareness of, and research on palliative care by passing the federal Palliative Care Hospice Education & Training Act (PCHETA) and working to execute the strategies developed by state palliative care expert advisory task forces regarding rural and ethnic disparities that hinder the delivery of palliative services in many communities; and

- ensuring that qualified health plans provide materials in appropriate languages, as well as developing strategies for increasing access to language translation services.

Research

Research is critical to understanding and reducing cancer disparities by identifying the genetic and biological underpinnings of cancers, as well as examining gaps in cancer prevention and care delivery that contribute to these disparities. Findings from this research contribute to the development of new, innovative ways to prevent or treat cancers that impact medically underserved populations. The National Cancer Institute (NCI), a part of the National Institutes of Health (NIH), is the largest funder of cancer research[10] and ACS CAN annually advocates to increase these federal appropriations.

Improved data collection is key to the identification of disparities in research and health care delivery. National and state surveys, such as the National Health Interview Survey and the Behavioral Risk Factor Surveillance System, are important data sources used to measure cancer risk factors and screening practices by race/ethnicity. While some desegregated racial/ethnic information is available, information on certain subgroups is not. This type of data would be helpful to identify those in need of targeted cancer control and prevention efforts with more granularity. Ensuring that detailed race and ethnicity data are available, as well as accurate, objective, and impartial, is critical to evidence-based health equity work. Additionally, information on SES is not routinely collected on medical records in the US. As a result, researchers in the US customarily use residential-based poverty rates, income, or educational attainment as a substitute for individual level SES. However, there is often a lack of uniformity among populations residing within the same geographic area. Collection of individual indicators of SES (e.g., income, education) should be a core element of medical records in order to monitor progress in eliminating racial and socioeconomic health disparities. ACS CAN is working to address these critical research needs by:

- advocating for increased funding for NIH and NCI to accelerate new discoveries;

- promoting the Childhood Cancer Survivorship, Treatment, Access, and Research Act (STAR Act) to provide research funding specifically for childhood cancers, which are rare and often lack robust treatment;

- pursuing policies that ensure clinical trials enroll diverse patient populations that reflect the broader patient population with cancer;

- supporting policies that would provide clinical trial navigation services for patients from medically underserved groups to connect with publicly available support resources and culturally sensitive educational materials;

- supporting policies that engage community leaders and community-based organizations – especially those serving racial and ethnic minority groups as well as medically underserved communities – to

effectively disseminate information about the importance of clinical research participation as a social justice issue; and

- supporting policies to fund, collect, and make available detailed race/ethnicity data and data on SES to provide researchers and policymakers with the best opportunity to help those individuals with cancer, cancer survivors, and those who will be diagnosed with cancer during their lifetime.

Conclusion

ACS CAN is dedicated to promoting public policy solutions that reduce cancer incidence and mortality rates among all US population groups. In order to ensure continuing declines, more needs to be done to address disparate outcomes in racial/ethnic minority and medically underserved populations. This goal can be achieved by instituting effective

public policies and public health programs that promote overall wellness and help to save lives. ACS CAN will continue our advocacy work to help eliminate disparities in access to health insurance, cancer prevention, screening, diagnosis, treatment, and survivorship and improve cancer-related outcomes for all US population groups.

References

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Overview

Cancer occurrence varies substantially by both race and geography.[1, 2, 3] Racial and ethnic minorities, persons of lower socioeconomic status (SES), and the uninsured are more likely than others to be diagnosed with certain cancers, often at later stages when the severity is likely to be greater and the odds of survival are decreased. They are also less likely to receive standard treatment (see Disparities in Access to Coverage - Cancer Treatment section, page 70), further exacerbating the disparity gap. Discrimination also contributes to cancer disparities, as studies have shown that racial/ethnic minority groups tend to receive lower-quality health care than non-Hispanics Whites (NHW), even when insurance status, age, severity of disease, and health status are comparable.

The largest contributors to racial and ethnic disparities in cancer occurrence and care is poverty.[4] According to the US Census Bureau, in 2016, 22 percent of Blacks and 19 percent of Hispanics lived below the federal poverty level (FPL), compared to 9 percent of non-Hispanic Whites and 10 percent of Asians.[5] Moreover, 11 percent of Blacks and 16 percent of Hispanics were uninsured, compared to 6 percent of non-Hispanic Whites.[6] Cancer mortality rates among both Black and non-Hispanic White men with 12 or fewer years of education are nearly triple those of college graduates for all cancers combined.[7] This is partly because incidence rates are higher in people with lower SES for many cancers because some factors that increase cancer risk are more prevalent in this group. For example, people with lower SES

are more likely to smoke and to be obese, partly because of targeted marketing to this population by tobacco companies and fast food chains (see Disparities in Prevention section, page 98). While some evidence suggests that differences in cancer risk may arise from genetic or other biological differences, it is important to note that these types of differences make only a minor contribution to the disparities between populations.[8]

Racial and ethnic disparities in mortality for many cancers can also be partly explained by the higher proportion of late stage diagnoses among racial and ethnic minorities compared to Whites (see Figures 21 - 26, pages 46 and 47). Certain cancers have particularly large disparities, such as cancers of the oral cavity and uterine corpus (body of the uterus, excluding the cervix). Notably, while the incidence rates of breast cancer in White women are higher than in Black women, death rates are strikingly higher in Black women (see Figure 6, page 19), in part reflecting differences in the proportion of Black women who are diagnosed with the disease at a later stage.

Differences in underlying risk factors also contribute to disparities. For example, Hispanics/Latinos and Asians/Pacific Islanders (when looking at aggregate data) share low rates of the most common cancers (female breast, colorectal, lung, and prostate) and high rates of infection-related cancers, such as stomach and liver cancers (see Figures 13 - 16, pages 39 and 40). American Indians and Alaska Natives (AIAN) have the highest kidney cancer incidence and death rates of any racial or

ethnic group (see Figure 17, page 41), which may reflect differences in cigarette smoking, obesity, and hypertension. However, like other broad racial and ethnic groups, cancer rates vary greatly within the AIAN population for a variety of reasons, including differences in behaviors that influence disease risk (see Disparities in Cancer Prevention section, beginning on page 98, for more information).

The degree of cancer disparities also can vary dramatically across geographic areas. Many of these geographic variations in disparities are due to differences in population composition, structural characteristics that facilitate or hinder healthy behaviors, and differences in access to health care. For example, a 2015 ACS study found three distinct colorectal cancer death rate hotspots located in the lower Mississippi Delta, west central Appalachia, and eastern North Carolina/Virginia (see Map 1).[9] These regions share a number of risk factors for colorectal cancer (high rates of obesity and dietary patterns conducive to colorectal cancer development), as well as high rates of demographic characteristics associated with limited access to health care and lower screening rates (e.g. poverty, low levels of education, high proportion of uninsured).

Significant Clusters of Low and High Colorectal Cancer Mortality Rates

2000-2009

| ■ Significant clusters of low mortality rates | ■ Not significant | ■ Significant clusters of high mortality rates |
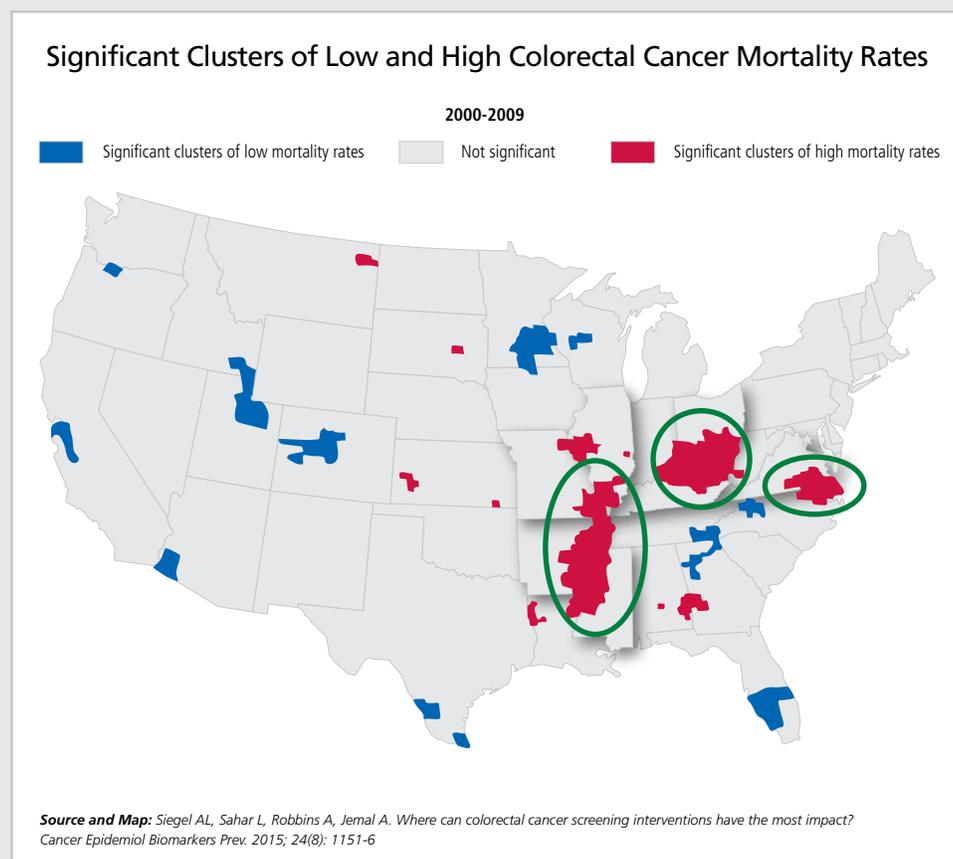
Map 1: Three distinct colorectal cancer death rate hotspots are located in the lower Mississippi Delta, west-central Appalachia, and eastern North Carolina/Virginia.

Source and Map: Siegel AL, Sahar L, Robbins A, Jemal A. Where can colorectal cancer screening interventions have the most impact? Cancer Epidemiol Biomarkers Prev. 2015; 24(8): 1151-6

Currently, over 15.5 million cancer survivors (not including non-invasive cancers) live in the US. Quality cancer care can significantly increase survival and quality of life during and after treatment. However, state-of-the art cancer treatments are not available across all segments of the population. Consequently, disparities in cancer treatment and outcomes persist for medically underserved populations such as racial and ethnic minority groups, the uninsured or underinsured, rural populations, and the elderly. Factors that contribute to racial disparities in survival include a later stage of diagnosis, as mentioned above, and a lower likelihood of receiving high-quality treatment. Additional factors include differences in tumor characteristics unrelated to early detection and differences in the prevalence of comorbidities (other health conditions). For many survivors, the transition from oncology care back to primary care— following the end of cancer treatment— is disjointed. Many of these patients do not have a care plan (as recommended by the Institute of Medicine) and are not fully clear about their next steps.[10] Newly diagnosed cancer patients and their families face numerous challenges and difficult decisions, such as selecting a doctor and treatment facility, that are even more overwhelming for patients who experience barriers to quality cancer care.

Note: Cancer statistics are generally only available in aggregate for five major racial and ethnic populations in the US. However, cancer occurrence varies considerably within these extremely heterogeneous populations, and aggregated data should be interpreted with caution. For example, cancer incidence rates within the Asian and Pacific Islander population have been reported to vary up to threefold, with rates in some subgroups approaching those of non-Hispanic Whites.

Cancer Incidence (2010 to 2014) and Mortality (2011 to 2015) Rates by Race/Ethnicity, US

Cancer Rates

A cancer incidence rate is defined as the number of new cases diagnosed per 100,000 population at risk, typically per year; a cancer mortality rate is the number of cancer deaths that occur per 100,000 population at risk per year.

Non-Hispanic White Females Have the Highest Cancer Incidence Rates, But Non-Hispanic Black Females Have the Highest Death Rates

Note: Rates are age-adjusted to the 2000 US standard population.
Sources: Incidence: North American Association of Central Cancer Registries (NAACCR), 2017. Mortality: National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention (CDC), 2017.

Figure 1: Among females, non-Hispanic Whites have the highest overall cancer incidence rates, but non-Hispanic Blacks have the highest cancer death rates. Importantly, while Hispanic and Asian/Pacific Islander women have among the lowest incidence and mortality rates overall, they have among the highest rates of certain infection-related cancers (e.g., liver and stomach cancers) (see Figures 13-16, pages 39 and 40).

Non-Hispanic Black Males Have Highest Cancer Incidence and Mortality Rates Compared to All Other Racial/Ethnic Groups

Rates per 100,000

Racial/Ethnic Group	Incidence	Mortality
Non-Hispanic Black	560.9	246.1
Non-Hispanic White	510.7	200.7
American Indian/Alaska Native	425.3	181.4
Asian/Pacific Islander	302.8	120.4
Hispanic	386.3	140.0

Incidence ■   Mortality ■

Note: Rates are age-adjusted to the 2000 US standard population.
Sources: Incidence: North American Association of Central Cancer Registries (NAACCR), 2017. Mortality: National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention (CDC), 2017.

Figure 2: Among males, non-Hispanic Blacks have the highest cancer incidence and mortality rates overall, driven by high rates for the most common cancers (lung and bronchus, prostate, and colorectal) (see Figure 7, page 23; Figure 9, page 26; and Figure 10, page 30). Similar to females, Hispanic, Asian/Pacific Islander, and American Indian/Alaska Native males generally have higher rates of cancers related to infections compared to non-Hispanic Whites.

Trends in Cancer Incidence (1975 to 2014) and Mortality (1975 to 2015) Rates by Race, US

Cancer Incidence Rates Have Been Higher in Blacks Compared to Whites among Males and in Whites Compared to Blacks among Females

Note: Rates are age-adjusted to the 2000 US standard population. Incidence rates are adjusted for delays in case reporting.
Sources: Incidence: Surveillance, Epidemiology, and End Results (SEER) program, 2017. Mortality: National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention (CDC), 2017.

Cancer Mortality Rates Have Been Higher in Blacks Compared to Whites among Either Sex

Note: Rates are age-adjusted to the 2000 US standard population. Incidence rates are adjusted for delays in case reporting.
Sources: Incidence: Surveillance, Epidemiology, and End Results (SEER) program, 2017. Mortality: National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention (CDC), 2017.

Figures 3 and 4: Since the mid-1970s, cancer incidence and mortality rates for all cancer types combined have been highest among Black males, although this disparity is narrowing in more recent years. Among females, although incidence rates are slightly higher in Whites, death rates remain highest in Blacks due to disparities in cancer survival. The excess risk of cancer death (or percentage by which cancer death rates in one group exceed another) in Blacks versus Whites dropped from 47 percent in 1990 to 19 percent in 2015 among males and from 21 percent in 1997 to 12 percent in 2015 among females.

Childhood and Adolescent (Ages 0 to 19 Years) Cancer Incidence (2010 to 2014) and Mortality (2011 to 2015) Rates by Race/Ethnicity, US

Childhood and Adolescent Cancer Incidence Rates are Higher among Non-Hispanic Whites, but Hispanics Are Slightly More Likely to Die from These Cancers than Other Racial/Ethnic Groups

Rates per 100,000

	Non-Hispanic White	Non-Hispanic Black	American Indian/ Alaska Native	Asian/Pacific Islander	Hispanic
Incidence	19.5	13.9	13.6	14.7	17.7
Mortality	2.3	2.3	2	2	2.4

Note: *Rates are age adjusted to the 2000 US standard population and include benign and borderline brain.*
Sources: *Incidence: North American Association of Central Cancer Registries (NAACCR), 2017. Mortality: National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention (CDC), 2017.*

Figure 5: Reasons for differences in the incidence of childhood and adolescent cancers by race/ethnicity in the US are not well understood. The cancer death rate is similar between non-Hispanic White, non-Hispanic Black, and Hispanic children, despite higher incidence rates in Whites. This is likely due to lower survival rates among Black and Hispanics compared to Whites.

Note: In contrast to what is observed for many adult cancers, childhood and adolescent cancer incidence rates are not consistently higher among populations with lower socioeconomic status; again, the reasons for this are not well understood.

Female Breast Cancer

Among women in the US, an estimated 266,120 new cases of invasive breast cancer will be diagnosed in 2018, and 40,920 deaths will occur. The prognosis of invasive breast cancer is strongly influenced by the stage of the disease— that is, the extent or spread of the cancer when it is first diagnosed. Approximately six out of every 10 breast cancer cases are diagnosed at the localized stage; the five-year survival rate for these cases is 99 percent. Overall, female breast cancer death rates have been declining since 1989 in the US, in part due to advances in early detection with mammography screening and treatment, but rates remain higher for non-Hispanic Black women.

Incidence (2010 to 2014) and Mortality (2011 to 2015) Rates for Female Breast Cancer by Race/Ethnicity, US

Non-Hispanic Black Females Have Higher Breast Cancer Mortality Rates Compared to All Other Racial/Ethnic Groups

	Incidence	Mortality
Non-Hispanic White	128.7	20.8
Non-Hispanic Black	125.5	29.5
American Indian/Alaska Native	100.7	14.3
Asian/Pacific Islander	90.8	11.3
Hispanic/Latina	91.9	14.2

Rates per 100,000

Sources: *Incidence: North American Association of Central Cancer Registries (NAACCR), 2017. Mortality: National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention (CDC), 2017.*

Figure 6: Although non-Hispanic White (NHW) females have the highest incidence rates for breast cancer, non-Hispanic Black (NHB) females have higher mortality rates than NHW females. This mortality disparity largely reflects striking inequalities in stage distribution and access to and receipt of high-quality cancer treatment among NHB, as well as other factors such as comorbidities, differences in screening, lack of timely follow-up of abnormal results, and response to treatment. In addition, White females have higher rates of the breast cancer subtype HR+/HER2- (which is responsive to anti-hormone therapy), whereas Black females have higher rates of triple-negative breast cancers (which have poorer short-term prognosis, in part because there are no current targeted therapies).[11]

Geographic Variation in Female Breast Cancer Death Rates by Race, 2011 to 2015

Geographic Variation in Female Breast Cancer
Death Rates, Non-Hispanic Whites, 2011 to 2015

Average annual rate per 100,000, age-adjusted to the 2000 US standard population.

17.5 – 19.4   19.5 – 20.2   20.3 – 20.9   21.0 – 21.4   21.5 – 24.5

Source: National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention, 2017.
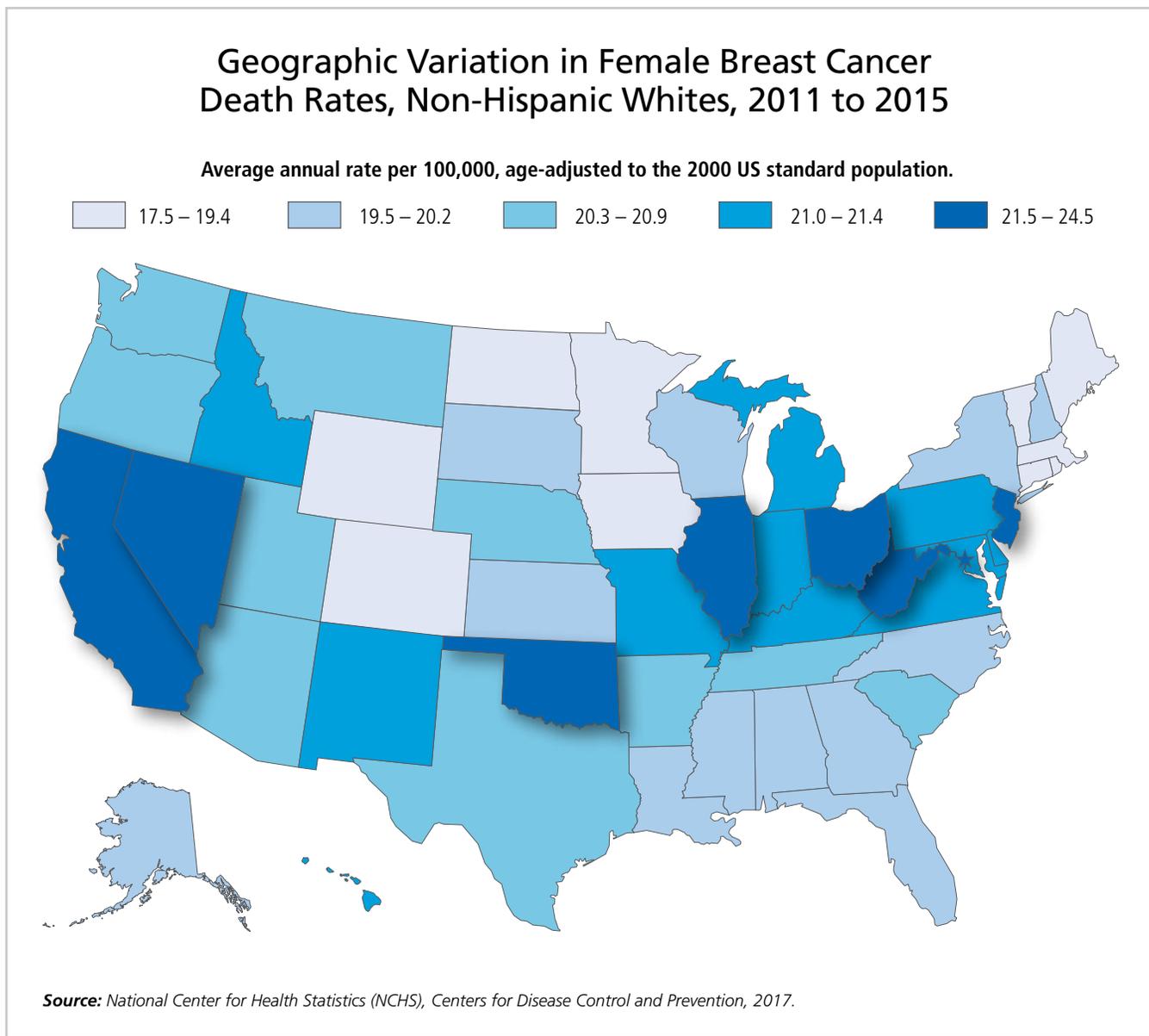
Map 2

Survival Rate

Relative survival adjusts for normal life expectancy by comparing survival among cancer patients to survival in people of the same age, race, and sex who were not diagnosed with cancer.

Geographic Variation in Female Breast Cancer Death Rates, Non-Hispanic Blacks, 2011 to 2015

Average annual rate per 100,000, age-adjusted to the 2000 US standard population.

| | 20.6 - 23.0 | | 23.1 - 28.1 | | 28.2 - 29.8 | | 29.9 - 31.5 | | 31.6 - 34.4 | | Data Unavailable |

Note: Data unavailable = statistic not displayed for states with fewer than 25 deaths during 2011-2015.
Source: National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention, 2017.
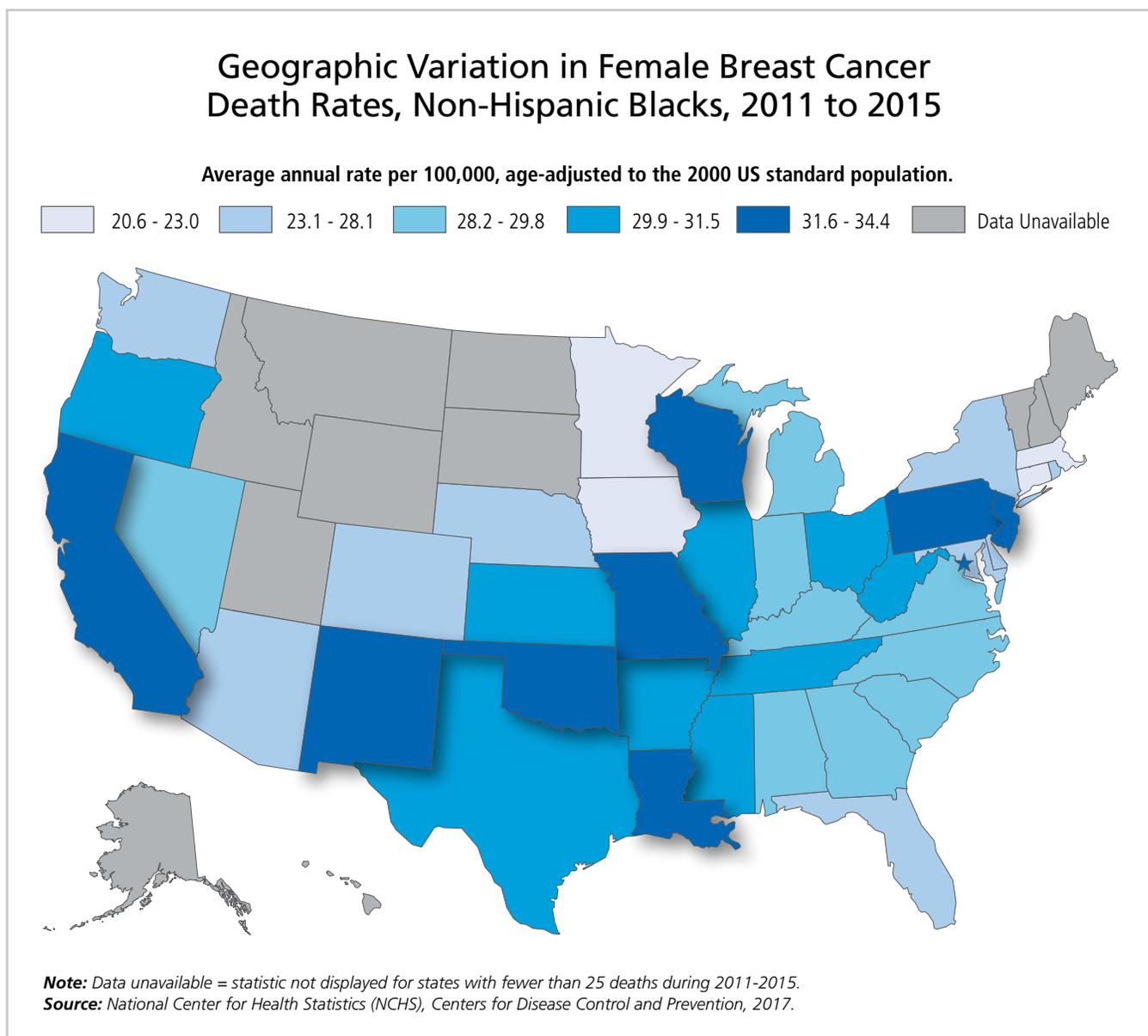
Map 3

Maps 2 and 3: Breast cancer mortality rates among non-Hispanic White (NHW) females tend to be highest in the North Central, Mid-Atlantic, and Western regions of the US. Among non-Hispanic Black (NHB) females, the highest death rates are found in the Deep South, South Central, and Mid-Atlantic states, as well as California. Breast cancer death rates are higher among NHB females in every state, with rates in some states (e.g., Mississippi and Louisiana) as much as 60 percent higher. Factors that contribute to geographic disparities include variations in risk factors and access to screening and treatment, which are influenced by socioeconomic factors, public policies, and proximity to medical services.

Colorectal Cancer

An estimated 97,220 cases of colon cancer and 43,030 cases of rectal cancer will be diagnosed in the US in 2018. Colorectal cancer (CRC) is the second-leading cause of cancer death when men and women are combined, with 50,630 deaths estimated to occur in 2018. The acceleration in the decline of CRC incidence rates since the early 2000s is thought to primarily reflect the detection and removal of precancerous polyps through increased uptake of screening.[12] Still, only 39 percent of cases are diagnosed at the localized stage, for which the five-year survival rate is 90 percent.[13] Of the five major racial/ethnic groups, non-Hispanic Black men and women have the highest incidence and mortality rates for CRC compared to other racial/ethnic groups.

Figures 7 and 8 (facing page): Colorectal cancer incidence rates are approximately 30 percent higher in males than in females, while mortality rates are approximately 40 percent higher.[14] Reasons for this sex disparity are not fully understood, but partly reflect differences in exposure to risk factors and hormonal variations, as well as complex interactions between these influences. CRC incidence and mortality rates when both sexes are combined remain highest among non-Hispanic Blacks (NHB), followed closely by American Indian/Alaska Natives (AIAN). Notably, rates in AIANs are driven by strikingly high rates among Alaska Natives, for whom rates are 80 percent higher than those in NHBs and more than double those in Whites, whereas CRC rates in other American Indian groups combined are more similar to Whites.[15] The reasons for racial/ethnic disparities in CRC are complex, but largely reflect differences in socioeconomic status. Close to half of the socioeconomic disparity is attributed to differences in conditions and activities that influence disease risk for CRC, i.e., smoking and obesity.[16] A similar proportion of the racial disparity in incidence is estimated to be due to differences in CRC screening (see Figure 57, page 86), which combined with lower stage-specific survival accounts for about half of the racial disparity in CRC mortality.[17]

Incidence (2010 to 2014) and Mortality (2011 to 2015) Rates for Colorectal Cancer by Race/Ethnicity and Sex, US

Non-Hispanic Black Males Face the Highest Incidence and Mortality Rates for Colorectal Cancer Compared to Other Racial/Ethnic Groups

Note: Rates are age-adjusted to the 2000 US standard population.
Sources: Incidence: North American Association of Central Cancer Registries (NAACR), 2017. Mortality: National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention, 2017

Figure 7

Non-Hispanic Black Females Face the Highest Incidence and Mortality Rates for Colorectal Cancer Compared to Other Racial/Ethnic Groups

Note: Rates are age-adjusted to the 2000 US standard population.
Sources: Incidence: North American Association of Central Cancer Registries (NAACR), 2017 Mortality: National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention, 2017

Figure 8

Geographic Variation in Colorectal Cancer Incidence (2010 to 2014) and Mortality (2011 to 2015) Rates, US

Geographic Variation in Colorectal Cancer Incidence Rates, 2010 to 2014

Average annual rate per 100,000, age-adjusted to the 2000 US standard population.

| 31.4 – 35.1 | 35.2 – 38.8 | 38.9 - 42.6 | 42.7 - 46.3 | 46.4 - 50 | Data Unavailable |

Note: Incidence rate for Nevada is 2008-2010.
Data Sources: North American Association of Central Cancer Registries (NAACCR), 2017
© 2018 American Cancer Society   CancerStatisticsCenter.cancer.org

Map 4

Geographic patterns are generally similar for Blacks and Whites, highlighting the substantial influence of socioeconomic status on colorectal cancer disparities.

Geographic Variation in Colorectal Cancer Death Rates, 2011 to 2015

Average annual rate per 100,000, age-adjusted to the 2000 US standard population.

| 11.2 – 12.7 | 12.8 – 14.3 | 14.4 - 15.8 | 15.9 - 17.4 | 17.5 – 18.9 |
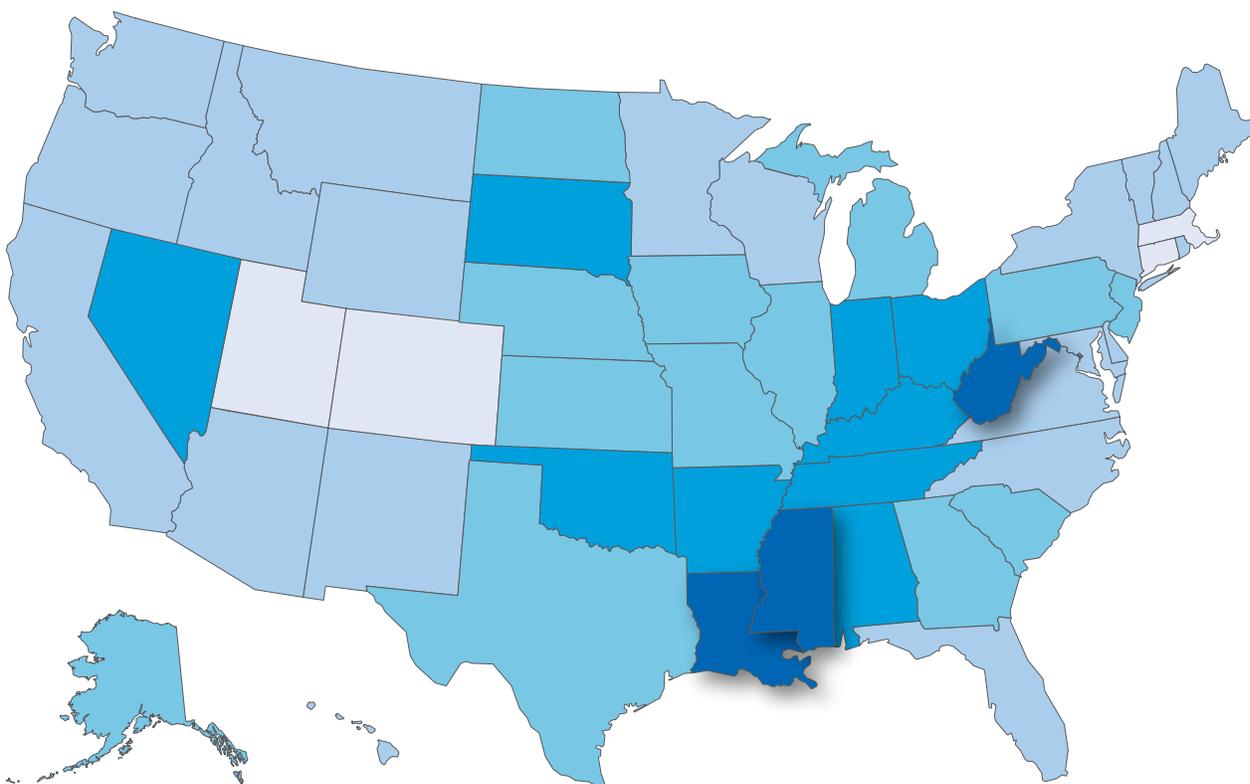
Data Sources: National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention, 2017
© 2017 American Cancer Society   *CancerStatisticsCenter.cancer.org*

Map 5

Maps 4 and 5: Colorectal cancer (CRC) incidence and mortality rates are currently highest in parts of the deep South and Midwest, where certain CRC risk factors are more common (e.g., obesity, smoking prevalence) (see Maps 16 and 17, pages 106 and 107; Map 20, page 128) and screening prevalence for the disease are also lower in these regions (see Map 14, page 88). Geographic patterns are generally similar for Blacks and Whites, highlighting the substantial influence of socioeconomic status on colorectal cancer disparities.

Prostate Cancer

In 2018, an estimated 164,690 new cases of prostate cancer will be diagnosed in the US; approximately 29,430 men will die of the disease. Among men in the US, prostate cancer is the most commonly diagnosed type of cancer (other than skin cancer). Ninety-one percent of cases are diagnosed at a localized or regional stage, for which the five-year survival rate is near 100 percent; this rate drops to 30 percent for distant stage. Mortality trends for prostate cancer have been declining, which is thought to be due, in part, to improvements in treatment, management of recurrent disease, and early detection with the prostate-specific antigen (PSA) test (a blood test to assess the levels of a protein made by the prostate).[18] However, non-Hispanic Black men continue to have higher incidence and mortality rates than all other racial/ethnic groups.

Incidence (2010 to 2014) and Mortality (2011 to 2015) Rates in Prostate Cancer, US

Prostate Cancer Death Rates in Non-Hispanic Black Males Are About Twice as High as Any Other Racial/Ethnic Group

Sources: *Incidence: North American Association of Central Cancer Registries (NAACR), 2017 Mortality: National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention, 2017*
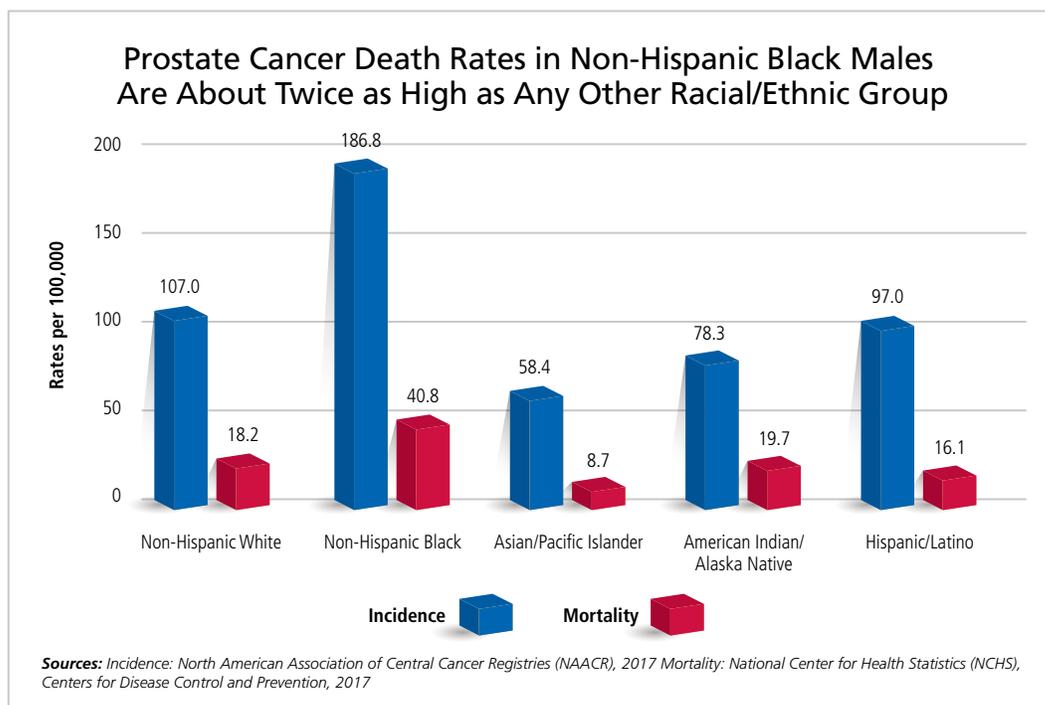
Figure 9: The prostate cancer incidence rate during 2010 to 2014 was 75 percent higher in non-Hispanic Blacks (NHB) than in non-Hispanic Whites (NHW) for reasons that remain unclear, but may include inherited susceptibility among men of African or Jamaican descent.[19, 20, 21, 22] NHB men have the highest death rates for prostate cancer of any racial or ethnic group in the US, more than twice that of NHW.

Localized Cancer: also called *local cancer.* A cancer that is confined to the organ where it started; that is, it has not spread to distant parts of the body.

Regional Involvement: also called *regional spread.* The spread of cancer from its primary (original) site to nearby areas such as lymph nodes, but not to distant sites.

Distant Cancer: sometimes called *distant metastases.* Cancer that has spread far from its original location or primary site to distant organs or lymph nodes.

Geographic Variation in Prostate Cancer Mortality Rates by Race (2011 to 2015)

Geographic Variation in Prostate Cancer Mortality Rates, Non-Hispanic Blacks, 2011 to 2015

Average annual rate per 100,000, age-adjusted to the 2000 US standard population.

| 19.6-25.4 | 25.5-36.1 | 36.2-41.2 | 41.3-51.5 | 51.6-60.6 | Data Unavailable |

Note: Data are unavailable for non-Hispanic Blacks for certain states due to sparse data [<10 deaths].
Source: National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention, 2017.

Map 6

Regardless of geographic variation, non-Hispanic Blacks have a much higher prostate cancer mortality rate than non-Hispanic Whites.

Geographic Variation in Prostate Cancer Mortality Rates, Non-Hispanic Whites, 2011 to 2015

Average annual rate per 100,000, age-adjusted to the 2000 US standard population.

15.3-16.8   16.9-17.7   17.8-18.8   18.9-20.5   20.6-24.1
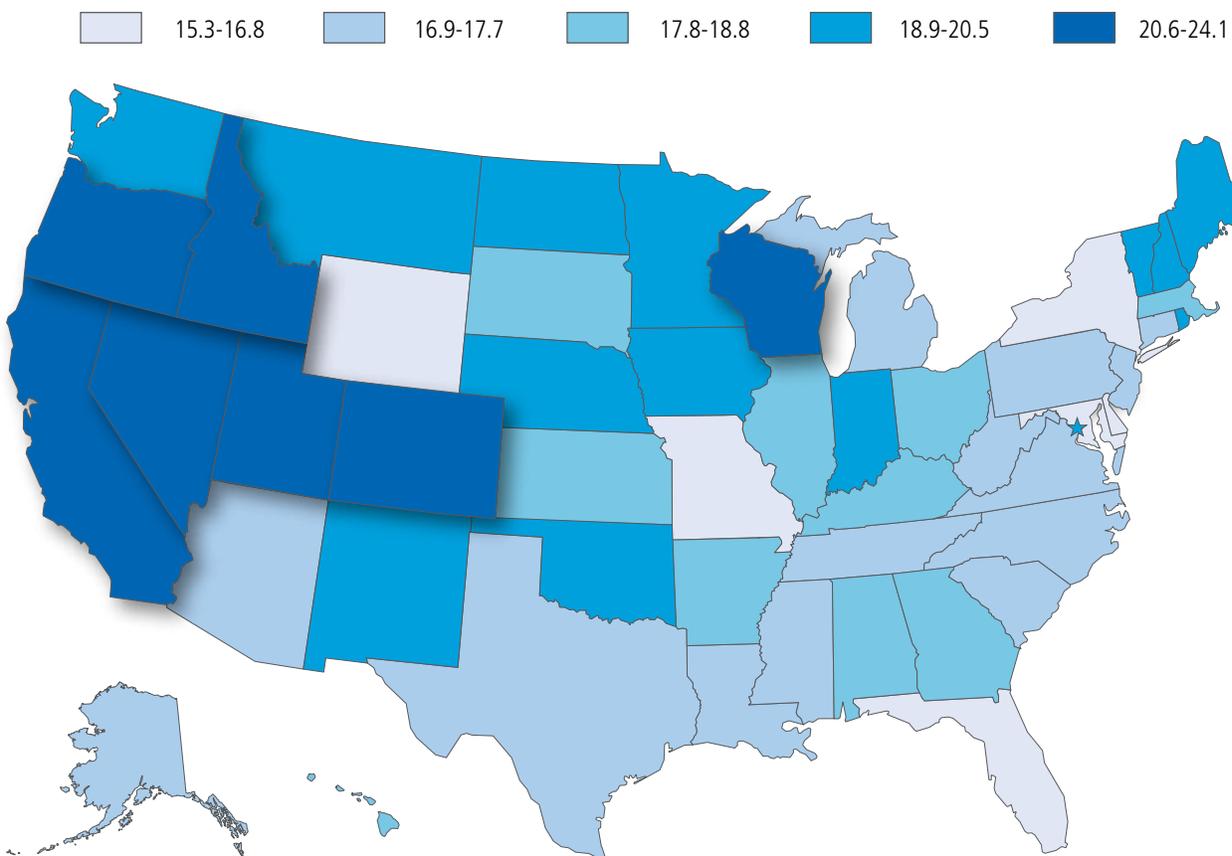
Source: National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention, 2017.

Map 7

Maps 6 and 7: Geographic patterns in prostate cancer mortality differ substantially between non-Hispanic White (NHW) and non-Hispanic Black (NHB) men.[23, 24] A county-level study found that prostate cancer death rates were associated with incidence rates of distant-stage disease for both NHB and NHW men, which suggests socioeconomic status plays a role in geographic disparities for both races.[25]

Lung Cancer

Lung cancer is the second most commonly diagnosed cancer in men and women (following prostate and breast cancer, respectively) and is the leading cause of cancer death in both sexes in the US. An estimated 234,030 new cases of lung cancer will be diagnosed and about 154,050 deaths are expected in 2018. The overall five-year relative survival rate for lung cancer is low at 18 percent, as only 16 percent of cases are diagnosed at a localized stage. The lung cancer death rate has declined by 45 percent since 1990 in men and by 19 percent since 2002 in women due to reductions in smoking, but we continue to see disparities by gender, race/ethnicity, and geographic location.

Incidence (2010 to 2014) and Mortality (2011 to 2015) Rates in Lung Cancer by Sex, US

Lung Cancer Incidence and Mortality Rates Highest in Non-Hispanic Black Males

Sources: Incidence: North American Association of Central Cancer Registries (NAACR), 2017. Mortality: National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention, 2017.

Lung Cancer Incidence and Mortality Rates Highest in Non-Hispanic White Females

Sources: Incidence: North American Association of Central Cancer Registries (NAACR), 2017. Mortality: National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention, 2017.

Figures 10 and 11: Hispanic/Latino and Asian/Pacific Islanders have lower rates of lung cancer than other racial/ethnic groups, mainly because they have historically been less likely to smoke. Non-Hispanic Black males have higher lung cancer rates than non-Hispanic White males, but the reverse is true for females, reflecting racial differences in historic smoking patterns (see Figure 64, page 101).[26]

The lung cancer death rate has declined by 45 percent since 1990 in men and by 19 percent since 2002 in women due to reductions in smoking, but we continue to see disparities by gender, race/ethnicity, and geographic location.

Geographic Patterns in Lung Cancer Death Rates by Gender, US, 2011 to 2015

Geographic Patterns in Lung Cancer Death Rates for Males, 2011 to 2015

Average annual rate per 100,000, age-adjusted to the 2000 US standard population.

23.9-41.9	42.0-52.1	52.2-59.4	59.5-70.6	70.7-86.6

Source: National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention, 2017
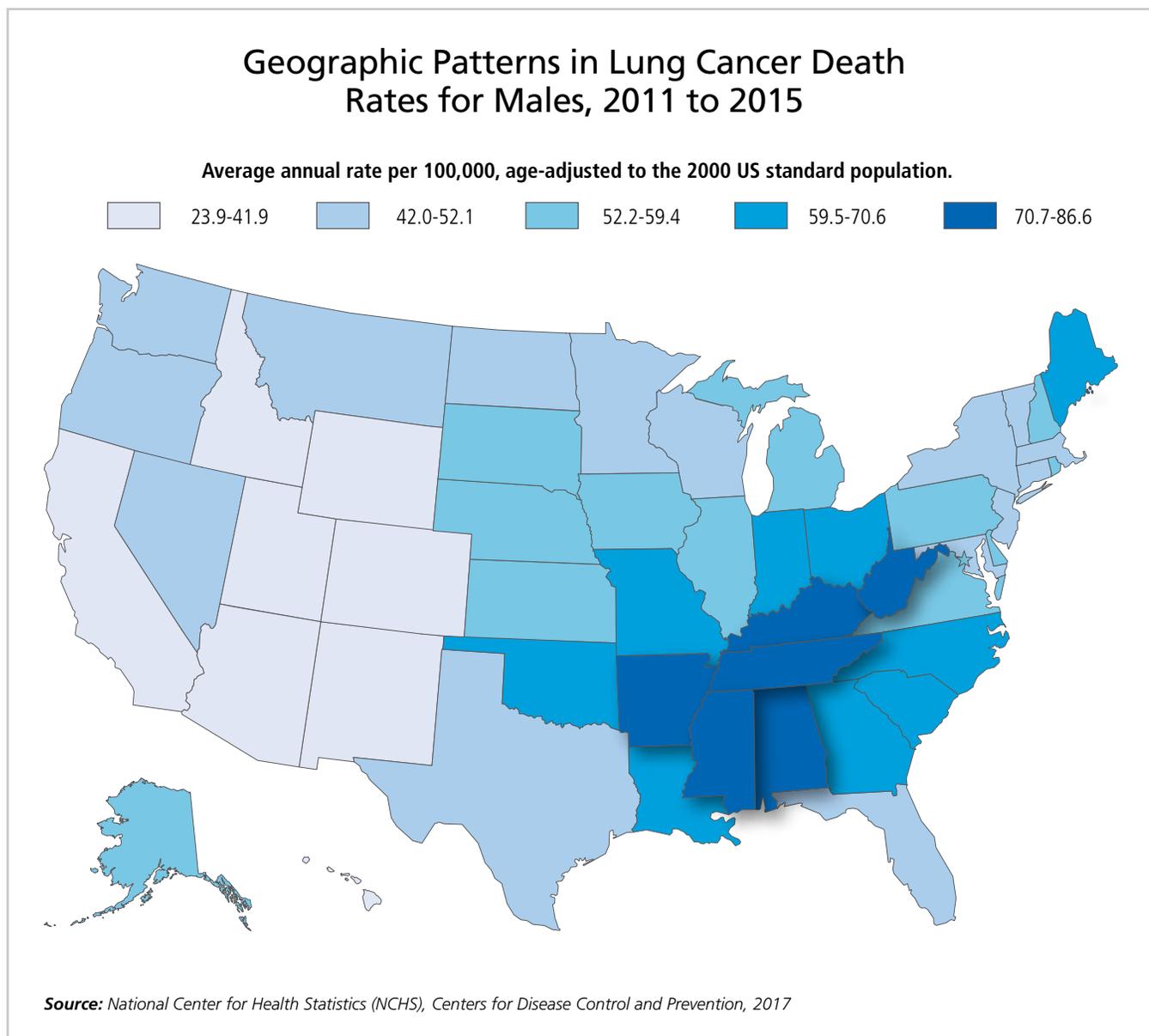
Map 8

While lung cancer is the leading cause of cancer death in both sexes in the US, cancer death rates are higher among males than females.

Geographic Patterns in Lung Cancer Death Rates for Females, 2011 to 2015

Average annual rate per 100,000, age-adjusted to the 2000 US standard population.

15.9-27.4	27.5-34.5	34.6-38.3	38.4-45.7	53.5

Source: *National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention, 2017*
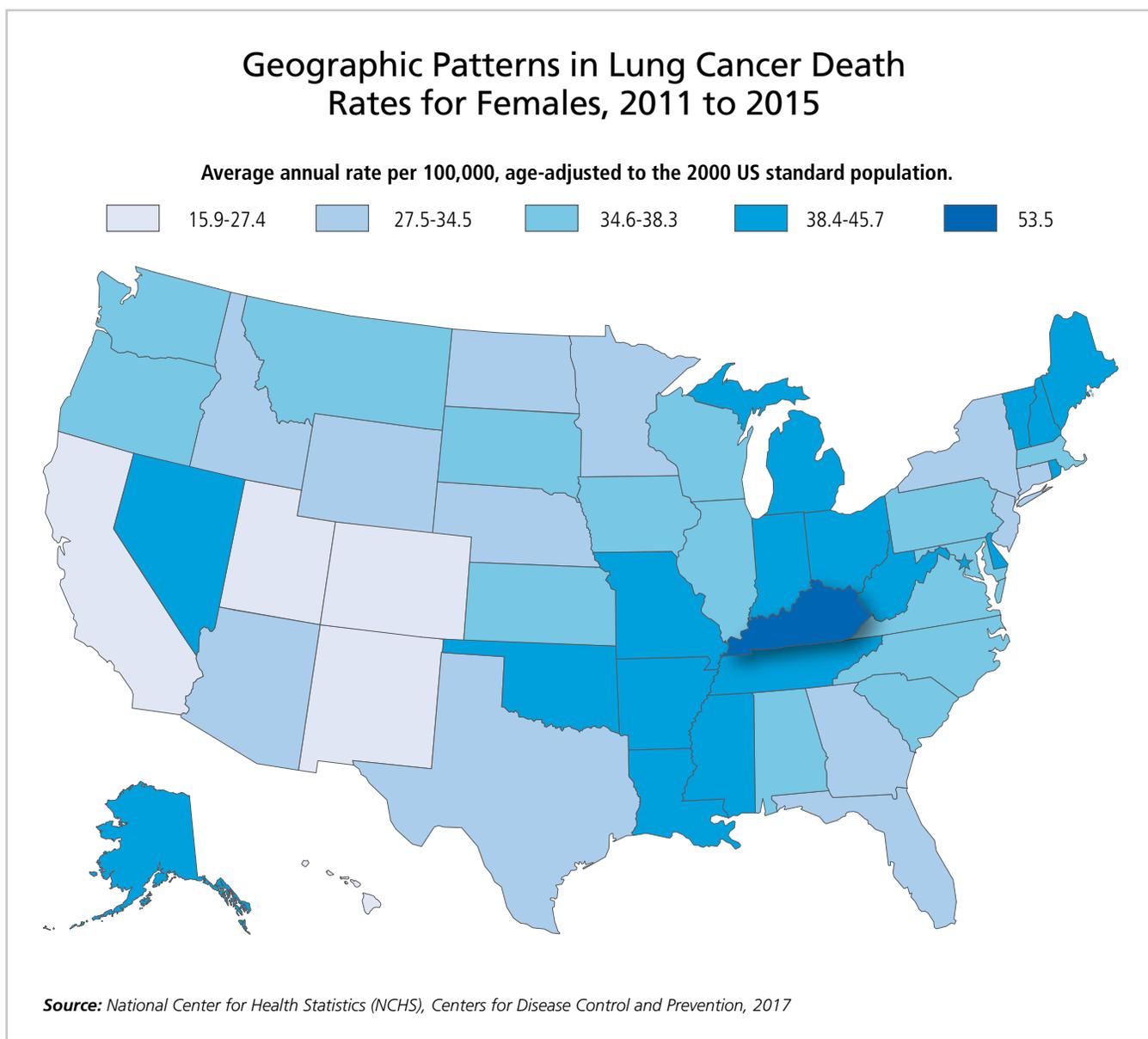
Map 9

Maps 8 and 9: Death rates from lung cancer are highest in the South and parts of Appalachia for both males and females. Current lung cancer patterns reflect historical smoking prevalence. However, the geographic pattern chart for lung cancer also closely mirrors that of current cigarette smoking prevalence (see Map 16, page 106). Some of these differences in lung cancer occurrence also reflect state tobacco control policies.

Cervical Cancer

In the US about 13,240 cases of invasive cervical cancer will be diagnosed in 2018, and an estimated 4,170 deaths will occur. Cervical cancer (also known as uterine cervix cancer) incidence and mortality rates have decreased by more than 50 percent over the past four decades. Most of the reduction is attributed to screening with the Pap test, which can detect both cervical cancer at an early stage and precancerous lesions. However, the magnitude of this decline has slowed in recent years. One-half of cervical cancer cases are diagnosed at regional- or distant-stage disease, with most occurring among women who have not had a recent Pap test.[27] Incidence and death rates are higher in non-Hispanic Black, Hispanic, and American Indian/Alaska Native women compared to non-Hispanic Whites and Asian/Pacific Islanders.

Incidence (2010 to 2014) and Mortality (2011 to 2015) Rates for Cervical Cancer by Race/Ethnicity, US

Incidence and Mortality Rates for Cervical Cancer Are Highest among Racial/Ethnic Minority Groups

Rates per 100,000

	Non-Hispanic White	Non-Hispanic Black	Asian/Pacific Islander	American Indian/ Alaska Native	Hispanic/Latina
Incidence	7.0	9.5	6.0	9.1	9.7
Mortality	2.1	3.8	1.8	2.6	2.6

Incidence ◼ **Mortality** ◼

Sources: *Incidence: North American Association of Central Cancer Registries (NAACR), 2017. Mortality: National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention, 2017.*

Figure 12: Cervical cancer incidence rates are highest among non-Hispanic Blacks (NHB) and Hispanics/Latinas, with NHB females having the highest mortality rate. NHB, American Indian/Alaska Native (AIAN), and Hispanic/ Latina females have higher incidence and mortality rates than non-Hispanic Whites (NHW) and Asian/Pacific Islanders, largely reflecting socioeconomic disparities and lack of access to care, including cervical cancer screening (see Figure 62, page 93).

The five-year relative survival rate for cervical cancer is 69 percent for White women and 56 percent for Black women for all stages combined.

**Geographic Variation in Cervical Cancer Incidence
(2010 to 2014) and Mortality Rates (2011 to 2015)**

Geographic Variation in Cervical Cancer Incidence Rates, 2010 to 2014

Average annual rate per 100,000, age-adjusted to the 2000 US standard population.

| | 4.6-6.2 | | 6.3-6.9 | | 7.0-7.6 | | 7.7-8.6 | | 8.7-9.9 | | Data Unavailable |

Note: Incidence rates for Minnesota did not meet NAACCR high quality data standards; rates for Nevada are from 2008-2010; rates for New Mexico are from 2010-2012.
Source: North American Association of Central Cancer Registries (NAACCR), 2017

Map 10

Factors that contribute to geographic disparities include variations in risk factors and access to screening and treatment, which are influenced by socioeconomic factors, public policies, and proximity to medical services.

Geographic Variation in Cervical Cancer Mortality Rates, 2011 to 2015

Average annual rate per 100,000, age-adjusted to the 2000 US standard population.

1.0-1.6	1.7-2.0	2.1-2.2	2.3-2.8	2.9-3.5
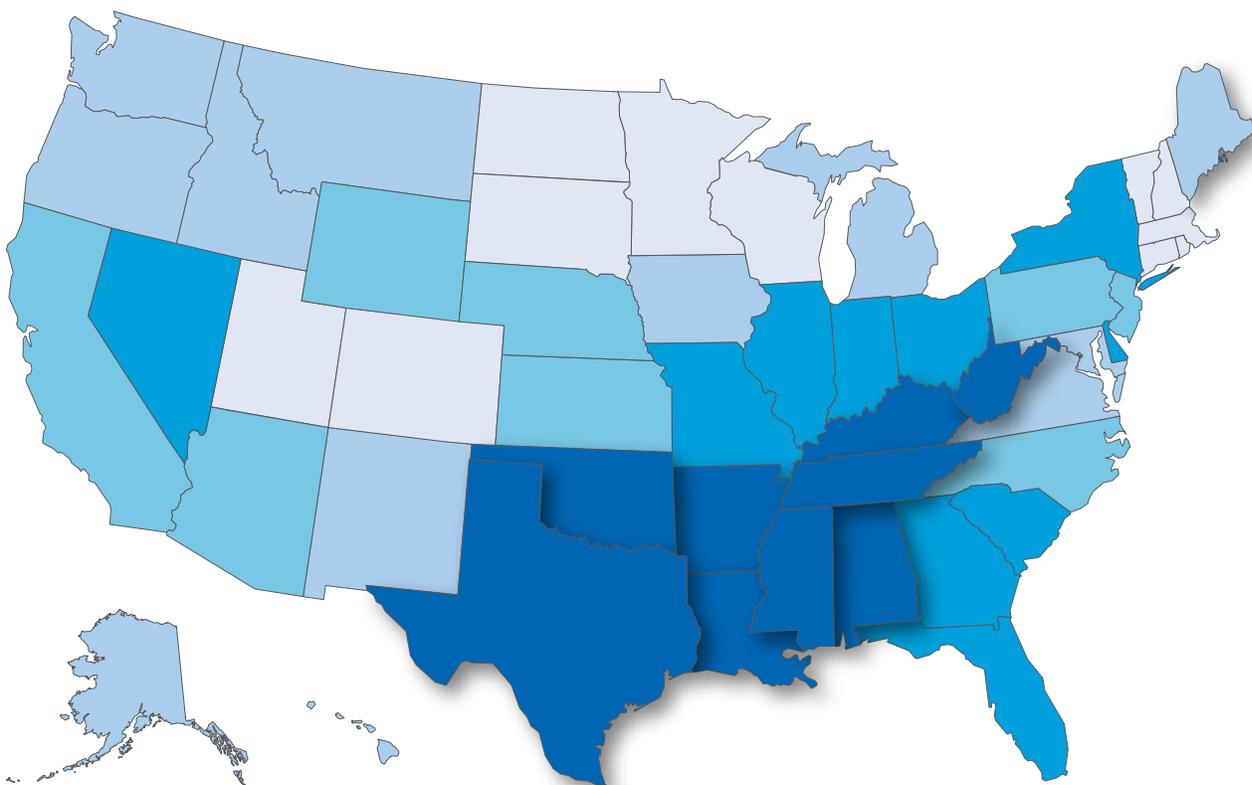
Source: *National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention, 2017*

Map 11

Maps 10 and 11: The South and Rust Belt states have higher incidence and mortality rates when compared to New England and Western states. Factors that contribute to geographic disparities include variations in risk factors and access to screening and treatment, which are influenced by socioeconomic factors, public policies, and proximity to medical services.

Other Infection-Related Cancers

Hispanic/Latino and Asian/Pacific Islander populations share low rates of the most common cancers (female breast, colorectal, lung, and prostate), but high rates of infection-related cancers, such as stomach and liver cancers. For example, female breast cancer death rates among Asian/Pacific Islanders are a third of those in non-Hispanic Blacks (see Figure 6, page 19). However, Asian/Pacific Islanders have among the highest liver and intrahepatic bile duct cancer incidence and death rates. It is important to reiterate that statistics reported for all Hispanics/Latinos and Asian/Pacific Islanders combined mask wide variation for different Hispanic/Latino and Asian/Pacific Islander subgroups, and trends are influenced by the cancer risk of new immigrants versus that of established residents (including non-citizens). The cancer burden among Hispanics/Latinos and Asian/Pacific Islanders in the US reflects those in immigrant countries of origin, but become more similar to non-Hispanic White Americans across generations due to acculturation.[28]

Liver Cancer

An estimated 42,220 new cases of liver cancer (including intrahepatic bile duct cancers) will be diagnosed in the US during 2018, and an estimated 30,200 will die from the disease. Liver cancer incidence has more than tripled since 1980 and rates are higher in racial/ethnic minority groups. The five-year relative survival rate for patients with liver cancer is 18 percent, with only 43 percent of patients diagnosed at a localized stage of disease.

Incidence (2010 to 2014) and Death (2011 to 2015) Rates for Other Infection-Related Cancers (Liver and Stomach) by Sex & Race/Ethnicity, US

Incidence Rates for Liver and Intrahepatic Bile Duct Cancers Are Higher in Racial/Ethnic Minority Groups

Rates per 100,000

	Male	Female
Non-Hispanic White	10.0	3.4
Non-Hispanic Black	17.2	5.1
American Indian/Alaska Native	20.1	8.8
Asian/Pacific Islander	20.0	7.6
Hispanic/Latino	19.8	7.6

Male ■ **Female** ■

Sources: Incidence: North American Association of Central Cancer Registries (NAACR), 2017. Mortality: National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention, 2017.

Mortality Rates for Liver and Intrahepatic Bile Duct Cancers Are Higher in Racial/Ethnic Minority Groups

Rates per 100,000

	Male	Female
Non-Hispanic White	8.2	3.4
Non-Hispanic Black	13.5	4.7
American Indian/Alaska Native	14.0	6.0
Asian/Pacific Islander	13.0	5.9
Hispanic	14.8	7.0

Male ■ **Female** ■

Sources: Incidence: North American Association of Central Cancer Registries (NAACR), 2017. Mortality: National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention, 2017.

Figures 13 and 14: Although Asian/Pacific Islanders and Hispanics/Latinos have some of the lowest cancer rates for all cancer types combined, these populations have among the highest rates of liver cancer. In general, liver cancer incidence and mortality rates are substantially higher in racial/ethnic minorities, partly reflecting disparities in the underlying prevalence of risk factors for the disease (e.g., chronic hepatitis B virus infection, particularly among foreign-born individuals from Asia and Latin America; chronic hepatitis C virus infection; obesity and diabetes; cigarette smoking; and excess alcohol consumption) as well as access to and receipt of high-quality prevention and treatment.

Stomach Cancer

In 2018, an estimated 26,240 new cases of stomach cancer will be diagnosed in the US and an estimated 10,800 will die from the disease. Incidence and mortality rates are higher among racial/ethnic minority groups. The five-year relative survival rate for patients with stomach cancer is 31 percent, with only 27 percent of patients diagnosed at a localized stage of disease.

Incidence Rates for Stomach Cancer Are Higher in Racial/Ethnic Minority Groups

Group	Male	Female
Non-Hispanic White	7.9	3.5
Non-Hispanic Black	14.3	7.8
American Indian/Alaska Native	11.6	6.5
Asian/Pacific Islander	14.1	8.1
Hispanic/Latino	12.9	7.8

Rates per 100,000

Male ■ **Female** ■

Sources: Incidence: North American Association of Central Cancer Registries (NAACR), 2017. Mortality: National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention, 2017.

Mortality Rates for Stomach Cancer Are Higher in Racial/Ethnic Minority Populations

Group	Male	Female
Non-Hispanic White	3.4	1.7
Non-Hispanic Black	8.5	4.0
American Indian/Alaska Native	7.3	3.5
Asian/Pacific Islander	6.8	4.2
Hispanic/Latino	6.7	4.0

Rates per 100,000

Male ■ **Female** ■

Sources: Incidence: North American Association of Central Cancer Registries (NAACR), 2017. Mortality: National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention, 2017.

Figures 15 and 16: Similar to liver cancer, Asian/Pacific Islander and Hispanic/Latino populations have higher rates of stomach cancer than non-Hispanic Whites (NHW), largely due to higher rates of Helicobacter pylori infection in countries of origin.[29] Non-Hispanic Blacks and American Indians/Alaska Natives also have higher incidence and mortality rates compared to NHW.

Kidney and Renal Pelvis Cancer

An estimated 65,340 new cases of kidney (renal) cancers will be diagnosed in the US during 2018. These are primarily renal cell carcinomas (which occur in the body of the kidney), but also include cancers of the renal pelvis (5 percent – which behave more like bladder cancer) and Wilms tumor (1 percent – a childhood cancer that usually develops before the age of five). An estimated 14,970 are expected to die from the disease. Kidney cancer incidence rates appear to have stabilized since the mid-2000s following decades of increase, in part, due to a rise in incidental detection because of the increased use of medical imaging; however, rates are higher among American Indians/Alaska Natives. The five-year relative survival rate for patients with kidney and renal pelvis cancer is 74 percent, with two-thirds of cases diagnosed at a localized stage of disease.

Kidney and Renal Pelvis Incidence (2010 to 2014) and Mortality (2011 to 2015) Rates by Race/Ethnicity

American Indian/Alaska Natives Have Higher Kidney and Renal Pelvis Cancer Rates Compared to Other Racial/Ethnic Groups

Rates per 100,000

	Incidence	Mortality
Non-Hispanic White	16	4
Non-Hispanic Black	18	4
American Indian/Alaska Native	23	6
Asian/Pacific Islander	8	2
Hispanic/Latino	16	4

Incidence ■ **Mortality** ■

Sources: Incidence: North American Association of Central Cancer Registries (NAACR), 2017. Mortality: National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention, 2017.

Figure 17: American Indian/Alaska Natives (AIAN) have the highest kidney cancer incidence and death rates of any racial/ethnic group – three times higher than those among Asian/Pacific Islanders, who have the lowest rates. However, like other broad racial/ethnic groups, cancer rates vary greatly within the AIAN population because of differences in conditions and activities that influence disease risk (e.g., obesity, cigarette smoking, and hypertension).

Melanoma

Invasive melanoma represents only about 1 percent of all skin cancer cases, but accounts for the majority of skin cancer deaths. An estimated 91,270 new cases of invasive melanoma will be diagnosed and 9,320 deaths will occur in 2018. The incidence of melanoma in the US has been increasing for at least 30 years, although current trends differ by age and race/ethnicity, with non-Hispanic Whites having higher incidence and mortality rates compared to other racial/ethnic groups. The five-year relative survival rate for patients with melanoma of the skin is 99 percent for localized stage, 63 percent for regional stage, and 20 percent for distant-stage disease.

Melanoma Incidence (2010 to 2014) and Mortality (2011 to 2015) Rates by Race/Ethnicity, US

Non-Hispanic Whites Have the Highest Melanoma of the Skin Incidence and Death Rates

Rates per 100,000

Race/Ethnicity	Incidence	Mortality
Non-Hispanic White	26.2	3.3
American Indian/Alaska Native	6.8	0.8
Hispanic	4.4	0.7
Asian/Pacific Islander	1.3	0.3
Non-Hispanic Black	1.0	0.4

Incidence   Mortality

Sources: *Incidence: North American Association of Central Cancer Registries (NAACR), 2017. Mortality: National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention, 2017.*

Figure 18: Non-Hispanic Whites are substantially more likely to be diagnosed with melanoma compared to other racial/ethnic groups.

Melanoma Incidence Rates (2010 to 2014) by Sex and Age, US

Melanoma Incidence in Males Ages 50+ Years Is Double That of Females

Rates per 100,000

	Ages 20-49 years	Ages 50+ years
Male	9.5	80.6
Female	13.5	37.1

Source: *North American Association of Central Cancer Registries (NAACR), 2017.*
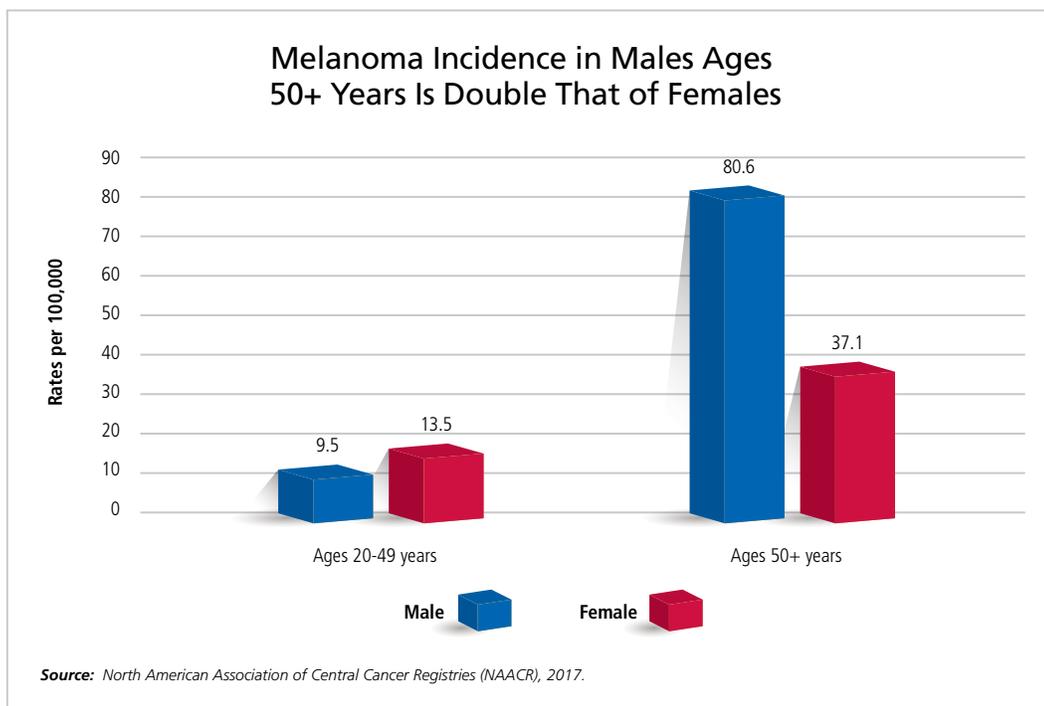
Figure 19: Melanoma incidence rates are higher in females than in males before age 50. By age 65, rates in males are double those in females. This pattern reflects age and sex differences in occupational and recreational exposure to ultraviolet radiation (including the use of indoor tanning), and perhaps early detection practices and use of health care (see Figure 77, page 121 and Figure 79, page 123).

Geographic Variation in Melanoma Incidence (2010 to 2014) for Non-Hispanic Whites

Melanoma of the Skin Incidence Rates for Non-Hispanic Whites, 2010 to 2014

Average annual rate per 100,000, age-adjusted to the 2000 US standard population.

| | 17.8-22.5 | | 22.6-28.6 | | 28.7-40.2 | | 40.3-65.3 | | Data Unavailable |

Note: Rates for New Mexico are for 2010-2012 and for Nevada are for 2008-2010.
Data Sources: *North American Association of Central Cancer Registries (NAACCR), 2017*
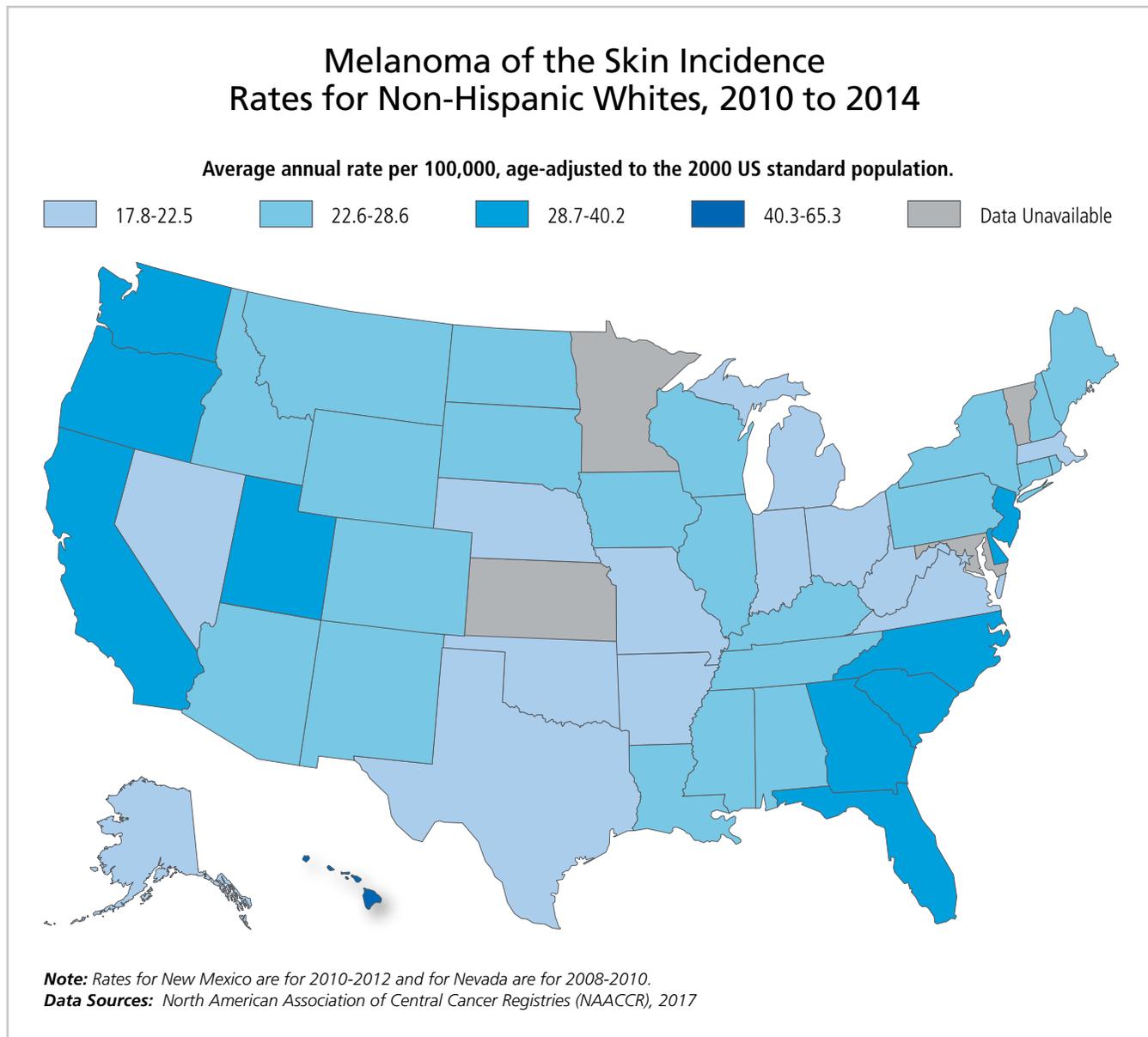
Map 12: For non-Hispanic Whites, melanoma incidence and mortality varies by state and region. There are patterns of high rates in the Southeast and the West. Factors that contribute to geographic disparities include variations in risk factors (e.g., tanning device use or increased intensity of ultraviolet exposure from the sun due to living at a lower latitude) and prevention (e.g., state policies regarding tanning device use).

Survival

The term "cancer survivor" refers to any person with a history of cancer, from the time of diagnosis through the remainder of their life. There are more than 15.5 million Americans with a history of cancer alive today. The Chartbook describes survival in terms of five-year relative or cause-specific survival rates. Relative survival adjusts for normal life expectancy by comparing survival among cancer patients to survival in people of the same age, race, and sex who were not diagnosed with cancer. Improvements in survival reflect improvements in treatment, as well as earlier diagnosis for some cancers. Survival varies greatly by cancer type and stage at diagnosis.

Five-Year Cause-Specific Survival for Melanoma of the Skin, by Race/Ethnicity, US, 2007 to 2013

Racial/Ethnic Minority Groups Are Less Likely than Non-Hispanic Whites to Survive Following a Melanoma of the Skin Diagnosis

Race/Ethnicity	Survival %
Non-Hispanic Black	66%
Asian/Pacific Islander	77%
Hispanic	84%
American Indian/Alaska Native	88%
Non-Hispanic White	90%

Note: Survival data for American Indian/Alaska Natives are based on a small number of cases and should be interpreted with caution. Survival rates are for patients diagnosed during 2007-2013, all followed through 2014.
Source: SEER 18 registries, 2017.

Figure 20: Although melanoma of the skin predominantly affects non-Hispanic Whites (NHW), there are notable survival disparities for the disease among minority racial/ethnic groups, reflecting, in part, a later stage at diagnosis. For example, during 2008 to 2012 (data not shown), 72 percent of melanoma of the skin cases were diagnosed at a localized stage among Hispanics, compared to 84 percent of NHWs.[30]

Stage Distribution by Race/Ethnicity at Diagnosis, US, 2007 to 2013

Black Cancer Patients Are More Likely to Be Diagnosed at Later Stages than Whites for Many Cancer Types

Breast Cancer Stage Distribution in Females

	Localized	Regional	Distant
All Races	62	31	6
White	63	30	5
Black	53	36	9

Source: SEER, 2017.

Figure 21

Colorectal Cancer Stage Distribution

	Localized	Regional	Distant
All Races	39	35	21
White	39	36	21
Black	38	32	25

Source: SEER, 2017.

Figure 22

Lung and Bronchus Cancer Stage Distribution

	Localized	Regional	Distant
All Races	16	22	57
White	16	22	56
Black	13	22	61

Source: SEER, 2017.

Figure 23

Uterine Corpus Cancer Stage Distribution

	Localized	Regional	Distant
All Races	67	21	9
White	69	20	8
Black	53	25	16

Source: SEER, 2017.

Figure 24

Melanoma Stage Distribution

Figure 25

Source: SEER, 2017.

Oral Cavity and Pharynx Cancer Stage Distribution

Figure 26

Source: SEER, 2017.

Figures 21 - 26: Cancer treatment is more likely to be successful and less extensive when a cancer is diagnosed locally - before it has spread beyond the organ in which it originated. However, Blacks are generally less likely than Whites to be diagnosed at a localized stage and are more likely to be diagnosed at a distant stage, when the cancer has spread widely to distant organs and/or lymph nodes (metastasized). The disparity is particularly striking for melanoma of the skin and cancers of the female breast, oral cavity and pharynx, and uterine corpus. Inequalities in cancer stage distribution in part reflect disparities in access to high-quality health care (see Access to Coverage section, beginning on page 54). Additional factors include differences in tumor characteristics unrelated to early detection and differences in the prevalence of comorbidities (other health conditions).

Localized Cancer: also called *local cancer.* A cancer that is confined to the organ where it started; that is, it has not spread to distant parts of the body.

Regional Involvement: also called *regional spread.* The spread of cancer from its primary (original) site to nearby areas such as lymph nodes, but not to distant sites.

Distant Cancer: sometimes called *distant metastases.* Cancer that has spread far from its original location or primary site to distant organs or lymph nodes.

Five-Year Relative Survival Rates by Cancer Type, Race, and Stage at Diagnosis, 2007 to 2013

Not only are Blacks more likely to be diagnosed with cancer at an advanced stage compared to Whites, but they also have lower survival within each stage, further reflecting inequalities in access to and receipt of high-quality cancer care.

Black-White Disparities for Breast Cancer Survival Rates in Females

Source: Howlader N, Noone AM, Krapcho M, et al. SEER Cancer Statistics Review, 1975-2012. *http://seer.cancer.gov/csr/1975_2012/*, based on November 2014 SEER data submission. Bethesda, MD: National Cancer Institute, 2015.
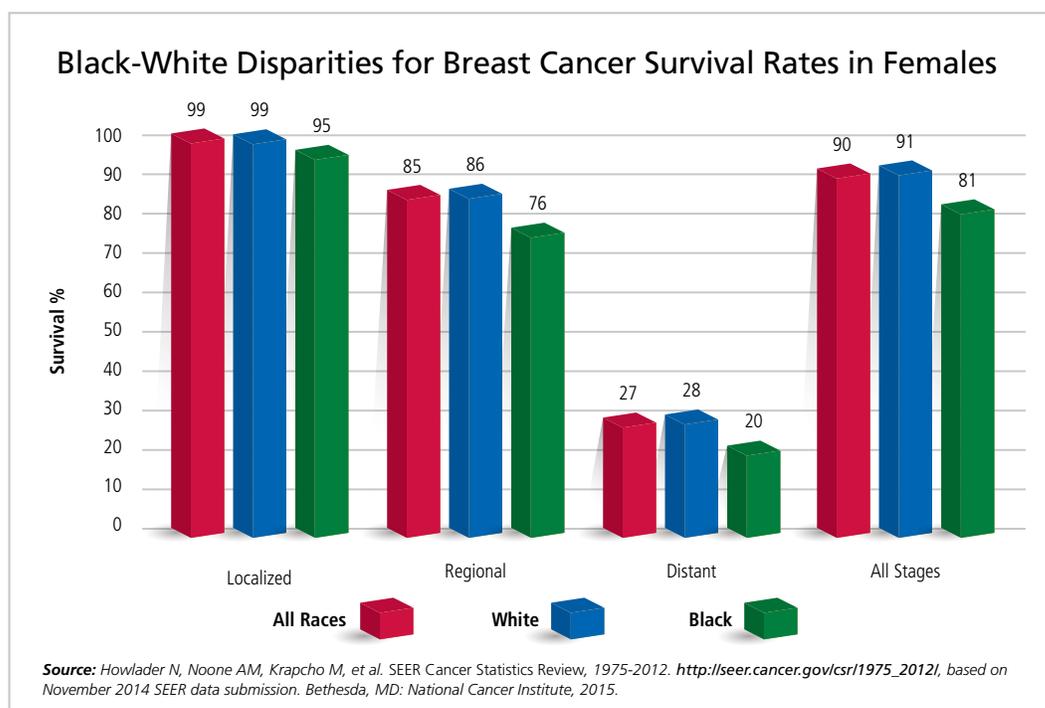
Figure 27: The five-year relative survival rate for all stages of invasive breast cancer is 90 percent. Most cases (62 percent) are diagnosed at a localized stage (no spread to lymph nodes, nearby structures, or other locations outside the breast), for which the five-year survival is 99 percent. Survival rates have increased over time for both White and Black women, although they remain 10 percent lower, in absolute terms, for Black women.

Black-White Disparities for Colorectal Cancer Survival Rates
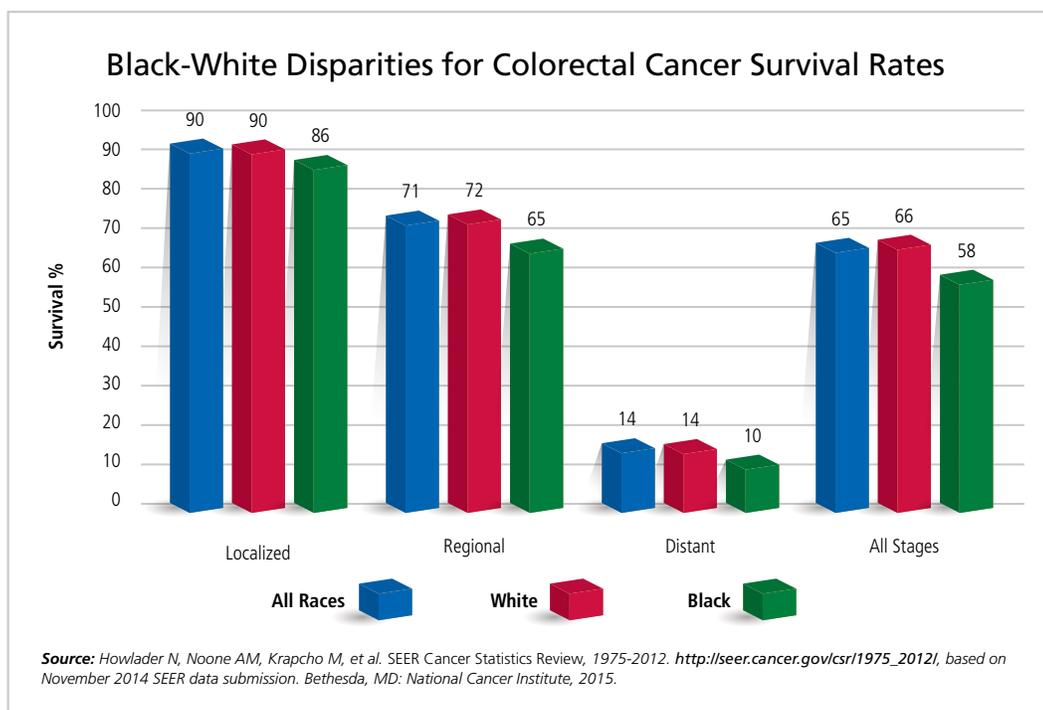
Figure 28: The five-year relative survival rate for colorectal cancer is 66 percent for Whites and 58 percent for Blacks. Only 39 percent of patients are diagnosed with localized disease, for which five-year survival is 90 percent. Again, survival is substantially lower for Blacks for every stage compared to Whites.

Black-White Disparities for Lung and Bronchus Cancer Survival Rates
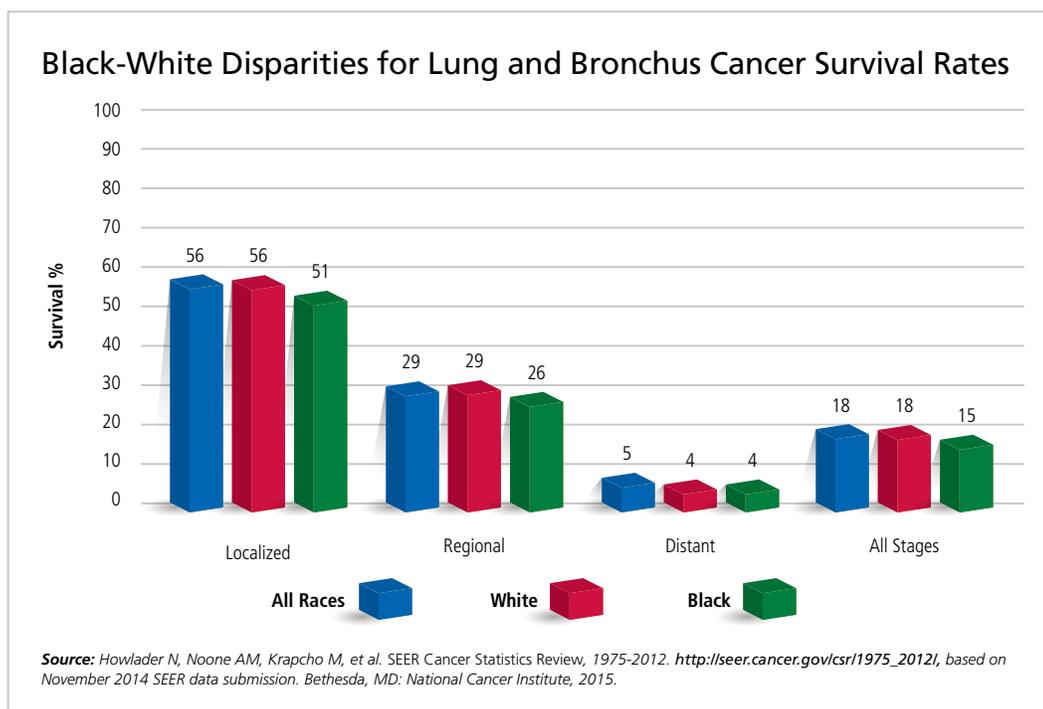
Figure 29: The five-year relative survival rate for lung and bronchus cancer at all stages is 18 percent for Whites and 15 percent for Blacks. Only 16 percent of lung cancers are diagnosed at a localized stage, for which the five-year survival is 56 percent. Survival rates remain lower in Blacks than in Whites.

Black-White Disparities for Uterine Corpus Cancer Survival Rates

Source: Howlader N, Noone AM, Krapcho M, et al. SEER Cancer Statistics Review, 1975-2012. *http://seer.cancer.gov/csr/1975_2012/*, based on November 2014 SEER data submission. Bethesda, MD: National Cancer Institute, 2015.
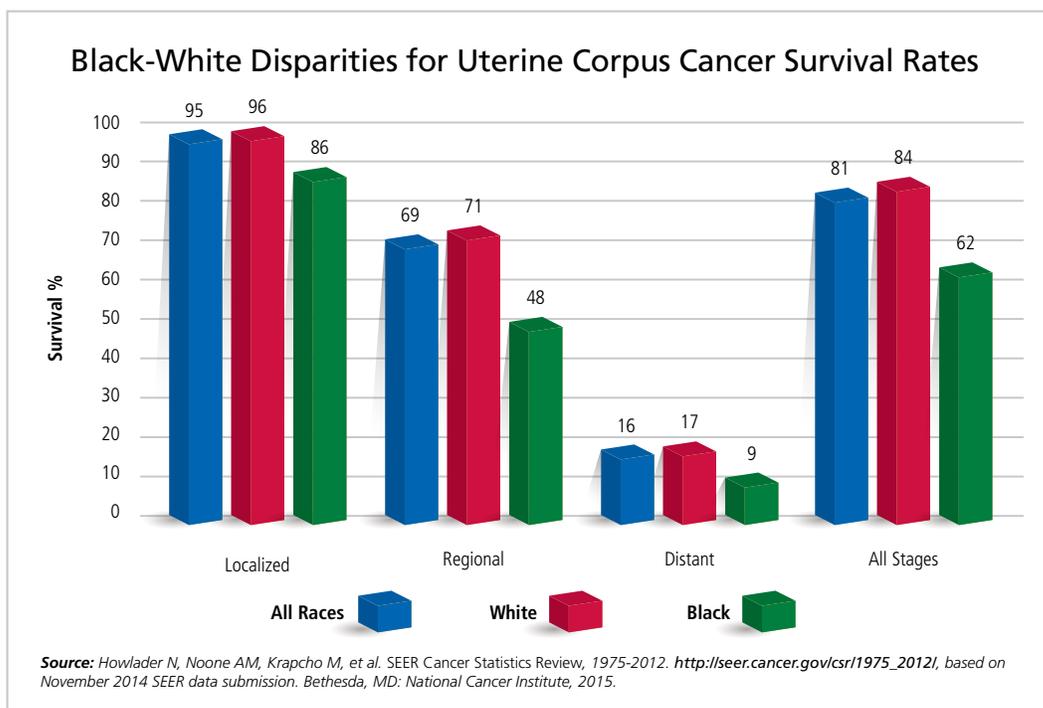
Figure 30: The five-year relative survival rate for uterine corpus cancer (body of the uterus, excluding the cervix) is 84 percent for White women and 62 percent for Black women, partly because White women are more likely than Black women to be diagnosed with early-stage disease; however, survival is substantially lower for Black women for every stage.

Trends in Childhood and Adolescent (0 to 19 Years) Five-Year Relative Cancer Survival (%) by Race, US, 1975 to 2013

Black Childhood and Adolescent Five-Year Relative Cancer Survival Remains Five Percentage Points Lower than Whites

Incidence rates per 100,000

	1975-1977	1978-1980	1981-1983	1984-1986	1987-1989	1990-1992	1993-1995	1996-1998	1999-2001	2002-2005	2007-2013
Whites	61.3	65.9	69.3	72.5	75	77.6	78.5	81.2	81.4	84.6	85.8
Blacks	59.4	60.3	62.5	58.4	64.3	68.6	74.2	73.9	74.7	74.6	80.8

Diagnosis Years

Source: SEER, 2017.

Figure 31: Five-year relative cancer survival rates for children and adolescents (ages 0 to 19 years) have increased since 1975 for both Blacks and Whites, although rates remain about five percentage points lower in Blacks. This may reflect inequalities in access to and receipt of diagnostic and treatment advances.[31]

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Racial and ethnic minorities, persons of lower socioeconomic status, and the uninsured are more likely than others to be diagnosed with certain cancers, often at later stages when the severity is likely to be greater and the odds of survival are decreased.

Overview

Access to timely, high-quality, affordable health care coverage is key to the successful fight against cancer. Research from the American Cancer Society shows that uninsured Americans are less likely to get screened for cancer and thus are more likely to have their cancer diagnosed at an advanced stage when survival is less likely and the cost of care more expensive.[1] Racial/ethnic minorities and people with lower socioeconomic status (SES) are more likely to be uninsured compared to Whites and those with higher SES, respectively, as demonstrated by the first charts in this section (see Figure 32, facing page and Figures 33, 34 and 35, pages 56, 58 and 59 respectively).

Racial and ethnic disparities in cancer care are largely attributed to obstacles to accessing health care services, including cancer prevention, early detection, and high-quality treatments. These obstacles include, but are not limited to, lack of or inadequate health insurance coverage, poverty, lacking a usual source of care, transportation difficulties, and health literacy challenges. The Affordable Care Act (ACA) increased access to health care for millions of Americans and reduced the number of uninsured individuals in the US to historic lows. In the ACA's first year, the number of uninsured, newly diagnosed cancer patients fell by one-third.[2, 3] However, following the 2012 Supreme Court ruling that made Medicaid expansion optional, many states failed to expand Medicaid to individuals with incomes up to 138 percent

of the federal poverty level (FPL) (or $16,753 for an individual or $34,638 for a family of four in 2018).[4] Individuals living in these non-expansion states are nearly twice as likely to be uninsured as individuals in states that expanded coverage (see Figure 41, page 66). This has left millions of low-income, underserved Americans without access to affordable coverage. Because cancer patients from racial/ethnic minority groups are more likely to be uninsured than others, they also are more likely to be diagnosed with cancer at a later stage, when survival rates are lower.[5] Further, debate on potential changes to the ACA continues at the federal and state levels, which could affect coverage for millions of Americans, potentially increasing the number of uninsured and creating further disparity gaps.

Percentage of People Living in Poverty by Race/Ethnicity, 2016

Blacks and Hispanics are Most Likely to Be Living in Poverty

Non-Hispanic White — 8.8
Black — 22
Asian — 10.1
Hispanic — 19.4

Below Poverty %
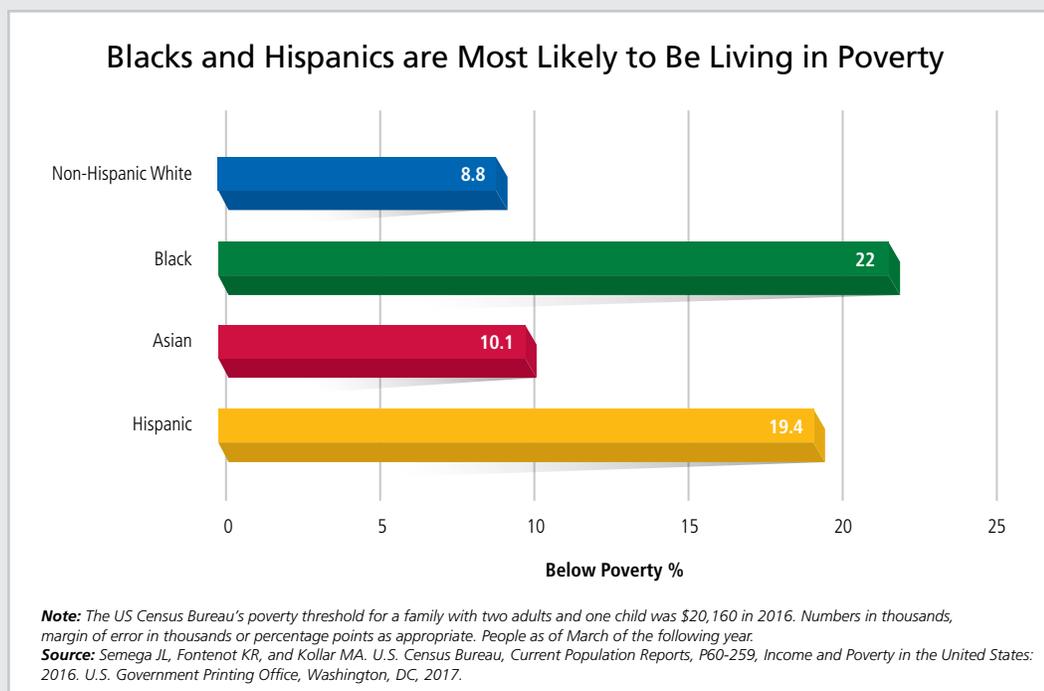
Figure 32: Blacks and Hispanics are more likely to be living in poverty compared to other racial/ethnic groups. Therefore, these populations are more likely to have a lower SES compared to their White and Asian counterparts, who tend to have higher SES.

Note: The US Census Bureau's poverty threshold for a family with two adults and one child was $20,160 in 2016. Numbers in thousands, margin of error in thousands or percentage points as appropriate. People as of March of the following year.
Source: Semega JL, Fontenot KR, and Kollar MA. U.S. Census Bureau, Current Population Reports, P60-259, Income and Poverty in the United States: 2016. U.S. Government Printing Office, Washington, DC, 2017.

In addition to health insurance coverage, many other factors play a role in racial/ethnic disparities in survival, including stage of disease at diagnosis (see Figures 21 - 26, pages 46 and 47), differences in the quality of cancer and non-cancer care, comorbidity, and SES.[6,7] Discrimination and implicit bias may also play a role in cancer disparities. Research suggests that racial and ethnic minorities, particularly Blacks, may receive lower-quality health care than non-Hispanic Whites even when insurance status, age, severity of disease, and health status are comparable.[8,9,10] Social inequality, including communication barriers and patient-provider relationships, can affect interactions between patients and physicians and contribute to miscommunication and/or delivery of substandard care.

Clinical trials are considered essential for the discovery and development of better drugs and treatments for cancer; yet, despite Congressional mandates to include racial/ethnic minorities in publicly funded research, racial/ethnic minorities remain underrepresented.[11,12,13] This raises the possibility that the clinical trial results may not be fully applicable to these populations.

Insurance Coverage for the General Population

Charts in this subsection focus on disparities in insurance coverage affecting the general population.

Health Insurance Status by Selected Demographic Characteristics for All Ages, 2016

Hispanics Are More Likely to Be Uninsured When Compared to All Other Racial/Ethnic Groups

Note: Individuals are considered to be uninsured if they do not have health insurance coverage for the entire calendar year.
Source: Barnett, JC, & Berchick, ER. Current Population Reports, P60-260. Health Insurance Coverage in the United States: 2016.U.S. Government Printing Office, Washington, DC, 2017.

Figure 33: Compared to other racial/ethnic groups, Hispanics are the most likely to be uninsured (16 percent uninsured), followed by Blacks (11 percent uninsured).

Note Figures 32 and 33: Federal surveys give respondents the option of reporting more than one race. These charts show data using race alone. The use of the single-race population does not imply that it is the preferred method of presenting or analyzing data. The Census Bureau uses a variety of approaches. Information on people who reported more than one race, such as White and American Indian and Alaska Native or Asian and Black or African American, is available from the 2010 Census through American FactFinder. About 2.9 percent of people reported more than one race in the 2010 Census. Data for American Indians and Alaska Natives, Native Hawaiians and Other Pacific Islanders, and those reporting two or more races are not shown separately.

Health Insurance Coverage of Nonelderly (<65 Years) Population by Race/Ethnicity, 2014
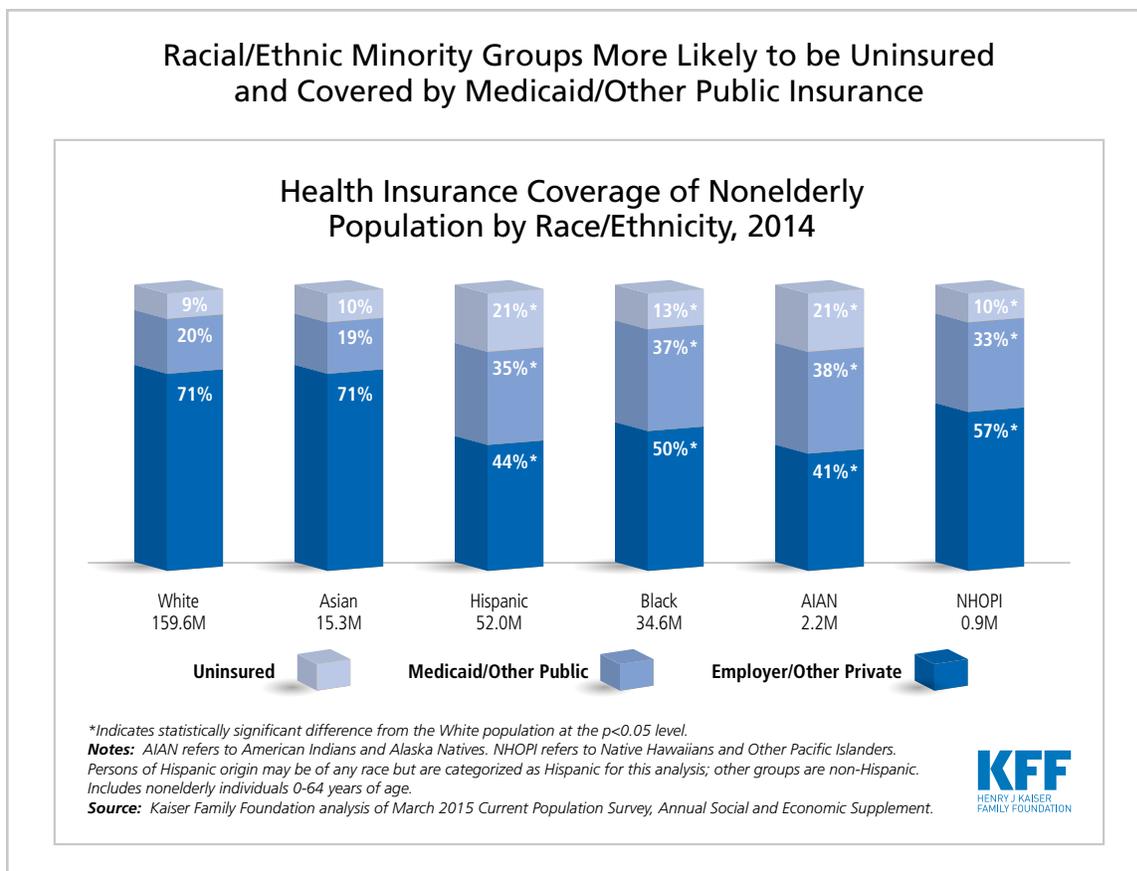
Figure 34: *Health Insurance Coverage of Nonelderly Population by Race/Ethnicity, 2014.* Information provided by the Henry J. Kaiser Family Foundation.

Using more detailed racial/ethnic data limited to the nonelderly population, most racial/ethnic minority groups continue to be more likely to be uninsured and more likely to receive health insurance coverage through Medicaid or another public source compared to Whites. Among nonelderly Hispanics and American Indian/Alaska Natives, nearly one in five lack health insurance coverage.

Note Figures 34 and 35: The category for Asian excludes NHOPI. M refers to millions.
- *Employer:* Includes those covered by employer-sponsored coverage either through their own job or as a dependent in the same household.
- *Other Private:* Includes individuals and families that purchased or are covered as a dependent by non-group insurance.
- *Medicaid:* Includes those covered by Medicaid, the Children's Health Insurance Program (CHIP), and those who have both Medicaid and another type of coverage, such as dual eligibles who are also covered by Medicare.
- *Other Public:* Includes those covered by Medicare, Medicare Advantage, and those who have Medicare and another type of non-Medicaid coverage where Medicare is the primary payer. Excludes those with Medicare Part A coverage only and those covered by Medicare and Medicaid (dual eligibles). Includes those covered under the military or Veterans Administration.
- *Uninsured:* Includes those without health insurance and those who have coverage under the Indian Health Service only.

Health Insurance Coverage of Children (0 to 18 Years) by Race/Ethnicity, 2014

Children of Racial/Ethnic Minority Populations Are More Likely to be Uninsured and Covered through Medicaid/Other Public Insurance

Health Insurance Coverage of Children by Race/Ethnicity, 2014

	White 40.5M	Asian 3.8M	Hispanic 19.0M	Black 10.8M	AIAN 0.8M	NHOPI 0.3M
Uninsured	5%	6%*	10%*	5%*	16%*	N/A
Medicaid/Other Public	31%	28%	56%*	58%*	50%*	50%*
Employer/Other Private	64%	65%	34%*	37%*	35%*	40%*

Indicates statistically significant difference from the White population at the p<0.05 level.
Notes: *AIAN refers to American Indians and Alaska Natives. NHOPI refers to Native Hawaiians and Other Pacific Islanders. Persons of Hispanic origin may be of any race but are categorized as Hispanic for this analysis; other groups are non-Hispanic. Includes children 0 – 18 years of age. Totals may not sum to 100% due to rounding. N/A: Point estimates do not meet minimum standards for statistical reliability.*
Source: *Kaiser Family Foundation analysis of March 2015 Current Population Survey, Annual Social and Economic Supplement.*

Figure 35: *Health Insurance Coverage of Children by Race/Ethnicity, 2014.* Information provided by the Henry J. Kaiser Family Foundation.

American Indian/Alaska Native (16 percent) and Hispanic (10 percent) children are more likely than their counterparts to be uninsured. White and Asian children are more likely to receive their health insurance coverage from a private source, whereas half of the children in every other racial/ethnic group receive health insurance through Medicaid or another public source.

Insurance Coverage for Cancer Patients

Charts in this subsection focus on disparities in insurance coverage for cancer patients and survivors.

Insurance Type among Individuals with a History of Cancer Aged 18 to 64 Years, NHIS 2016

Seven Percent of Individuals with a History of Cancer Are Uninsured

0.5%
6.8%
8.9%
15.0%
68.8%

Private
Other coverage
Don't know
Medicaid and other public
Uninsured

Source: National Center for Health Statistics (NCHS). National Health Interview Survey (NHIS), 2016. Public-use data file and documentation. 2016; https://www.cdc.gov/nchs/nhis/nhis_2016_data _release.htm. Accessed December 14, 2017.

Figure 36: In 2016, nearly 7 percent of individuals with a history of cancer aged 18 to 64 years old were uninsured, down from previous years,[14, 15] largely thanks to the ACA pre-existing condition exclusion. Fifteen percent of individuals with a history of cancer relied on Medicaid and other public programs for their health insurance coverage, compared to nearly 69 percent who had private insurance.

Note: Weighted percentage using National Health Interview Survey (NHIS) 2016 data (national representative of civilian noninstitutionalized US population). The distribution of insurance type for individuals reporting a history of cancer.
- *Private coverage*: Includes any comprehensive private insurance plan (including health maintenance organizations, preferred provider organizations, and exchange-based coverage).
- *Medicaid*: Includes those who do not have private coverage, but who have Medicaid or other state-sponsored health plans including CHIP.
- *Other coverage:* Includes those who do not have private insurance, Medicaid, or other public coverage, but who have any type of military coverage, Medicare, or other government program.
- *Uninsured*: Includes persons who have not indicated that they are covered at the time of the interview. This category also includes persons who are covered by Indian Health Service only or who only have a plan that pays for one type of service such as accidents or dental care.

History of Cancer

A history of cancer is defined by reporting a diagnosis of cancer at some point in an individual's lifetime. People with a history of cancer include those who are undergoing active treatment for the disease as well as those who are not receiving treatment or who are in remission. People with a history of cancer are not only at risk of long-term or late effects of their cancer or treatment but also may experience additional cancers or recurrence.[16] Thus, access to high-quality health care is essential to reduce the cancer burden in this population.

Cancer Patients without Health Insurance at Diagnosis Aged 19 to 64 Years, US, 2010 to 2014

Black and Hispanic Cancer Patients Are More Likely to Be Uninsured at Diagnosis, Even After ACA Implementation

Pre-ACA % [2010-2013] Post-ACA % [2014]

White: 5, 3
Black: 9, 7
Hispanic: 10, 6
Other: 5, 2

Uninsured %

Source: Soni A, Sabik LM, Simon K, Sommers BD. Changes in insurance coverage among cancer patients under the Affordable Care Act. JAMA Oncol. 2018;4(1):122-24.
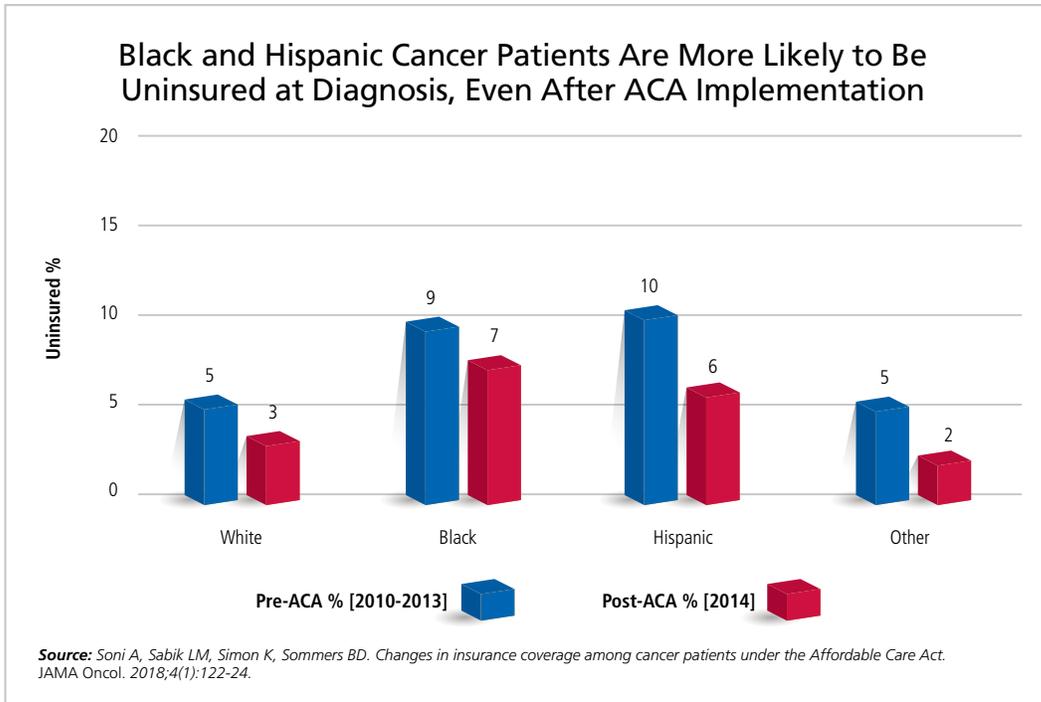
Figure 37: Disparities exist for Black and Hispanic individuals compared to Whites in both the pre-ACA and post-ACA timeframes. However, following the implementation of health insurance exchanges and Medicaid expansion under the ACA, uninsured rates among cancer patients declined for every major racial/ethnic group, with the largest decline occurring among Hispanics.

New Colorectal and Lung Cancer Patients More Likely to Be Uninsured at Diagnosis Compared to Patients with Other Common Cancers

Source: Soni A, Sabik LM, Simon K, Sommers BD. Changes in insurance coverage among cancer patients under the Affordable Care Act. JAMA Oncol. 2018;4(1):122-24.
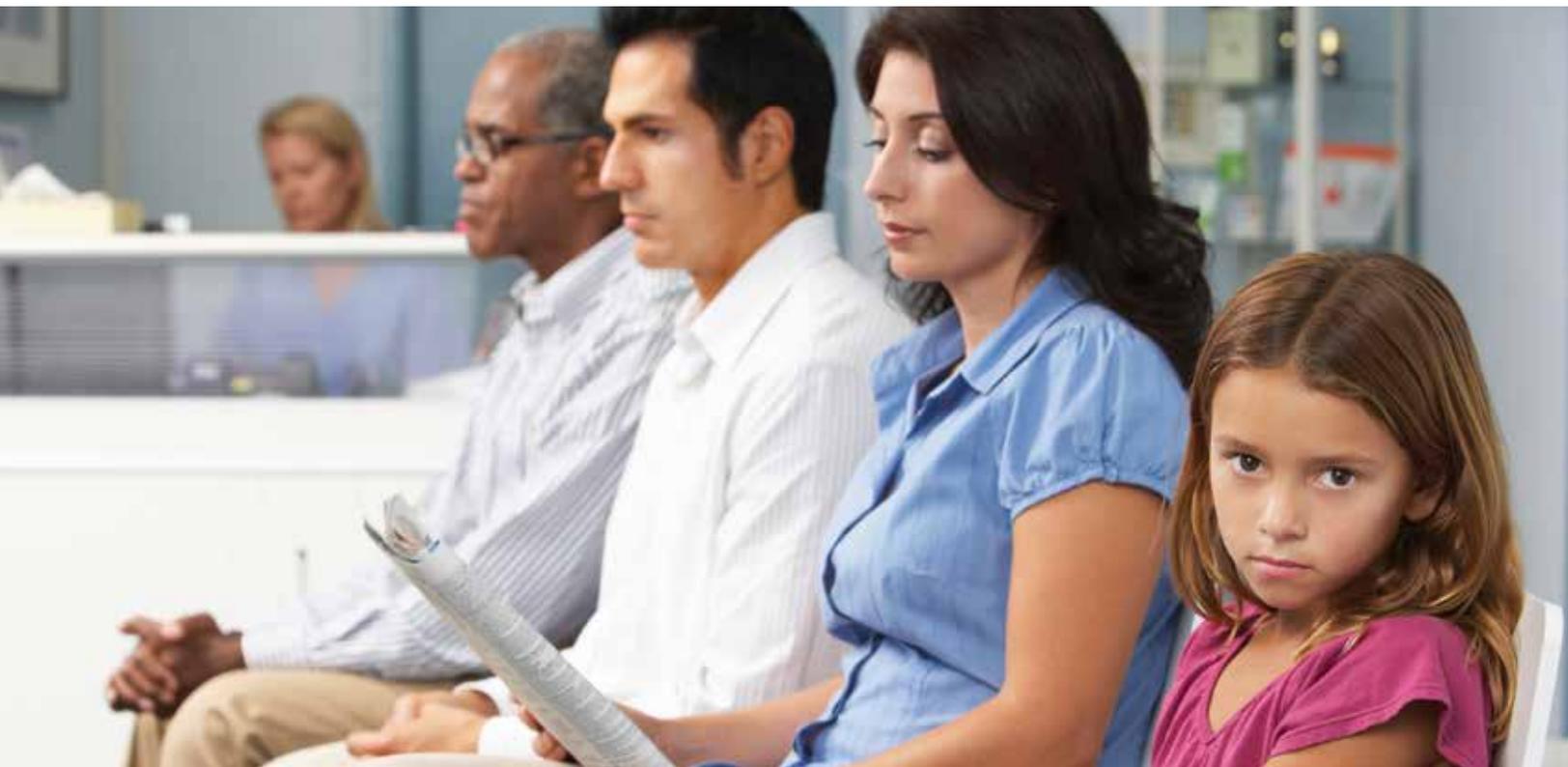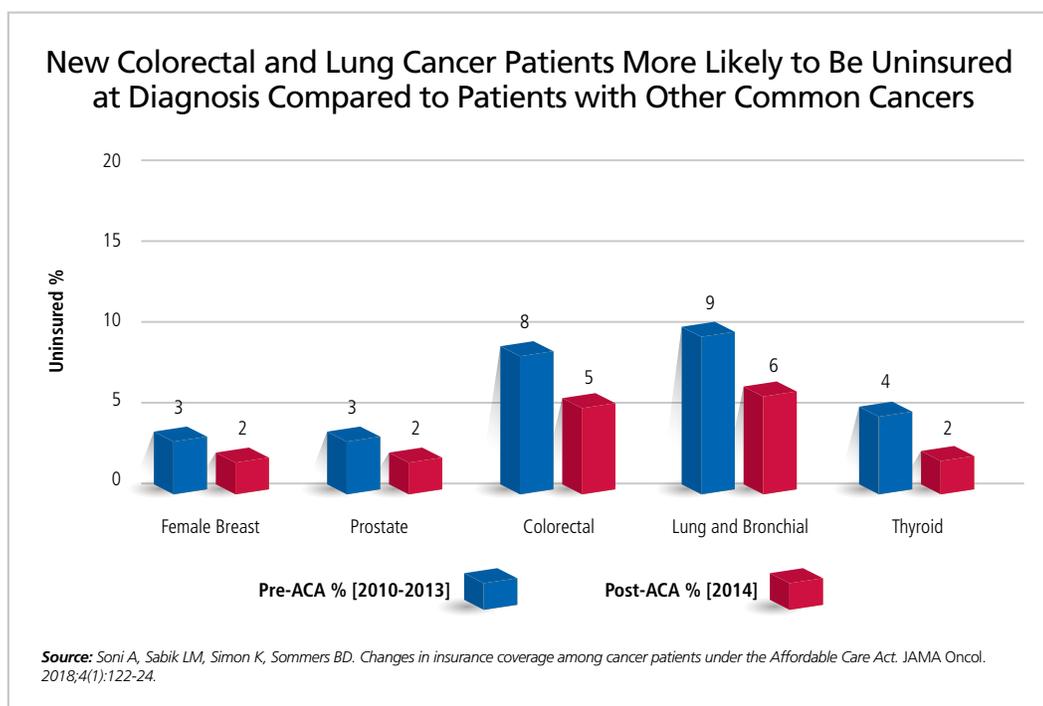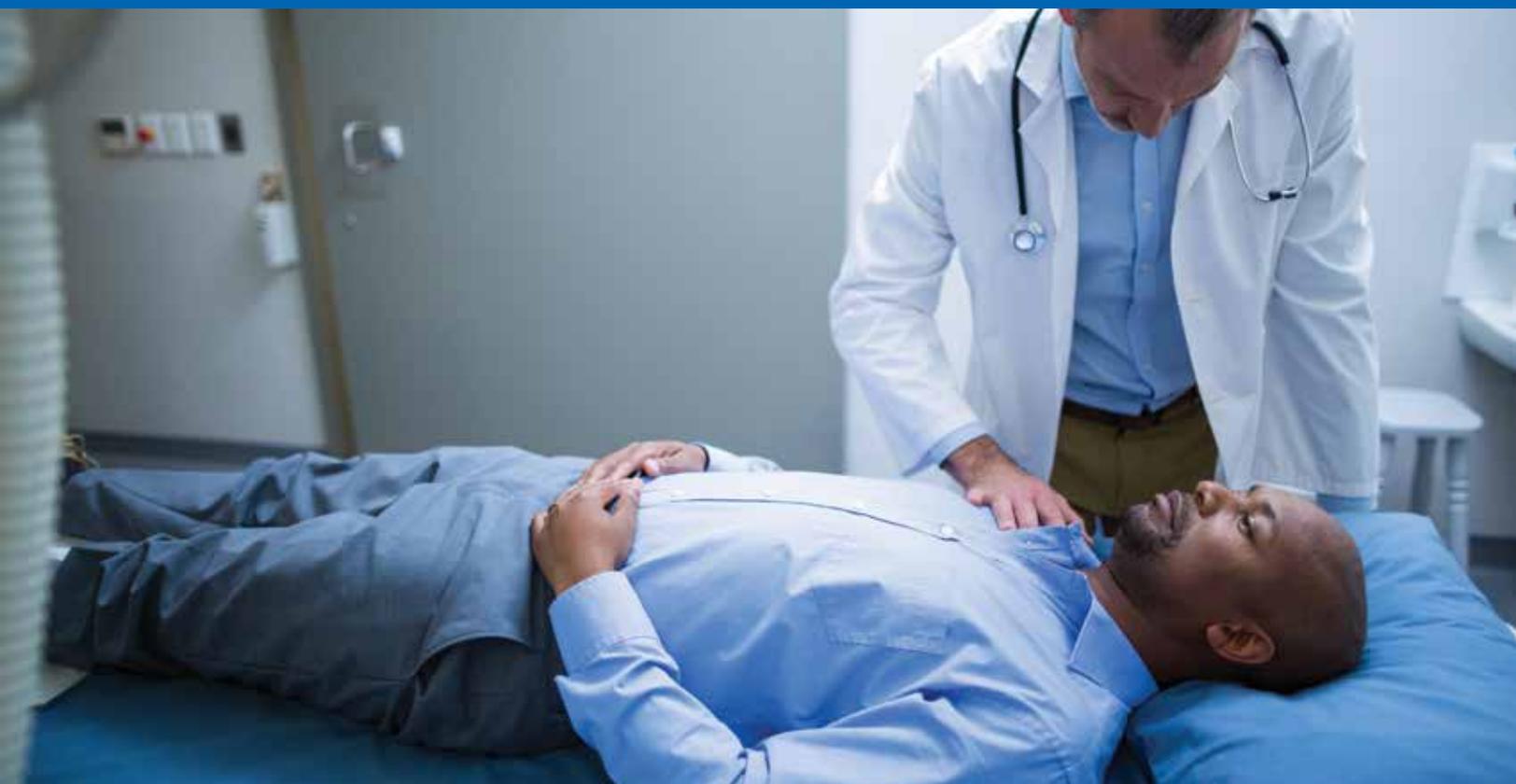
Figure 38: Higher percentages of newly diagnosed lung and colorectal cancer patients are uninsured compared to patients diagnosed with other common cancers. However, overall, fewer cancer patients were uninsured at diagnosis in the post-ACA period (2014) than in the pre-ACA period (2010 to 2013). Many factors may contribute to differences in uninsured rates at diagnosis by cancer type, including but not limited to differences in screening prevalence by cancer type and SES, participation in the CDC's National Breast and Cervical Cancer Early Detection Program among low-income women, and risk factors.

Uninsured Patients Are More Likely to Be Diagnosed at a Distant Stage of Cancer

Source: Soni A, Sabik LM, Simon K, Sommers BD. Changes in insurance coverage among cancer patients under the Affordable Care Act. JAMA Oncol. *2018;4(1):122-24.*
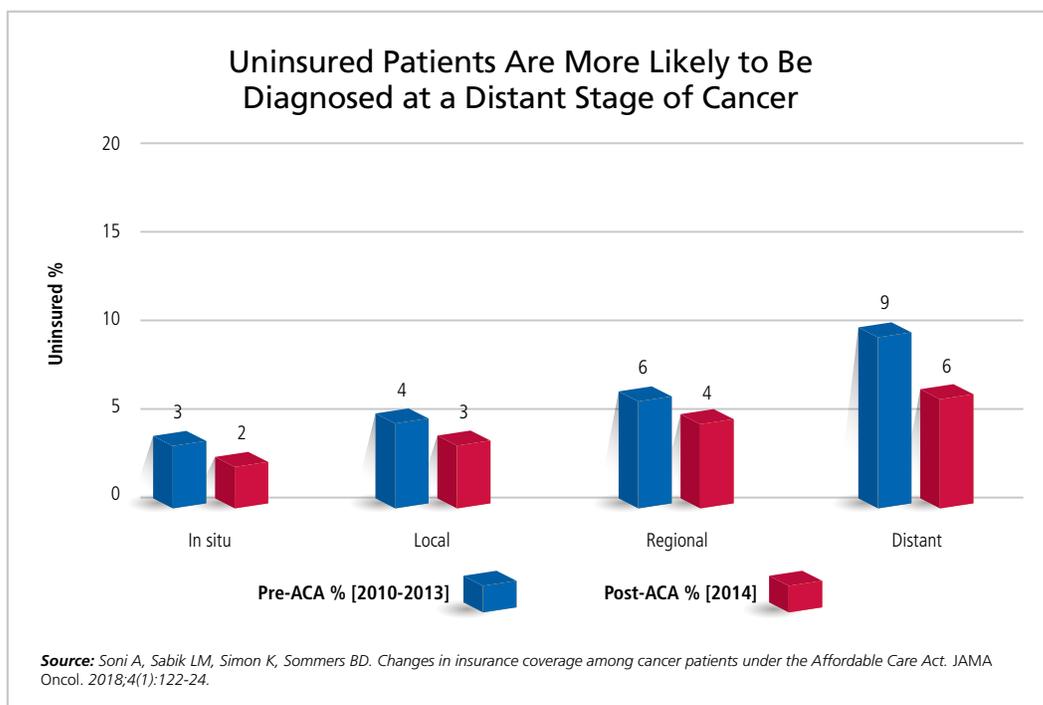
Figure 39: Uninsured cancer patients are more likely to be diagnosed at a distant stage of cancer when treatment outcomes are not as successful as cases where the cancer is caught at an earlier stage. This is partly because uninsured patients may not be able to access high-quality health care to detect cancer before symptoms arise and, in order to avoid medical expenses, may postpone or avoid seeking care until their symptoms and the cancer have progressed (see Figure 40, facing page). However, a smaller percentage of cancer patients diagnosed at a distant stage were uninsured in the post-ACA period (6 percent), compared to the pre-ACA period (9 percent).

In situ:

in place; localized and confined to one area. A very early stage of cancer.

Localized Cancer:

also called *local cancer.* A cancer that is confined to the organ where it started; that is, it has not spread to distant parts of the body.

Regional Involvement:

also called *regional spread.* The spread of cancer from its primary (original) site to nearby areas such as lymph nodes, but not to distant sites.

Distant Cancer:

sometimes called *distant metastases.* Cancer that has spread far from its original location or primary site to distant organs or lymph nodes.

Barriers to Health Care among Nonelderly Adults by Insurance Status, 2016

No Usual Source of Care
- 49%
- 12%
- 12%

Postponed Seeking Care Due to Cost
- 23%
- 9%
- 6%

Went Without Needed Care Due to Cost
- 20%
- 8%
- 3%

Postponed or Did Not Get Needed Prescription Drug Due to Cost
- 18%
- 14%
- 6%

0% 5% 10% 15% 20% 25% 30% 35% 40% 45% 50%

Uninsured **Medicaid/Other Public** **Employer/Other Private**

Figure 40: *Barriers to Health Care Among Nonelderly Adults by Insurance Status, 2016.* Information provided by the Henry J. Kaiser Family Foundation.
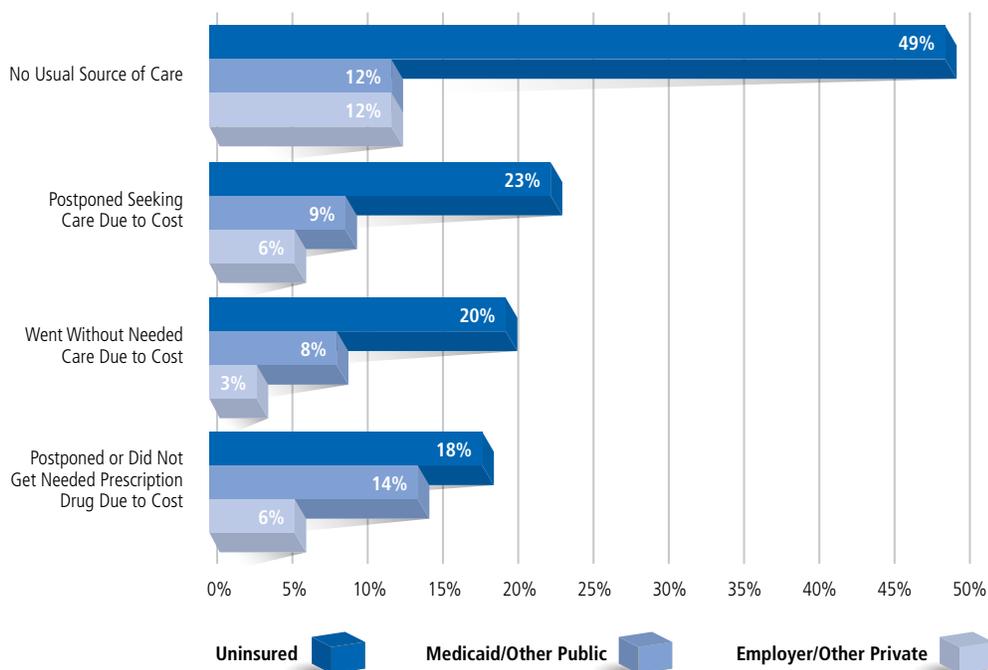
Notes: Includes nonelderly adults ages 18-64. Includes barriers experienced in past 12 months. Respondents who said usual source of care was the emergency room were included among those not having a usual source of care. All differences between uninsured and insurance groups are statistically significant (p<0.05).
Source: Kaiser Family Foundation analysis of the 2016 National Health Interview Survey.

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State Medicaid Expansion Decision

As of August 2018, 17 states have chosen not to expand their Medicaid program to individuals with incomes up to 138 percent of the Federal Poverty Level (FPL), which has left many individuals in these states uninsured (Maine adopted Medicaid expansion through a ballot initiative in November 2017; however, the Governor failed to submit the state plan amendment requirements for implementation of expansion by the deadline). Medicaid expansion could further reduce the uninsured rate for individuals/families in non-expansion states who make equal to or less than 138 percent of the federal poverty level (FPL). ACS CAN continues to advocate for the remaining states to expand their Medicaid programs. Charts in this subsection focus on disparities caused by state Medicaid expansion decisions. Charts include both the effects Medicaid expansion decisions have had on the general population, as well as cancer patients and survivors.

Percentage of Adults Ages 19 to 64 Who Were Uninsured by State Medicaid Expansion Decision

Individuals in States that Did Not Expand Medicaid Coverage Are More Likely to Be Uninsured

State did not expand Medicaid: 23, 19, 18, 16, 19
State expanded Medicaid: 18, 12, 10, 10, 11
(July–Sept. 2013, April–June 2014, March–May 2015, Feb.–April 2016, March–June 2017)

Notes: We categorize states as expansion states if their state expanded their Medicaid program as of January of the survey year.
Data: The Commonwealth Fund Affordable Care Act Tracking Surveys, July–Sept. 2013, April–June 2014, March–May 2015, Feb.–April 2016, March–June 2017.
Source: S. R. Collins, M. Z. Gunja, and M. M. Doty, Following the ACA Repeal-and-Replace Effort, Where Does the U.S. Stand on Insurance Coverage? Findings from the Commonwealth Fund Affordable Care Act Tracking Survey, March–June 2017, The Commonwealth Fund, Sept. 2017.

The Commonwealth Fund

Figure 41: *Individuals in States that Did Not Expand Medicaid Coverage Are More Likely to Be Uninsured.* Information provided by The Commonwealth Fund.

Individuals living in states that did not expand their Medicaid coverage to individuals up to 138 percent of the FPL are more likely to be uninsured than individuals in states that expanded coverage; leaving millions of low-income, underserved Americans without access to affordable coverage.

Figures 42 and 43 (facing page): The percentage of families/individuals with incomes <$50,000 with health insurance coverage (including private or government-funded) improved in both expansion and non-expansion states under enactment of the ACA. However, those living in non-expansion states continued to have noticeably less insurance coverage than those in expansion states, especially among those with annual incomes <$20,000. For example, among those with annual incomes <$10,000 in 2015, 81 percent reported insurance coverage in expansion states versus 62 percent in non-expansion states.

Changes in Insurance Coverage under the Affordable Care Act by Household Income in Expansion vs. Non-Expansion States, 2013 to 2015

Improvements in Insurance Coverage by Household Income and Medicaid Expansion Status Before and After ACA Implementation, Expansion States, 2013 to 2015

Notes: Data extracted for adults 18-64 years using the Behavioral Risk Factor Surveillance System (BRFSS) data. The percentage of the population that has insurance coverage, stratified by SES, year, and residence in a Medicaid expansion and non-expansion states. FPL = federal poverty level. Year 2017 - 138 percent of the FPL was equal to $16,643 for an individual or $33,534 for a family of four.
Source: Griffith K, Evans L, Bor J. The Affordable Care Act Reduced Socioeconomic Disparities in Health Care Access. Health Aff. 2017 Jul 26.

Figure 42

Improvements in Insurance Coverage by Household Income and Medicaid Expansion Status Before and After ACA Implementation, Non-Expansion States, 2013 to 2015

Notes: Data extracted for adults 18-64 years using the Behavioral Risk Factor Surveillance System (BRFSS) data. The percentage of the population that has insurance coverage, stratified by SES, year, and residence in a Medicaid expansion and non-expansion states. FPL = federal poverty level. Year 2017 - 138 percent of the FPL was equal to $16,643 for an individual or $33,534 for a family of four.
Source: Griffith K, Evans L, Bor J. The Affordable Care Act Reduced Socioeconomic Disparities in Health Care Access. Health Aff. 2017 Jul 26.

Figure 43

Changes in Health Insurance Coverage among Nonelderly Adult (18 to 64 Years) Patients with Newly Diagnosed Cancer by Income and Medicaid Expansion

Note: *Nonelderly adults=18-64 years of age. Q=Quarter; Low income=≤138% federal poverty level (FPL); Middle income=139-400% FPL; High income=≥401% FPL. Medicaid Expansion states as of January 1, 2014: Arizona, Arkansas, California, Colorado, Connecticut, Delaware, District of Columbia, Hawaii, Illinois, Iowa, Kentucky, Maryland, Massachusetts, Michigan, Minnesota, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Dakota, Ohio, Oregon, Rhode Island, Vermont, Washington, and West Virginia.*
Source: *Jemal A, Lin CC, Davidoff AJ, Han X. Changes in insurance coverage and stage at diagnosis among nonelderly patients with cancer after the Affordable Care Act. J Clin Oncol. 2017; 35(35):3906-15.*

Figure 44: Following the implementation of the ACA, the percentage of uninsured among low-income cancer patients in non-expansion states (13.3 percent) is >3.5 times that than in expansion states (3.6 percent). Between the pre-ACA and post-ACA periods, the percentage of uninsured individuals decreased in all income categories in both Medicaid expansion and non-expansion states among patients with newly diagnosed cancer. However, middle- and high-income cancer patients continued to be more likely to be insured than low-income cancer patients.

Changes in Proportion of Stage I Disease in Medicaid Expansion States vs. Non-Expansion States among Cancer Patients, 2011 to 2014

Patients in Non-Medicaid Expansion States Least Likely to Receive Early-Stage Diagnosis of Select Cancers

Lung
- Non-Expansion: 16.5
- Expansion: 18

Female Breast
- Non-Expansion: 46.1
- Expansion: 48.7

Colorectal
- Non-Expansion: 21
- Expansion: 22.8

Proportion of Stage I Disease

Note: *Data from second to fourth quarter of 2014 (post-ACA) in Medicaid expansion and nonexpansion states by family income level. Medicaid Expansion states as of January 1, 2014: Arizona, Arkansas, California, Colorado, Connecticut, Delaware, District of Columbia, Hawaii, Illinois, Iowa, Kentucky, Maryland, Massachusetts, Michigan, Minnesota, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Dakota, Ohio, Oregon, Rhode Island, Vermont, Washington, and West Virginia.*
Source: *Jemal A, Lin CC, Davidoff AJ, Han X. Changes in insurance coverage and stage at diagnosis among nonelderly patients with cancer after the Affordable Care Act. J Clin Oncol. 2017; 35(35):3906-15.*

Figure 45: There has been an increase in early-stage diagnosis of select cancers (lung, female breast, and colorectal) since implementation of the Affordable Care Act. Earlier-stage diagnosis is generally associated with better outcomes for cancer patients. Although individuals in non-expansion states also have seen some small gains in early-stage diagnosis, they are less likely to be diagnosed at an earlier stage than their expansion state counterparts.

Cancer Treatment

Charts in this subsection focus on disparities in cancer treatment, including the delay or avoidance of necessary care for financial reasons.

Differences in Medication Non-Adherence Due to Cost among Cancer Survivors

Previous studies have shown that some cancer survivors delay or avoid necessary care for financial reasons[17, 18] (cancer survivors include people with a history of a cancer diagnosis who may be undergoing active treatment as well as those who are not undergoing treatment or who are in remission). Medication non-adherence, which may include non-adherence to prescribed medications for active cancer, as well as for long-term or late side effects, is one of the most important issues in deferred treatment.

Female and Minority Cancer Survivors Report Greatest Medication Non-Adherence Due to Cost

Note: Sampling weights were derived by comparing the number of individuals in the data set with the national estimate of cancer survivors for each of the years.
Source: Lee M, Khan MM. Gender Differences in Cost-Related Medication Non-Adherence among Cancer Survivors. J Cancer Surviv. 2016; 10:384-393.

Figure 46: For most racial/ethnic groups, female cancer survivors are more likely than males to report not adhering to prescribed medications for financial reasons. However, overall, Hispanics and African Americans of either sex are more likely to report medication non-adherence due to cost than other racial/ethnic groups.
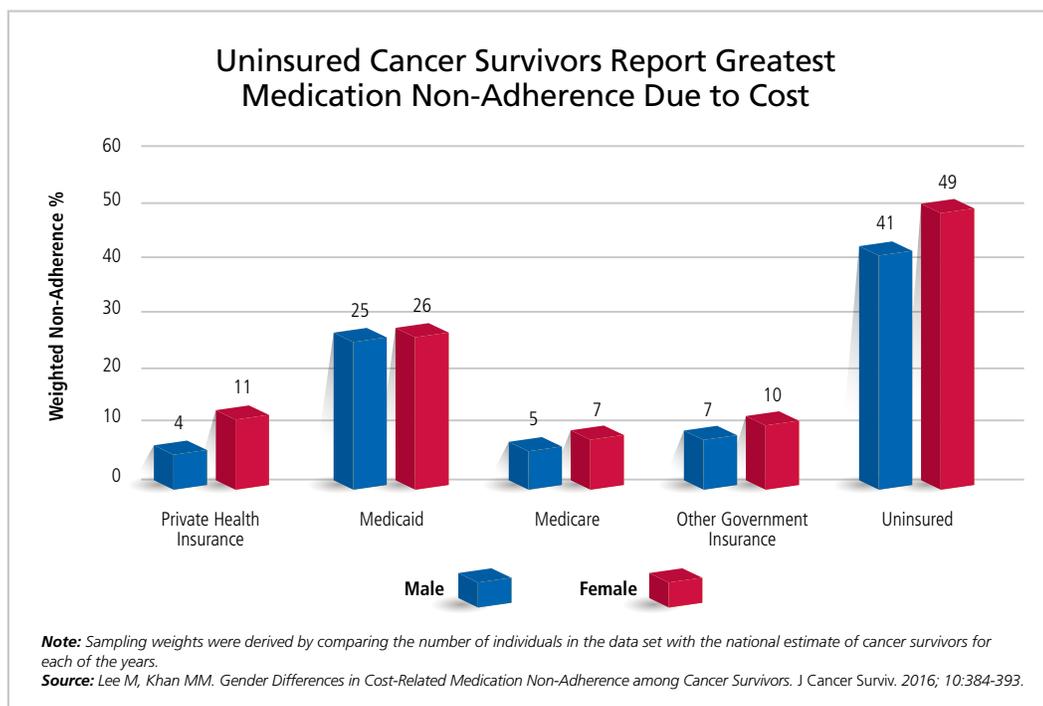
Figure 47: Uninsured cancer survivors are more likely to report cost-related non-adherence to their medication regimens than those with private insurance. Those with Medicaid are also more likely to report cost-related non-adherence than those in private and other public health insurance.

The Lee et al study also found that:

- Across each age group, reported medication non-adherence among cancer survivors varies. Females under the age of 40 are more likely than males to report non-adherence to their medication due to cost, whereas males over the age of 80 are more likely than females to report non-adherence.
- Across every household income level, females are more likely than males in a similar household income to not adhere to their medication as prescribed.

Percentage of Adults Aged 18 to 64 with No Usual Source of Medical Care, by Race/Ethnicity, US, 2014 to 2015

Hispanic/Latino and American Indian/Alaska Native Adults Are Least Likely to Have Usual Source of Care

Race/Ethnicity	Adults Without a Usual Source of Care %
White	17
Black	18
AI/AN	20
Asian	18
Hispanic or Latino	26

Adults Without a Usual Source of Care %

Note: Data are based on household interviews of a sample of the civilian noninstitutionalized population. Persons who report the emergency department as their usual source of care are defined as having no usual source of care.
Source: National Center for Health Statistics (NCHS). Health, United States, 2016: With Chartbook on Long-term Trends in Health. Hyattsville, MD. 2017.

Figure 48: Racial/ethnic minority groups are less likely to have optimal access to care measures, such as having a usual place to go for medical care, as compared to Whites. This is mostly due to these populations also being less likely to be insured (see Figures 33 and 34, pages 56 and 58). Notably, one in four Hispanic/Latino and one in five American Indian/Alaska Native (AIAN) adults report not having a usual place to go for medical care.

Sociodemographic Disparities in the Treatment of High-Risk Prostate Cancer in Community vs. Academic Centers

Increasing patient access to receiving cancer care at high-quality, research-focused academic cancer centers is a major goal of the National Cancer Institute's (NCI) Community Oncology Research Program initiative to reduce cancer disparities. However, some studies, such as the one explored below, have shown that cancer treatment disparities occur with similar frequency across both academic and community cancer centers, demonstrating the need for further research into how and why these disparities occur.

About 15 percent of patients with non-metastatic prostate cancer exhibit characteristics that are associated with a higher risk of disease progression and are referred to as having "high risk" prostate cancer.[19] Definitive therapy for these patients has been defined as receiving the recommended treatment of either radical prostatectomy or radiation therapy plus androgen-deprivation therapy. In the following study, approximately nine out of 10 high-risk prostate cancer patients received definitive therapy. However, receipt of definitive therapy varied by race/ethnicity and insurance status across both academic and community cancer centers.

Racial/Ethnic Minority High-Risk Prostate Cancer Patients Are Less Likely to Receive Definitive Therapy at Academic Cancer Centers Compared to Non-Hispanic Whites

	Academic Cancer Center	Community Cancer Center
Non-Hispanic White	90.8	92
Black	79.7	87.1
Hispanic	79.4	86.4

Source: Mahal BA, Chen YW, Muralidhar V, et al. National sociodemographic disparities in the treatment of high-risk prostate cancer: Do academic cancer centers perform better than community cancer centers? CA. 2016;112(21):3371-7.

Figure 49: Non-Hispanic White high-risk prostate cancer patients were more likely to receive definitive therapy at both academic and community centers, as compared to Black and Hispanic patients. Surprisingly, Black and Hispanic patients treated at a community cancer center were more likely to receive definitive therapy than were those treated at an academic center.

Uninsured and Medicaid Patients with Prostate Cancer Are Far Less Likely to Receive Definitive Treatment, Regardless of Facility Type

Privately Insured Patients

1.16

0.47

0.31

Odds Ratio

Uninsured   Medicaid   Medicare

Note: The comparison (reference) group, which is indicated by the dotted line, represents privately insured.
Source: Mahal BA, Chen YW, Muralidhar V, et al. National sociodemographic disparities in the treatment of high-risk prostate cancer: Do academic cancer centers perform better than community cancer centers? CA. 2016;112(21):3371-7.

Figure 50: In this study, uninsured patients had about one-fourth the odds of receiving definitive therapy as compared to the odds among privately insured patients (dotted line), regardless of treatment center type, while Medicaid patients had about one-half the odds.

The Mahal et al. study also found that:

- White high-risk prostate cancer patients received definitive therapy quicker than Black and Hispanic patients, no matter the facility treatment was received. The median time to receipt of treatment for White cancer patients at an academic center was 83 days, compared to 102 days for Black patients and 94 days for Hispanic patients. The median time to receipt of treatment at a community center for these groups was 77 days, 92 days, and 87 days, respectively.
- Uninsured high-risk prostate cancer patients were also less likely to receive timely definitive therapy at both community and academic centers than the insured.

Percentage of Early-Stage Non-Small Cell Lung Cancer Patients Receiving Curative Surgery by Race and Certain States, 2007 to 2011

Non-Hispanic Black Patients Are Less Likely to Receive Standard Treatments for Lung Cancer than Non-Hispanic Whites

Note: Non-Hispanic = NH
Source: Sineshaw HM, Wu XC, Flanders WD, Osarogiagbon RU, Jemal A. Variations in receipt of curative-intent surgery for early-stage non–small cell lung cancer (NSCLC) by state. J Thorac Oncol. 2016;11(6):880-9.
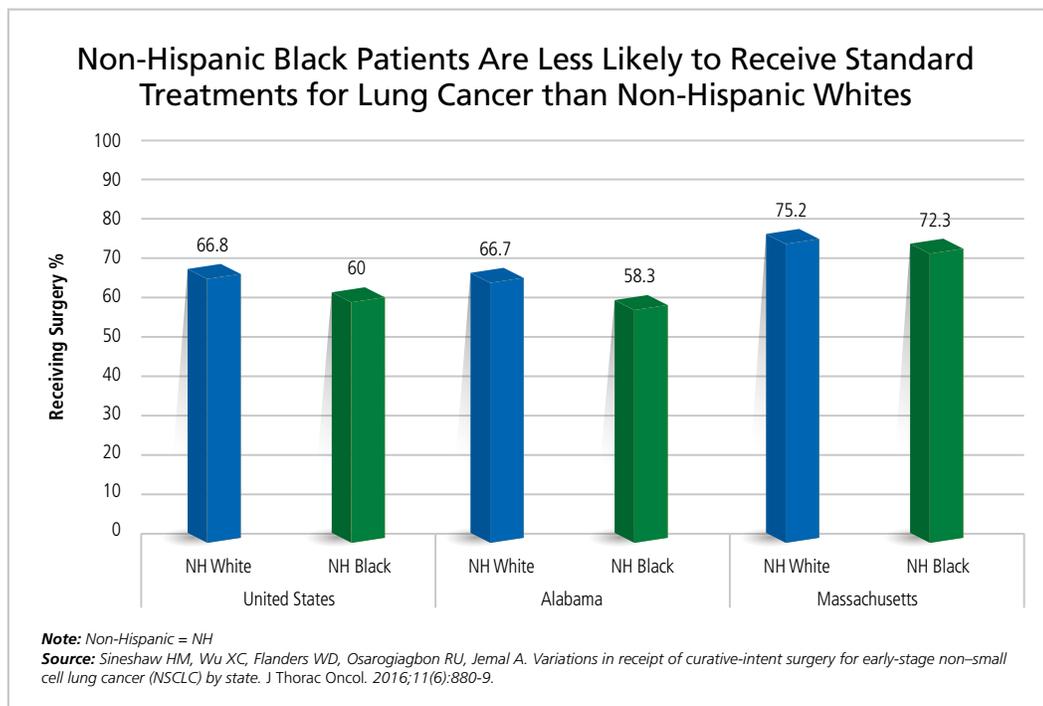
Figure 51: Black patients are often less likely to receive standard treatments for cancer than Whites. For example, surgery is the recommended curative treatment for patients with non-small cell lung cancer, the most common form of lung cancer, when it is diagnosed at an early stage (about 16 percent of cases). However, non-Hispanic Black (NHB) patients are less likely than non-Hispanic Whites (NHW) to receive curative surgery. This is likely partly due to NHBs being diagnosed with cancer at later stages than NHWs (see Figures 21 - 26, pages 46 and 47). There is also substantial variation in the size of the disparity among states, with Northeastern states generally showing higher rates than other states.

Participation in Clinical Trials

Clinical trials are considered essential for the discovery and development of better drugs and treatments for cancer. Despite Congressional mandates to include racial/ethnic minorities in publicly funded research, racial/ethnic minority groups remain underrepresented,[20, 21, 22] which raises the possibility that the clinical trial results may not be fully applicable to these populations. There are also large disparities found among age groups represented in clinical trials. The elderly population is less likely to be represented in clinical trials than younger populations (see Figure 53, page 78 and Figure 54, page 79). Demographic and socioeconomic disparities in trial enrollment can occur anywhere along the pathway from the design of the trial, to provider patient interactions, to factors affecting patient enrollment decisions. The two largest categories of cancer clinical trial sponsors are the pharmaceutical industry and the federal government. Pharmaceutical trials are typically submitted to the Food and Drug Administration (FDA) for approval and product registration, while the largest federal funder of cancer trials is the National Cancer Institute (NCI).

Racial and ethnic disparities are very pronounced in FDA registrational trials for oncology drugs, but in NCI trials, enrollment of different racial and ethnic groups more closely matches the US cancer population demographics (see Figure 52, page 77 and Figure 54, page 79). Barely over a third of patients in FDA registrational cancer clinical trials are from North America (see Figure 52, page 77), making it unlikely that the racial/ethnic makeup of such trials could accurately reflect the US cancer population.

Geographic Origins of Participants in FDA-Submitted Cancer Trials

Latin America 4.4%

Asia 8.4%

Russia & Baltic States 4.2%

North America 36%

Europe 45%

Source: *Kanapuru (2017), FDA analysis of patient enrollment by region in clinical trials for approved oncological indications, ASCO Annual Meeting. (Trials from 2005-2015)*
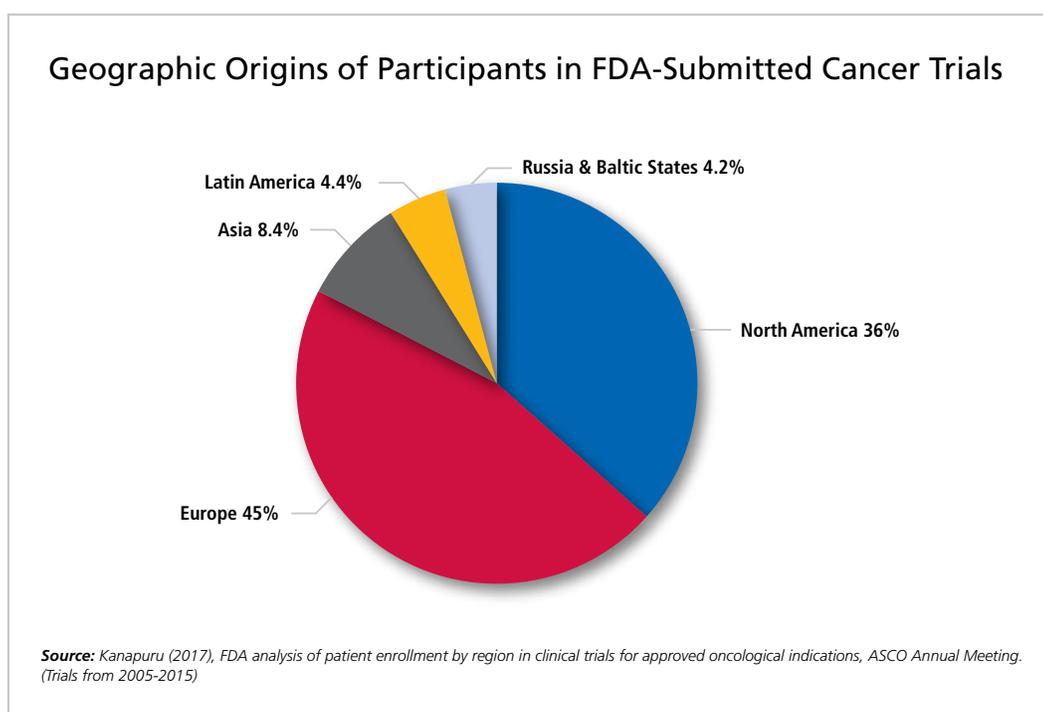
Figure 52: Clinical trials used to gather data for submission to FDA are not required to be conducted in the US. In fact, only 36 percent of patients in clinical trials submitted to FDA for drug approval come from North America, with the rest coming from Europe, Asia, Latin America, and Russia. Therefore, oncology clinical trials may not always be representative of racial/ethnic groups in the US.

Blacks and American Indian/Alaska Natives Are Least Likely to Participate in FDA Clinical Trials than Other Racial/Ethnic Groups

Sources: *Singh (2017) FDA analysis of enrollment of older adults in clinical trials for cancer drug registration: A 10-year experience by the U.S. Food and Drug Administration, ASCO Annual Meeting. FDA cancer trials 2005-2015; Fashoyin-Aje (2017), Racial composition in trials supporting the U.S. approval of anti-cancer new molecular entities (NMEs): 2011- 2016. ASCO Annual Meeting*
AI/AN = American Indian/Alaska Native

Figure 53: FDA oncology drug registration clinical trials have very pronounced racial and ethnic disparities. Asian adults are more likely to be oncology trial patients as compared to all other racial/ethnic groups. Additionally, individuals under the age of 70 are more likely than those over the age of 70 to be included in trials.

Note, Figure 53: Data from a decade of FDA-submitted cancer trials shows large over representation of Asians and significant under representation of Blacks and American Indians/Alaska Natives (AI/AN). Bars represent the ratio of the demographic representation in clinical trials versus demographic representation in the broader population diagnosed with cancer. A ratio of 1.0 indicates that the demographic make-up of a clinical trial matches the demographic make-up of the population with cancer. A number greater than 1.0 indicates over representation in clinical trials while a number less than 1.0 indicates under representation in clinical trials.

Racial/Ethnic Minorities Are Often Underrepresented in NCI Clinical Trials
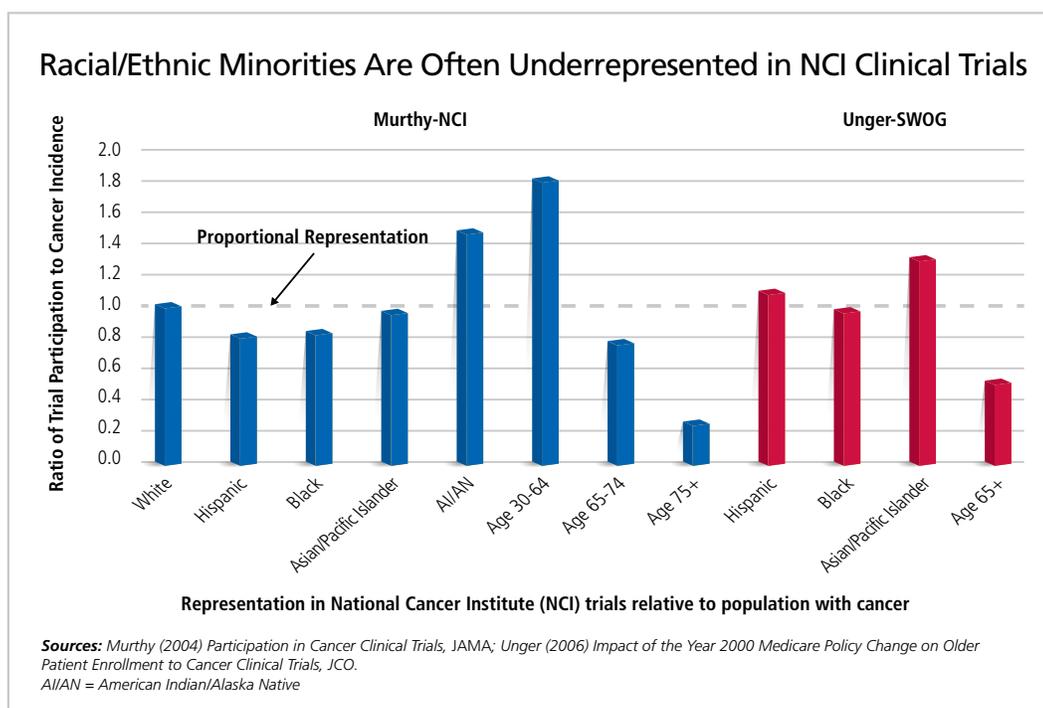
Figure 54: In this graph, groups with a ratio of clinical trial enrollment to cancer patient population (also known as an enrollment factor) of less than one are generally underrepresented in clinical trials. The largest disparity in clinical trial participation is for older adults, and it exists in both industry and NCI trials.

Note, Figure 54: Demographic representation was evaluated in NCI cooperative group trials as well as within SWOG (Southwest Oncology Group), one of the NCTN clinical trial groups. Bars represent the ratio of the demographic representation in clinical trials versus demographic representation in the broader population diagnosed with cancer. A ratio of 1.0 indicates that the demographic make-up of a clinical trial matches the demographic make-up of the population with cancer. A number greater than 1.0 indicates over-representation in clinical trials while a number less than 1.0 indicates under-representation in clinical trials.

For more information about clinical trials, please see ACS CAN's newest report titled "Barriers to Patient Enrollment in Therapeutic Clinical Trials for Cancer: A Landscape Report."

https://www.acscan.org/policy-resources/clinical-trial-barriers

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22 National Institutes of Health. Revision: NIH Policy and Guidelines on the Inclusion of Individuals Across the Lifespan as Participants in Research Involving Human Subjects. NOT OD 18 116. https://grants.nih.gov/grants

Because cancer patients from racial/ethnic minority groups are more likely to be uninsured than others, they also are more likely to be diagnosed with cancer at a later stage, when survival rates are lower.

Overview

Early detection of cancer through screening saves lives and reduces health care costs.[1] Screening can help prevent some cancers altogether – such as colorectal and cervical cancer—through detection and removal of precancerous lesions. Screening also offers the opportunity to detect some cancers early, when treatment is less extensive, less costly, and more likely to be successful. Yet many Americans still do not have access to preventive services that could save their lives. In particular, racial and ethnic minorities and persons of lower socioeconomic status (SES) are less likely than others to receive timely cancer screenings.[2, 3, 4]

Differences in insurance and access to care largely explain the screening disparities found among minorities and those of lower SES. As shown in the previous section, minorities and the uninsured/underinsured are more likely to receive a cancer diagnosis at later stages, as they are less likely to seek care (including screenings) until their symptoms and the cancer have progressed (see Figure 39, page 64). This may be due, in part, to the

financial costs associated with cancer screenings and the possibility of needing costly cancer treatments if cancer is detected at screening. Research has shown that even small out-of-pocket costs can deter individuals with limited financial resources from seeking health care services, including preventive screenings.[5, 6, 7]

Structural and cultural barriers also significantly contribute to the disparities in the prevention and early detection of cancers in minority and lower SES populations. Structural barriers to preventive care include out-of-pocket costs, lack of transportation, lack of child care, health literacy challenges, and lack of provider referrals. From a cultural standpoint, lack of language services, low awareness of screening recommendations, embarrassment about the procedure, fear of a cancer diagnosis, distrust of the medical institution, and poor patient-physician communication are factors that delay or cause individuals to forego cancer screenings. Additionally, some ethnic minority groups have beliefs about cancer screenings and preventive

behaviors that may deter them from obtaining timely services, including beliefs about who is at risk for specific cancers and fear of pain or harm from the screening procedure.[8] Overcoming these informational barriers are critical to closing the disparities gap.

Prevention and early detection are central to the Society's and ACS CAN's mission of helping save lives, celebrate lives, and lead the fight for a world without cancer. The Society has screening guidelines for breast, cervical, colorectal, lung, and prostate cancer (see ACS Guidelines in the Appendix, page 152).

Breast Cancer – Screening

Mammography is a low-dose x-ray procedure used to detect breast cancer before it can be felt. Early detection with mammography can allow for less extensive treatment and reduces breast cancer mortality. Among women 40 years of age and older, according to 2015 National Health Interview Survey (NHIS) data, 50.2 percent reported having

had a mammogram within the past year and 64.3 percent reported having had one within the past two years.

For more information on breast cancer screening, see page 152 for the American Cancer Society's screening guidelines.

Mammography among Women 40 Years and Older, US, 2015

Asians, American Indian/Alaska Natives, and Hispanics Are Less Likely to Have Had a Recent Mammogram

	White	Black	Hispanic	American Indian/Alaska Native	Asian
Within the past year	50.3	55.4	45.7	46.1	47.1
Within the past two years	64.8	68.8	60.8	60.1	59.4

Note: Estimates are age-adjusted to the 2000 US standard population and do not distinguish between examinations for screening and diagnosis. Estimates for White, Black, American Indian/Alaska Native, and Asian are among non-Hispanics. Estimate for Asians does not include Native Hawaiians or other Pacific Islanders.
Source: *Centers for Disease Control and Prevention (CDC). National Health Interview Survey (NHIS), 2015.*

Figure 55: The proportion of women who have had a mammography in the past two years ranges from 59 percent in Asians to 69 percent in Blacks. Breast cancer screening prevalence is generally similar between White and Black women, but is slightly lower among Hispanics, American Indian/Alaska Natives, and Asians. Despite having slightly higher screening rates than Whites, the later stage at diagnosis found among Black women (see Figure 21, page 46) has been largely attributed to longer intervals between mammograms and lack of timely follow-up of abnormal results.[9, 10, 11, 12] Geographic disparities in women receiving a mammography also exist (see Map 13, page 85), which may partly contribute to geographic variations in breast cancer occurrence.

Uninsured Women 40 to 64 Years Are Less Likely than Insured Women to Have Had a Mammogram

Within the past year
- Uninsured: 20.9
- Insured: 52.5

Within the past two years
- Uninsured: 30.7
- Insured: 67.8

Prevalence %

■ Uninsured   ■ Insured

Note: Estimates are age adjusted to the 2000 US standard population and do not distinguish between examinations for screening and diagnosis.
Source: Centers for Disease Control and Prevention (CDC). National Health Interview Survey (NHIS), 2015.

Figure 56: The prevalence of insured women 40 to 64 years of age who got a mammogram within the past two years (68 percent) is twofold that of uninsured women (31 percent).

Additional Disparities

Women with lower educational attainment (some high school or less) are less likely than those with higher educational attainment (high school diploma/GED or greater) to have had a mammography in the past two years.

Geographic Variation of Breast Cancer Screening (%), Mammography within the Past Two Years, Uninsured Women 40 to 64 Years of Age, 2016

Legend:
- 26.8 - 39.6
- 39.7 - 42.4
- 42.5 - 49.1
- 49.2 - 54.2
- 54.3 - 62.9
- Data Unavailable
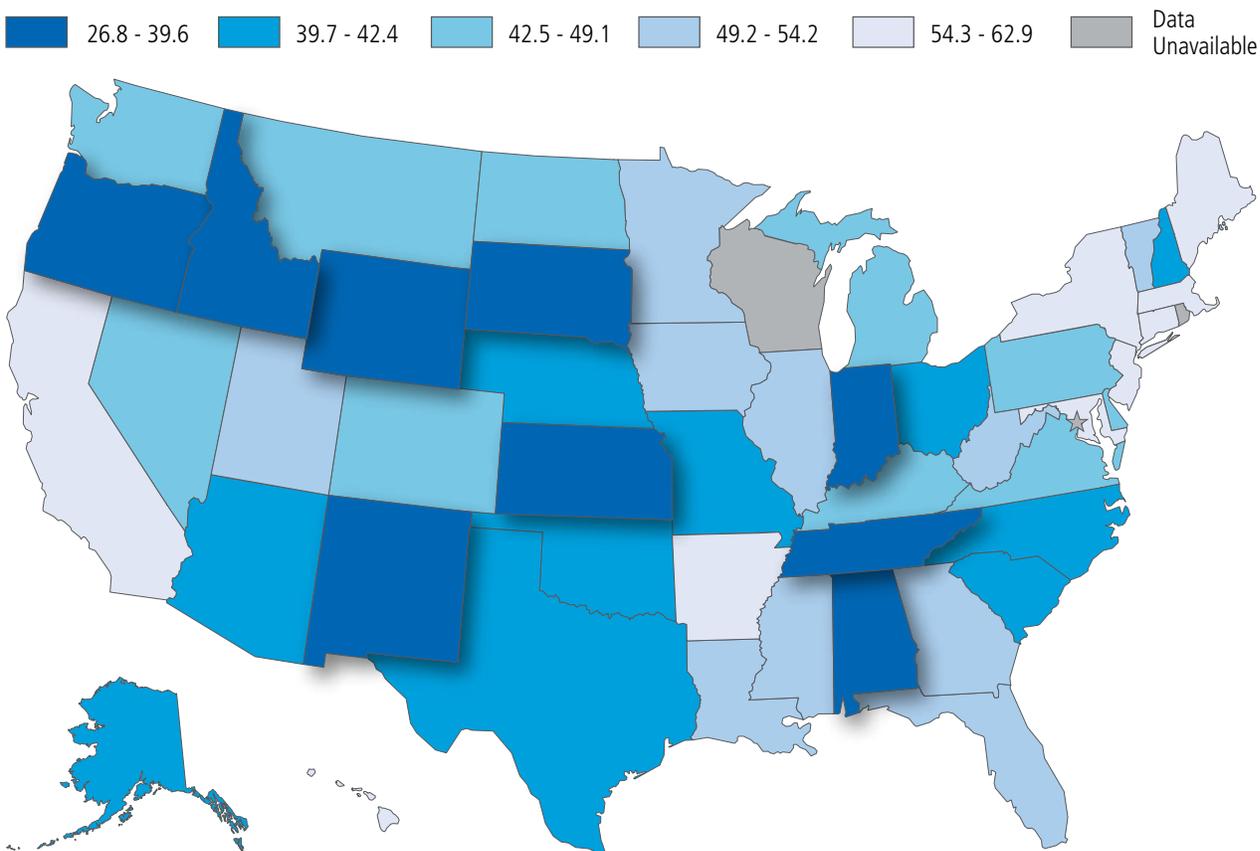
Note: The mammography prevalence estimates do not distinguish between examinations for screening and diagnosis. Estimates for the District of Columbia, Rhode Island, and Wisconsin not presented due to instability.
Source: Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System (BRFSS), 2016. Public-use data file and documentation. Available from URL: https://www.cdc.gov/brfss/index. html.

Map 13: Reported prevalence of mammograms in the past two years among uninsured women 40 to 64 years of age, all races combined, ranged from 63 percent in New York to 27 percent in Idaho. The prevalence of mammography screening among uninsured women in the past two years is lowest among states in the Midwest, parts of the Northwest, and Appalachia region as compared to other states.

Racial and ethnic minorities and persons of lower socioeconomic status (SES) are less likely than others to receive timely cancer screenings.[2, 3, 4]

Colorectal Cancer – Screening

Screening can prevent colorectal cancer (CRC) through the detection and removal of precancerous growths, as well as detect cancer at an earlier stage, when treatment is usually less extensive and more successful. According to 2015 NHIS data, among adults 50 years of age and older, 62.6 percent reported having either a fecal occult blood test (FOBT)/ fecal immunochemical test (FIT) within the past year, a sigmoidoscopy within the past five years, or a colonoscopy within the past 10 years.

For more information on colorectal cancer screening, see page 153 for the American Cancer Society's screening guidelines.

Colorectal Cancer Screening (%), Adults 50 Years and Older, US, 2015

Prevalence of Colorectal Cancer Screening Lower among Non-Hispanic Asians and Hispanics than Other Races/Ethnicities

Note: A combined stool/endoscopy is either a FOBT or FIT within the past year, sigmoidoscopy within the past five years, or a colonoscopy within the past 10 years. Estimates are age-adjusted to the 2000 US standard population and do not distinguish between examinations for screening and diagnosis. Estimates for Asians does not include Native Hawaiians or other Pacific Islanders.
Source: Centers for Disease Control and Prevention (CDC). National Health Interview Survey (NHIS), 2015.

Figure 57: Colorectal cancer screening is defined as stool/endoscopy. The proportion of adults 50 years and older who had a stool test or an endoscopy within the recommended timeframe is lowest in Hispanics and non-Hispanic Asians. In addition to other factors, health care barriers due to language and beliefs about cancer contribute to these lower screening rates.[13, 14] Screening prevalence among non-Hispanic Whites and non-Hispanic Blacks are higher than that among other races/ethnicities.

Uninsured Adults Are More than Half as Likely to Be Screened for CRC than Insured Adults, Ages 50 to 64 Years

Note: Estimates are age- adjusted to the 2000 US standard population and do not distinguish between examinations for screening and diagnosis. Colorectal cancer screening defined as either a FOBT or FIT within the past year, sigmoidoscopy within the past five years, or a colonoscopy within the past 10 years.
Source: Centers for Disease Control and Prevention (CDC). National Health Interview Survey (NHIS), 2015.

Figure 58: Among aged 50 to 64 years, the prevalence of colorectal cancer screening in insured adults is more than double that in uninsured adults.

Additional Disparities

- More adults aged 65 to 75 years are up-to-date with screening (78.4 percent) than those aged 50 to 64 years (61.8 percent).
- CRC screening prevalence is lowest among those with lower levels of educational attainment. For those 50 years and older with less than a high school degree, only about 47 percent reported having had a stool test or endoscopy within the recommended timeframe compared to about 71 percent of college graduates.
- CRC screening prevalence was higher in the gay/lesbian population (72 percent) compared to other groups surveyed (straight 63 percent; bisexual 53 percent).

Geographic Variation of Colorectal Cancer Screening (%), Combined Stool/Endoscopy, Uninsured Adults 50 to 64 Years of Age, 2016

■ 13.9 - 26.6	■ 26.7 - 32.2	■ 32.3 - 35.6	■ 35.9 - 39.6	■ 39.7 - 56.6	■ Data Unavailable

Note: Combined stool/endoscopy defined as either fecal occult blood test (FOBT) or fecal immunochemical test (FIT) within the past year or sigmoidoscopy within the past five years or colonoscopy within the past 10 years. The colorectal cancer screening prevalence estimates do not distinguish between examinations for screening and diagnosis. Estimates for District of Columbia not provided due to instability.
Source: Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System (BRFSS), 2016. Public-use data file and documentation. Available from URL: https://www.cdc.gov/brfss/index.html.

Map 14: The prevalence of colorectal cancer screening varies substantially by state. In 2016, among adults aged 50 to 64 years without insurance, those in the South and Midwest had lower colorectal cancer screening prevalence as compared to their counterparts in the Northeast and Mid-Atlantic. As seen in the first section of this Chartbook, incidence and mortality rates for colorectal cancer are highest in the South, particularly in the Mississippi Delta region (see Maps 4 and 5, pages 24 and 25). Among adults aged 50 to 75 years living in rural areas of the US, only about 43 percent of Hispanics reported meeting the colorectal cancer screening recommendations compared to about 62 percent of non-Hispanic Whites.[15]

A small area estimation model[16] has shown geographic variation in the estimated prevalence of colorectal cancer screening among states and among counties within states. There are larger disparities at the county level by race/ethnicity for non-Hispanic Blacks, Asians, American Indians and Alaska Natives, and Hispanics.[17]

Increasing Colonoscopy Screening in Disparate Populations: Results from an Evaluation of Patient Navigation in the New Hampshire Colorectal Cancer Screening Program

Patient navigators aide patients through the health care system, including the complex process of colorectal cancer screening. For patients diagnosed with cancer, navigators provide aid from the time of diagnosis through survivorship. Navigators help increase patients access to care, remove barriers, and increase coordination of care. Unfortunately, many patients do not have access to these types of navigators.

Patient Navigation May Increase Screening Uptake

Patients Receiving Patient Navigation Are More Likely to Complete Their Colonoscopy

Measure	No Patient Navigator Group %	Patient Navigator Group %
Colonoscopy Completed	69	96
Adequate Bowel Preparation Quality	88	98
Missed Appointment / No Show	16	0
Cancellation <24h before Appointment	16	1
Results Communicated to Patient	96	100
Results Communicated to Primary Care Provider	48	100
Final Recommended Rescreening Interval Consistent with Clinical Guidelines	82	100

No Patient Navigator Group %   Patient Navigator Group %

Source: *Rice K, Gressard L, DeGroff A, et al. Increasing colonoscopy screening in disparate populations: Results from an evaluation of patient navigation in the New Hampshire Colorectal Cancer Screening Program.* Cancer. 2017; 123(17): 3356-66.

Figure 59: Results of an evaluation study of the New Hampshire Colorectal Cancer Screening Program patient navigation model show hopeful outcomes related to colonoscopy screening among patients with patient navigation. Specifically, patients in the navigator group were more likely to complete their colonoscopy and not miss an appointment. Further, in the navigator group, all patients and their primary care providers received the test results.

Prostate Cancer – Screening

Informed decision-making between a man and his health care provider is an important part of prostate cancer screening. The decision to be screened for prostate cancer should take into account the uncertainties, risks, and potential benefits of screening. If a man chooses to have prostate cancer screening after thorough discussion with his health care provider, he should be tested with the prostate specific antigen (PSA) blood test. A digital rectal exam (DRE) may also be used as part of screening.

Asymptomatic men who have at least a 10-year life expectancy and are at average risk should receive information about prostate cancer screening beginning at age 50; men at higher risk should receive this information at age 40 or 45, depending on individual risk profile. Asymptomatic men who have less than a 10-year life expectancy should not be offered prostate cancer screening. Shared decision-making between a man and his health care provider should continue on a regular basis as new information becomes available regarding the risks and benefits of prostate cancer screening and as a man's health and preferences change.

For more information on prostate cancer screening, see page 153 for the American Cancer Society's screening guidelines.
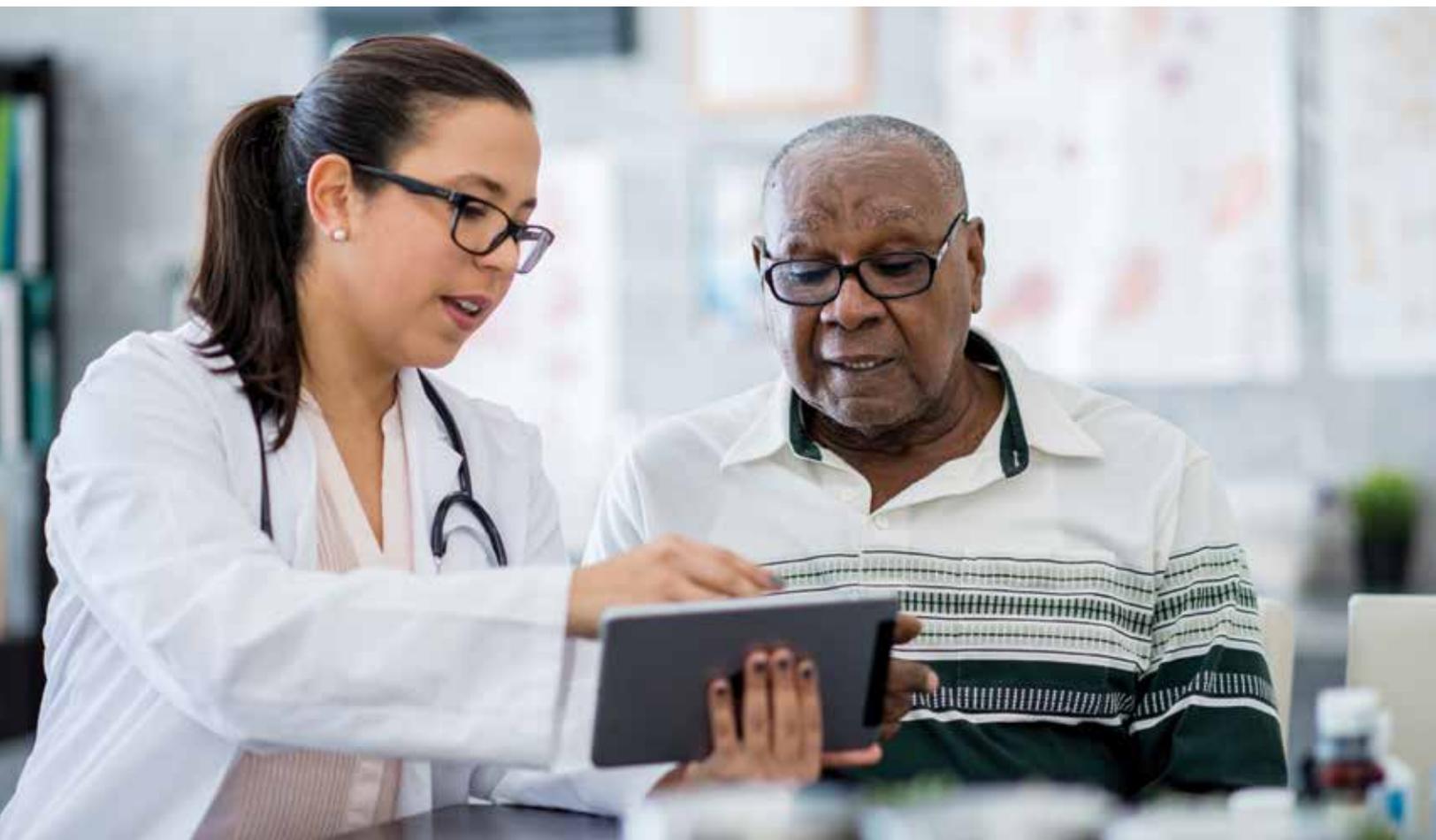
Prostate Cancer Test (%) within the Past Year, Men 50 Years and Older, US, 2015

Minority Populations Less Likely to Receive Prostate Cancer Test

Note: *Estimate for American Indian/Alaska Native not provided due to instability. Estimates for White, Black, and Asian are among non-Hispanics. The Asian sub-group does not include Native Hawaiians or other Pacific Islanders. Estimates are age adjusted to the 2000 US standard population and are among men who have not been diagnosed with prostate cancer.*
Source: *Centers for Disease Control and Prevention (CDC). National Health Interview Survey (NHIS), 2015.*

Figure 60: The percentage of men age 50 and older who received routine prostate-specific antigen (PSA) testing in the past year varied from 17 percent in Asians to 37 percent in Whites.

Prevalence of PSA Testing among the Insured Nearly Three Times Higher than among the Uninsured

Uninsured 10.2

Insured 29.8

Prevalence %

Note: PSA: prostate specific antigen. Estimates are age adjusted to the 2000 US standard population and are among men who have not been diagnosed with prostate cancer.
Source: Centers for Disease Control and Prevention (CDC). National Health Interview Survey (NHIS), 2015.

Figure 61: Among men 50 to 64 years, the prevalence of receiving a prostate cancer test within the past year is nearly three times higher for the insured than the uninsured.

Cervical Cancer – Screening

Regular screening for cervical cancer— using the Pap test and human papillomavirus (HPV) DNA test— is critical to preventing cervical cancer, by identifying precancerous lesions and catching cervical cancer early when survival rates are the highest. Nearly all cervical cancers are preventable. The disease begins as a precancerous lesion that if detected via screening and removed early can prevent cancer from developing. Based on 2015 NHIS data, 81.4 percent of women 21 to 65 years of age reported having had a Pap test within the past three years.

In addition to screening, there is potential to further reduce the occurrence of cervical cancer with the human papillomavirus (HPV) vaccine (see HPV section in Cancer Prevention, page 115). Of note, because it does not protect against established infections or all HPV types, HPV vaccination supplements rather than replaces cervical cancer screening.

For more information on cervical cancer screening, see page 152 for the American Cancer Society's screening guidelines.

Cervical Cancer Screening in Women 21 to 65 Years by Race and Ethnicity, US, 2015

Note: Estimates are age-adjusted to the 2000 US standard population and do not distinguish between examinations for screening and diagnosis. Estimates for White, Black, American Indian/Alaska Native, and Asian are among non-Hispanics. Estimate for Asians does not include Native Hawaiians or other Pacific Islanders. Estimates are among women with no history of hysterectomy.
Source: Centers for Disease Control and Prevention (CDC). National Health Interview Survey (NHIS), 2015.

Figure 62: Prevalence of recent Pap testing is lower among American Indian/Alaska Natives, Asians, and Hispanics compared to Whites and Blacks.

Additional Disparities

Cervical cancer incidence rates (see Figure 12, page 35) are highest among Hispanic women (followed closely by Black and American Indian/Alaska Native (AIAN) women) and, like AIANs, Hispanics are less likely to be insured (see Figure 34, page 58). The higher incidence rates among Hispanic women is partly explained by Hispanic women being less likely than women of other races/ethnicities to return for recommended follow-up after an abnormal Pap test.[18] In addition:

- Women of Cuban and Central/South American origin have the lowest rates of Pap tests in the past three years among all Hispanic women in the US.[19]
- Hispanic women who have been in the US for less than 10 years are significantly less likely to have had a Pap test in the last three years compared to those who have been in the country for 10 or more years.[20]
- Hispanic women with public insurance or who are uninsured are significantly less likely to have had a Pap test.[21]

Uninsured Women are Less Likely to Receive a Pap Test Compared to Insured Women, Ages 21 to 64 Years

Uninsured — 61
Insured — 84

Prevalence %

Note: Estimates are age-adjusted to the 2000 US standard population and do not distinguish between examinations for screening and diagnosis. Estimates are among women with no history of hysterectomy.
Source: Centers for Disease Control and Prevention (CDC). National Health Interview Survey (NHIS), 2015.

Figure 63: Among women ages 21 to 64 years, about 61 percent of those who were uninsured reported having had a Pap test in the past three years, compared to about 84 percent of insured women.

Additional Disparities

- Women with lower education attainment (some high school or less) are less likely to be screened for cervical cancer (only 70 percent are screened) than those with a higher educational attainment (college graduate – 89 percent are screened).
- The prevalence of Pap testing was lower among gay and lesbian women (74 percent) than among straight (82 percent) and bisexual women (80 percent).
- Pap testing prevalence was similar between women born in US territories (74 percent) and women who have been in the US for 10+ years (76 percent).

Geographic Variation of Cervical Cancer Screening (%), Pap Test within the Last Three Years, Women 21 to 65 Years of Age, 2016

73.2 – 77.9	78.0 – 79.4	79.5 – 80.9	81.0 – 81.9	82.0 – 85.1	Data Unavailable
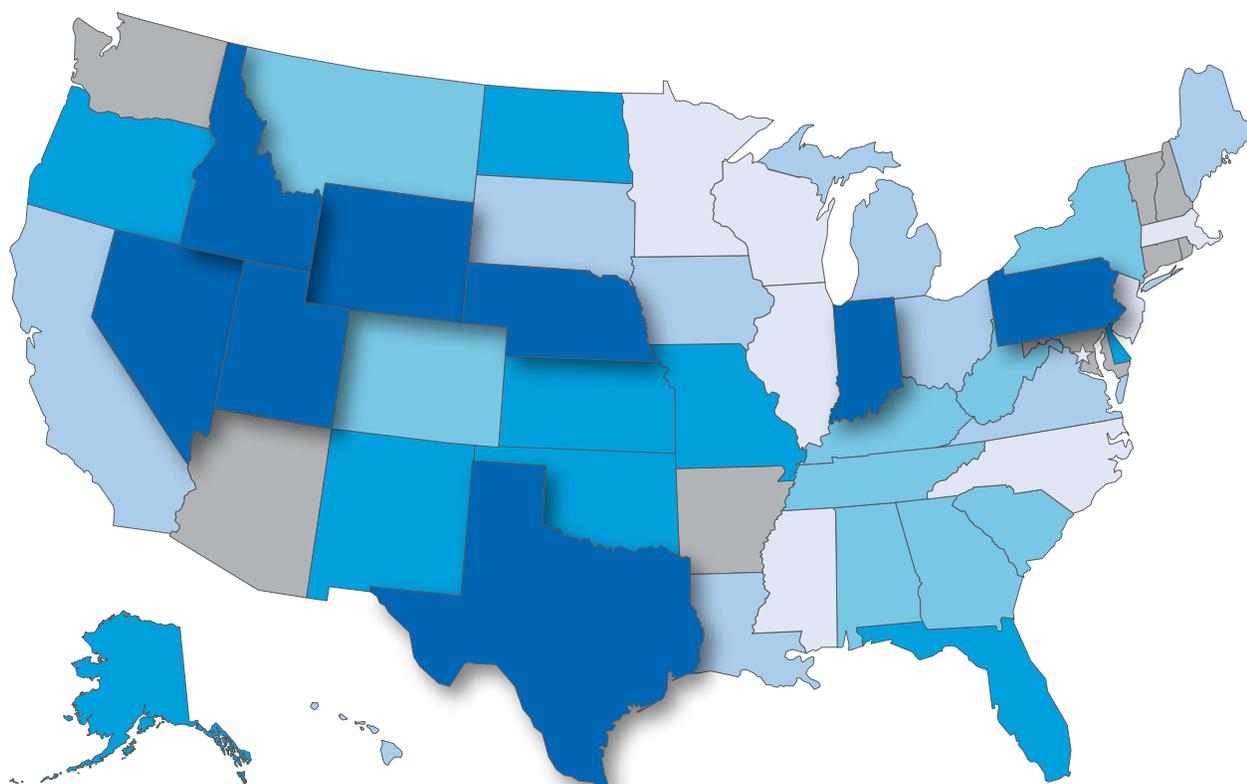
Notes: Data are among women with an intact uterus. The cervical cancer screening prevalence estimates do not distinguish between examinations for screening and diagnosis.
Source: Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System (BRFSS), 2016. Public-use data file and documentation. Available from URL: https://www.cdc.gov/brfss/index. html.

Map 15: The prevalence of receiving a Pap test within the last three years for women between the ages of 21 and 65 years of age varies by region. While over 80 percent of women in the US reported receiving a Pap test in the past 3 years, women in the Midwest and Southwest were less likely to have received one as compared to women in other regions, with rates ranging from 73.2 percent in Idaho and Wyoming and 85.1 percent in the District of Columbia.

Differences in insurance and access to care largely explain the screening disparities found among minorities and those of lower SES.[22]

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Overview

A substantial proportion of cancers can be prevented, including all cancers caused by tobacco use. Further, about one-fifth of all cancers diagnosed in the US are caused by a combination of excess body weight, physical inactivity, excess alcohol consumption, and poor nutrition, and thus could also be prevented.[1] Cancers caused by certain infections (e.g., human papillomavirus [HPV], hepatitis B or C viruses) can be prevented by vaccination, treatment of the infection before it causes cancer, or by modifying behaviors to avoid infection. Many of the more than five million skin cancer cases that are diagnosed annually could be prevented by protecting skin from excessive sun exposure or by not using indoor tanning devices.

Unfortunately, many racial and ethnic minorities and persons of lower socioeconomic status (SES) have higher rates of risky health behaviors,[2] further contributing to the disparities gap. For example, both smoking and obesity prevalence are higher in populations of lower SES, partly because of marketing strategies by tobacco companies[3] and fast food chains[4] that target these populations. Moreover, environmental and/or community factors often limit opportunities for physical activity and access to affordable fresh fruits and vegetables. Although not represented in this chartbook, higher prevalence of cancer-causing infections, workplace exposures, and other environmental exposures also contribute to higher incidence rates among those with lower SES.[5]

Tobacco

Smoking remains the world's most preventable cause of death. Smoking cigarettes increases the risk of cancers of the oral cavity and pharynx, larynx, lung, esophagus, pancreas, uterine cervix, kidney, bladder, stomach, colorectum, liver, and acute myeloid leukemia.[6] Accumulating evidence suggests that smoking also increases the risk of advanced-stage prostate cancer.[7, 8] The proportion of deaths attributable to smoking varies across cancer sites, but ranges from about 10 percent for colorectal and pancreatic cancers to about 80 percent for lung, bronchus, and tracheal cancers combined (see infographic, page 100).[9, 10]

In the US, tobacco-related cancer incidence and mortality decreased from 2004 to 2013, though these declines were not uniform across states nor population subgroups.[11] According to research conducted by Society epidemiologists, about three in 10 cancer deaths in the US overall are attributable to smoking, though in many Southern states, smoking causes as much as 40 percent of all cancer deaths in men.[12, 13, 14] Even with overall decreases in the use of tobacco, populations targeted by the tobacco industry, such as racial/ethnic minority groups; those of lower SES; the lesbian, gay, bisexual, and transgender (LGBT) community; and individuals with mental illness and addictions, still have significant rates of tobacco usage.[15]

For more on how to reduce risk of cancer from tobacco products, please visit https://www.cancer.org/healthy/stay-away-from-tobacco.html.

Proportion of Cancer Deaths Attributable to Cigarette Smoking in Both Sexes Combined, Adults 30 Years and Older, US, 2014

Oral Cavity, Pharynx, Nasal Cavity, Paranasal Sinus — 47%

Larynx — 72%

Esophagus — 50%

Lung — 81%

Myeloid Leukemia — 15%

Liver — 22%

Stomach — 17%

Kidney, Renal Pelvis, Ureter — 17%

Pancreas — 10%

Urinary Bladder — 45%

Colorectum — 11%

Cervix — 20%

Source: *Islami F, Goding Sauer A, Miller KD, et al. Proportion and number of cancer cases and deaths attributable to potentially modifiable risk factors in the United States.* CA Cancer J Clin. *2018; 68: 31-54.*

Infographic 1: The proportion of cancer deaths attributable to cigarette smoking for both sexes combined differs by cancer site, ranging from about 10 to 11 percent for pancreatic and colorectal cancer to about 80 percent for lung cancer.

Current Cigarette Smoking (%), Adults 18 Years and Older by Racial/Ethnic Groups, Sex, Health Insurance Coverage, and Poverty Status, 2016

American Indian/Alaska Native Adult Females Have the Highest Smoking Prevalence Compared to All Other Racial/Ethnic Groups

Note: *Data from the National Health Interview Survey, United States, 2016. Current cigarette smoking is defined as having ever smoked 100 or more cigarettes in lifetime and smoking every day or some days at time of survey. Excludes 89 respondents of non-Hispanic unknown race. Unless otherwise indicated, all racial/ethnic groups are non-Hispanic. Hispanics can be of any race. Estimate for Asians does not include Native Hawaiians or other Pacific Islanders. These estimates differ slightly from those published in Cancer Facts & Figures Early Detection Facts & Figures Tables & Figures 2018 due to age adjustment.*
Source: *Jamal A, Phillips E, Gentzke AS, et al. Current cigarette smoking among adults — United States, 2016. MMWR. 2018; 67(2):53-9.*

Figure 64: Smoking prevalence has decreased over the past several years, but remains higher in non-Hispanic American Indian/Alaska Native (AIAN), non-Hispanic Black, and non-Hispanic White males and females than in Hispanic or Asian populations. AIANs have the highest smoking prevalence of any group. For example, the percentage of AIAN females who smoke is almost seven-fold that of Asian females (who have the lowest smoking prevalence).

Uninsured Adults and Adults on Medicaid Have a Higher Prevalence of Smoking Compared to Other Individuals

Prevalence %

Category	Male	Female
Private Insurance	13.5	10.1
Medicaid	27.7	23.9
Medicare Only (aged >65 yrs)	11.8	9.1
Other Public Insurance	21.9	17.1
Uninsured	32.8	22.6

Male ■ **Female** ■

Note: Data from the National Health Interview Survey, United States, 2016. Current cigarette smoking is defined as having ever smoked 100 or more cigarettes in lifetime and smoking every day or some days at time of survey. Other public coverage: includes adults who do not have private insurance, Medicaid, or other public coverage, but who have any type of military coverage, coverage from other government programs, or Medicare (for those aged <65 years). This category also includes adults who are covered by other government programs.
Source: *Jamal A, Phillips E, Gentzke AS, et al. Current cigarette smoking among adults — United States, 2016. MMWR. 2018; 67(2):53-9.*

Figure 65: Those who have health insurance coverage through Medicaid or are uninsured have a higher smoking prevalence than their counterparts. The percentage of uninsured males who smoke is more than two-fold that of the privately insured. The prevalence of cigarette smoking among females in Medicaid is similar to that among uninsured females and over double that of females with private insurance.

Smoking in Adults Living Below the Poverty Level Is Two Times Higher than Adults Above the Poverty Level

Note: *Data from the National Health Interview Survey, United States, 2016. Current cigarette smoking is defined as having ever smoked 100 or more cigarettes in lifetime and smoking every day or some days at time of survey. 2016 poverty status estimates are based on reported family income and family size, using the 2015 poverty thresholds published by the US Census Bureau.*
Source: *Jamal A, Phillips E, Gentzke AS, et al. Current cigarette smoking among adults — United States, 2016. MMWR. 2018; 67(2):53-9.*

Figure 66: The prevalence of smoking among those living below the poverty level is nearly double the smoking prevalence among those at or above the poverty level.

Additional Disparities

Those aged 25 to 64 years had the highest smoking prevalence for both males (20 to 21 percent) and females (15 to 17 percent).

Current Cigarette Smoking in Adults (>18 Years) by Educational Attainment

Smoking Prevalence Higher among Those with High School Degree or Less Compared to Those with Higher Educational Degree, 1966 to 2016

Original Caption: Current Cigarette Smoking Prevalence by Education Status (National Health Interview Survey, 1966-2016). Note that the analysis included only adults aged 25 years or older.
Reproduced with permission from Drope et al. (2018): Drope J, Liber AC, Cahn Z, Stoklosa M, Kennedy R, Douglas CE, Henson R, Drope J. Who's still smoking? Disparities in adult cigarette smoking prevalence in the United States. CA: J Clin Oncol. 68(2): 106–15. Wiley, publisher.

Figure 67: Fifty years ago, prevalence was fairly similar across education groups, with nearly 40 percent of college graduates smoking and about 45 percent of other education groups also smoking. However, while only 6.5 percent of college-educated individuals continued to smoke in 2016, the prevalence among those with a high school education or less was more than threefold (23 percent).

Cigarette Smoking in Adults (>18 Years) by Sexual Orientation

Smoking Prevalence Higher among Lesbian, Gay, Bisexual, Transgender Identifying Males than Heterosexuals

Original caption: Lesbian, Gay, Bisexual, and Transgender Smoking Rates. Data from NHIS 2016.
Reproduced with permission from Drope et al. (2018): Drope J, Liber AC, Cahn Z, Stoklosa M, Kennedy R, Douglas CE, Henson R, Drope J. Who's still smoking? Disparities in adult cigarette smoking prevalence in the United States. CA: J Clin Oncol. 68(2): 106–15. Wiley, publisher.

Figure 68: In general, smoking prevalence among lesbian, gay, bisexual, and transgender (LGBT) individuals in the US is typically higher than those among heterosexuals.

Geographic Variation of Current Cigarette Smoking (%) in Adults, 2016

Geographic Variation of Current Cigarette Smoking (%) Adults 18 Years and Older, 2016

8.8 - 14.3	14.4 – 16.4	16.5 – 18.0	18.1 – 20.8	20.9 – 24.8

Note: Current cigarette smokers are defined as individuals having smoked more than 100 cigarettes in their entire lifetime and are current smokers (regular and irregular).
Source: Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System (BRFSS), 2016. Public-use data file and documentation. Available from URL: https://www.cdc.gov/brfss/index.html.

Map 16: Smoking prevalence varies by state, with West Virginia having the highest smoking prevalence (24.8 percent) – almost three times higher than Utah (the lowest, at 8.8 percent). The prevalence of smoking is higher in portions of the Midwest, South, Appalachia, and Alaska than in the Northeast and West.

Current Adult Cigarette Smoking Prevalence by Ohio County, 2015

Percent of Adults

| | 0 – 15 | | 15 – 20 | | 20 – 25 | | 25 – 30 | | 30 – 35 | | 35 – 40 | | Data Unavailable |
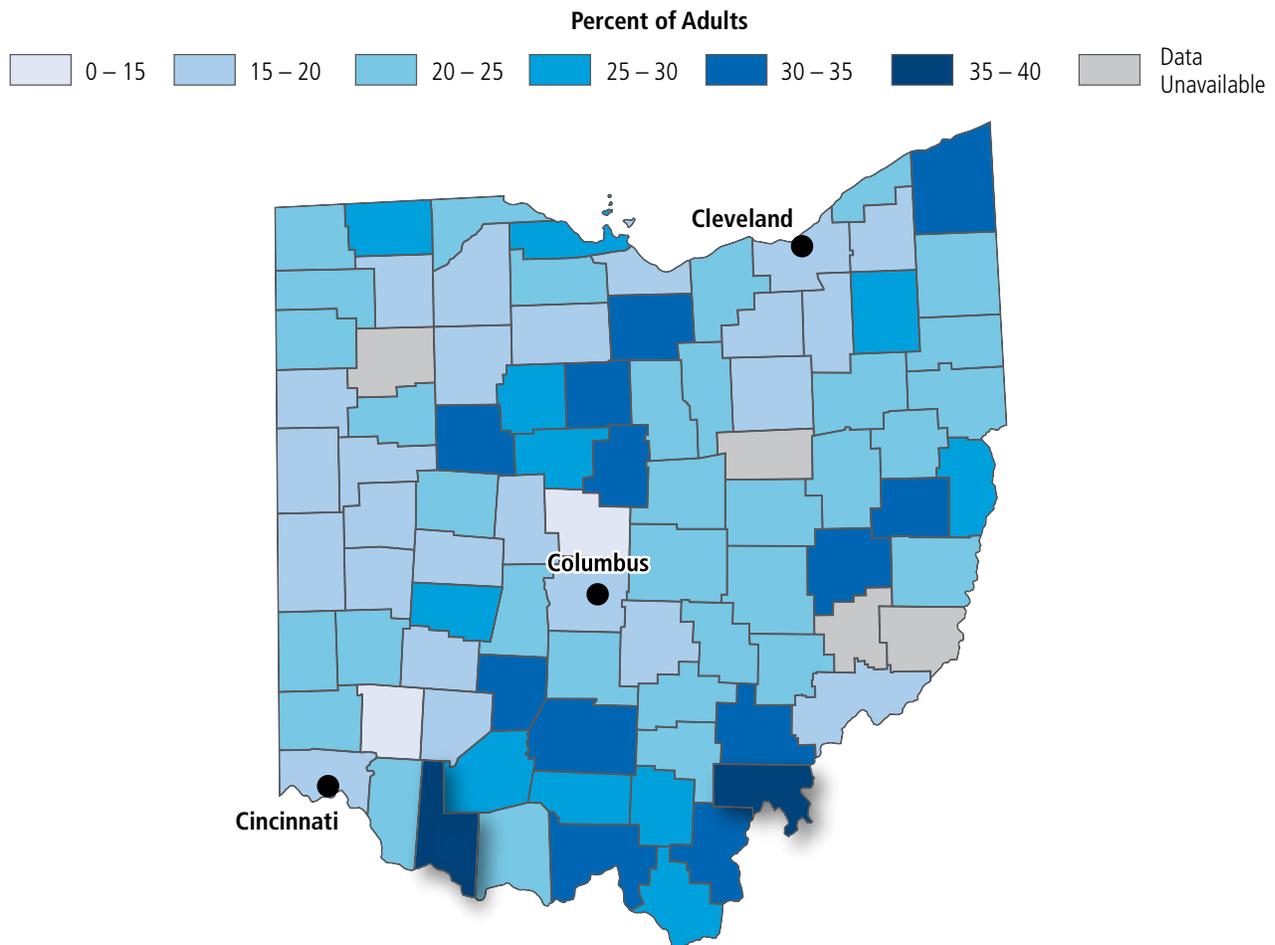
Original caption: *Current Adult Cigarette Smoking Prevalence by Ohio County (Behavioral Risk Factors Surveillance System, 2015).*
Source: *Reproduced with permission from Drope, et al. (2018): Drope J, Liber AC, Cahn Z, Stoklosa M, Kennedy R, Douglas CE, Henson R, Drope J.* Who's still smoking? *Disparities in adult cigarette smoking prevalence in the United States.* CA: J Clin Oncol. *68(2): 106–15. Wiley, publisher.*

Map 17: In addition to interstate disparities, there are considerable disparities within states at the county level (and lower). In Ohio, for example, smoking prevalence is higher in rural areas, particularly those in or bordering on Appalachia (counties along parts of the southern and eastern border of the state). Similar intrastate patterns are visible throughout the US.

**Current Electronic Cigarette (E-Cigarette) Use (%),
Adults 18 Years and Older, US, 2016**

Non-Hispanic American Indian/Alaska Native Adults Have Higher Prevalence of E-Cigarettes Use Compared to Other Racial/Ethnic Groups

Group	Prevalence %
Non-Hispanic White	4.1
Non-Hispanic Black	2.0
Non-Hispanic AIAN	10.6
Non-Hispanic Asian	2.8
Hispanic	1.4

Prevalence %

Note: *Estimates are age-adjusted to the 2000 US standard population. The Asian sub-group does not include Native Hawaiians or other Pacific Islanders.*
Source: *National Center for Health Statistics (NCHS). National Health Interview Survey (NHIS), 2016. Public-use data file and documentation. Available from: https://www.cdc.gov/nchs/nhis/data-questionnaires-documentation.htm. Accessed: October 2017.*

Figure 69: Non-Hispanic Asian, Hispanic, and non-Hispanic Black adults are less likely to be current electronic cigarette (e-cigarette) users as compared to non-Hispanic Whites (NHW) and non-Hispanic American Indians/Alaska Natives (AIAN). The prevalence of e-cigarette use among non-Hispanic AIAN adults is over two-fold that of NHW adults.

Additional Disparities

- Four percent of males report currently using e-cigarettes, whereas 2.7 percent of females report using them.
- Current e-cigarette usage is higher among individuals 18 to 24 and 25 to 44 years of age (4.7 and 4.2 percent, respectively) as compared to individuals 45 to 64 and 65 and older (2.9 and 1.0 percent, respectively).

Current Cigar Smoking (%), Adults 18 Years and Older, US, 2016

Non-Hispanic American Indian/Alaska Native and Black Adults More Likely to Currently Smoke Cigars

Group	Prevalence %
Non-Hispanic White	4.3
Non-Hispanic Black	5.3
Non-Hispanic AIAN	5.3
Non-Hispanic Asian	1.4
Hispanic	2.7

Prevalence %

Note: Estimates are age-adjusted to the 2000 US standard population. The Asian sub-group does not include Native Hawaiians or other Pacific Islanders.
Source: National Center for Health Statistics (NCHS). National Health Interview Survey (NHIS), 2016. Public-use data file and documentation.
Available from: https://www.cdc.gov/nchs/nhis/data-questionnaires-documentation.htm. Accessed: October 2017.

Figure 70: Prevalence of current cigar smoking is higher among Non-Hispanic American Indian/Alaska Native and non-Hispanic Black adults (5.3 percent) than other racial/ethnic groups.

Current smokeless tobacco usage among US adults 18 years and older is higher in males (4.7 percent) than females (0.3 percent).[16]

Tobacco Product Use among Middle and High School Students by Racial/Ethnic Groups and Sex, US, 2016

High School Students More Commonly Use E-Cigarettes than Regular Cigarettes

Prevalence %

	Non-Hispanic White	Non-Hispanic Black	Hispanic	Other, Non-Hispanic
Electronic Cigarettes	13.7	6.2	10.3	5.4
Cigarettes	9.9	3.9	6.4	4.8
Cigars	7.9	9.5	7.2	3.7
Smokeless Tobacco	7.4	2.1	4.4	3.8
Hookah	4.5	4.1	6.4	3.4
Pipe Tobacco	1.4	1.2	1.2	

Non-Hispanic White   **Non-Hispanic Black**   **Hispanic**   **Other, Non-Hispanic**

Note: *Pipe tobacco estimates for Other, non-Hispanic: Data are statistically unreliable because sample size was <50 or relative standard error was >0.3.*
Source: *Jamal A, Gentzke A, Hu SS, et al. Tobacco use among middle and high school students - United States, 2011-2016. MMWR. 2017; 66(23):597-603.*

Figure 71: Among high school students, prevalence of e-cigarette use was higher than regular cigarettes. The prevalence of current e-cigarette use, cigarette smoking, and smokeless tobacco use was highest among non-Hispanic White students. Cigar smoking prevalence was highest among non-Hispanic Black students, while the prevalence of hookah smoking was highest among Hispanic students.

Additional Disparities

Among middle school students, the prevalence of having used e-cigarettes and smoking hookah is highest among Hispanics compared to non-Hispanic White (NHW) and non-Hispanic Black (NHB) students. However, the prevalence of cigar smoking is highest among NHB students.

Middle School Students More Commonly Use E-Cigarettes Compared to Other Tobacco Products

Prevalence %

Product	Male	Female
Electronic Cigarettes	5.1	3.4
Cigarettes	2.5	1.8
Cigars	2.7	1.7
Smokeless Tobacco	3	1.5
Hookah	2.1	1.9
Pipe Tobacco	0.8	0.6

Male ◼ Female ◼

Source: Jamal A, Gentzke A, Hu SS, et al. Tobacco use among middle and high school students - United States, 2011-2016. MMWR. *2017; 66(23):597-603.*

Figure 72: E-cigarettes were also the most commonly used tobacco product among middle school students. Male students are more likely than females to use any tobacco product.

Percentage of Middle and High School Students Who Reported Seeing Ads for Tobacco Products by Racial/Ethnic Group, US, 2000 to 2012

Pro-Tobacco Internet Advertisement Exposure Steadily Increasing for Middle and High School Students of All Racial/Ethnic Groups

	2000	2002	2004	2006	2009	2011	2012
	21.9	33.3	33.1	35.7	34.3	40	44.7
	22.8	35	30.5	32.4	37.1	38.2	39.7
	23.9	37	32.3	37	32.9	38.8	38.6
	22.6	35.9	33.5	35.3	36.9	38	42.3

Non-Hispanic White ———   Non-Hispanic Black ———   Non-Hispanic Asian ———   Hispanic ———

Note: *Analyses excluded U.S. middle and high school students who indicated "I do not use the Internet," with the proportion ranging from 3.1 percent (2011) to 19.8 percent (2000).*
Source: *Agaku IT, King BA, Dube SR. Trends in exposure to pro-tobacco advertisements over the Internet, in newspapers/magazines, and at retail stores among US middle and high school students, 2000–2012. Prev Med. 2014; 58:45-52.*

Figure 73: Exposure to pro-tobacco internet advertisements is an area where disparities are low, but the trend across all racial/ethnic groups has been rapidly increasing over the past few years, nearly doubling in all groups since 2000. Hispanic students and non-Hispanic White students report slightly higher exposure to pro-tobacco ads on the internet.

Both smoking and obesity prevalence are higher in populations of lower SES, partly because of marketing strategies by tobacco companies[3] and fast food chains[4] that target these populations.

Exposure to Pro-Tobacco Advertisement at Retail Stores Steadily Declining for Middle and High School Students among All Racial/Ethnic Groups, but Prevalence of Exposure Is Double That of Internet Ads

Prevalence %

	2000	2002	2004	2006	2009	2011	2012
Non-Hispanic White	90.8	90.9	86.7	87.8	87	84.9	80.2
Non-Hispanic Black	79.7	83.7	78.4	77.3	74.8	76.8	71.4
Non-Hispanic Asian	85.8	86.5	76	77.5	78.1	74.7	63.7
Hispanic	83.5	87	79.3	79.3	79	79.4	72.6

Note: *Analyses excluded U.S. middle and high school students who indicated "I never go to a convenience store, supermarket, or gas station", with the proportion ranging from 1.8% (2002) to 4.6% (2012).*
Source: *Agaku IT, King BA, Dube SR. Trends in exposure to pro-tobacco advertisements over the Internet, in newspapers/magazines, and at retail stores among US middle and high school students, 2000–2012.* Prev Med. *2014; 58:45-52.*

Figure 74: Although exposure to pro-tobacco ads at a retail store has been shifting down for both high schoolers and middle schoolers for all racial/ethnic groups relative to 2000, prevalence of seeing a pro-tobacco ad at retail stores is almost double that of internet ads.

Exposure to E-Cigarette Advertising among Middle and High School Students by Racial/Ethnic Group – US, 2014 to 2016

E-Cigarette Advertising Exposure Increasing Steadily for Middle and High School Students

Note: Estimates presented here include advertising exposure via retail stores, internet, television/movies, and newspaper/magazines.
Source: Marynak K, Gentzke A, Wang TW, Neff L, King BA. Exposure to electronic cigarette advertising among middle and high school students – United States, 2014-2016. MMWR. 2018; 67(10):294-99.

Figure 75: Exposure to e-cigarette advertisements has been steadily increasing across all racial/ethnic groups and grade levels in the past few years. Non-Hispanic White students report being exposed to e-cigarette ads slightly more than students in other racial/ethnic groups.

Additional Disparities

- In 2016, middle and high school students were more likely to be exposed to e-cigarette advertising in retail stores (68 percent), followed by the Internet (40.6 percent).
- In 2016, female students (79.9 percent) were more likely to be exposed to e-cigarette advertising than males (76.5 percent).

Human Papillomavirus (HPV) and Cancer – Vaccination

Human papillomavirus (HPV) is one of several infectious agents known to cause cancer.[17] HPV is a group of over 150 related viruses transmitted through intimate skin-to-skin contact and is usually asymptomatic.[18] HPV infections are very common— nearly 80 million people in the US are currently infected with HPV.[19] Although most HPV infections are cleared by the body and do not cause cancer, virtually all cervical cancers are caused by persistent HPV infections. Persistent infection with HPV also causes 90 percent of anal cancers, about 70 percent of oropharyngeal cancers, and 60 to 70 percent of vaginal, vulvar, and penile cancers.[20] Cervical cancer is the most common HPV-related cancer in women, and oropharyngeal cancer the most common in men.[21] 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 detect this cancer at an early stage or prevent it entirely (through the removal of precancerous lesions). Many racial/ethnic minority groups are disproportionately affected by HPV-associated cervical cancer incidence and mortality (see Figure 12, page 35).[22]

The first vaccine to prevent HPV-related cancers, Gardasil, was approved by the Food and Drug Administration (FDA) in 2006.[23] Gardasil 9, approved in 2014, is the only HPV vaccine available in the US as of 2017 and protects against nine types of HPV.[24] Two or three-dose vaccine schedules are recommended by the Advisory Committee on Immunization Practices (ACIP) and the ACS, depending on when individuals began receiving their vaccinations.[25, 26, 27] To be most effective, vaccination should be completed at the recommended age of 11 to 12 years.

Despite the vaccine's benefits, uptake of HPV vaccination among adolescents continues to lag behind other ACIP-recommended vaccines, particularly for males. Many barriers exist that prevent increased uptake of the HPV vaccine in the US, including:[28]

- Physicians not recommending HPV vaccines as routinely or strongly as they do other vaccines, particularly for boys. Provider recommendations are the strongest predictor of vaccination acceptance;

- Lack of parental education or knowledge of HPV vaccination as cancer prevention, including misinformation about the appropriate age for vaccination, vaccine safety concerns, or association with sexual activity;

- Concerns regarding the cost of the vaccine; and

- Lack of reminder systems – including in electronic health records – to effectively avoid missed opportunities for HPV vaccination.

For more information on HPV vaccination, see page 157 for the American Cancer Society's vaccination guidelines.

HPV Vaccination Coverage (%), Male Adolescents 13 to 17 Years, US, 2016

Non-Hispanic American Indian/Alaska Native Male Adolescents Have Lower Prevalence of Being Up to Date with HPV Vaccination

> 1 Dose: Non-Hispanic White 49.7, Non-Hispanic Black 61.4, Hispanic 67.8, Non-Hispanic AIAN 56, Non-Hispanic Asian 53.5

Up to Date: Non-Hispanic White 34, Non-Hispanic Black 40.5, Hispanic 44.6, Non-Hispanic AIAN 30.3, Non-Hispanic Asian 36.6

Note: Up to date (UTD) includes those with ≥ three doses, and those with two doses when the first HPV vaccine dose was initiated prior to age 15 years and there was at least five months minus four days between the first and second dose.
Source: Walker TY, Elam-Evans LD, Singleton JA, et al. National, regional, state, and selected local area vaccination coverage among adolescents aged 13–17 years — United States, 2016. MMWR. 2017;66(33):874–882.

Figure 76: Among adolescents aged 13 to 17 years, males and non-Hispanic Whites (NHW) are less likely to initiate HPV vaccination compared to females and racial/ethnic minority groups. By race/ethnicity, female vaccination rates (not shown) varied from 60 to 72 percent for at least one dose and 46 to 58 percent for being up to date with the HPV vaccination series compared to the percentages shown above for males. Among males, although vaccination initiation is lowest among NHWs, non-Hispanic American Indian/Alaska Natives (AIAN) have the lowest prevalence of being up to date with HPV vaccination. Hispanic males have the highest percentage of HPV vaccination coverage. These estimates may be due to NHW parents being more hesitant about the HPV vaccination despite being more likely to have heard of the vaccine as compared to parents of a boy from racial/ethnic minority groups.[29, 30] Indeed, sociodemographic factors that were associated with receiving an HPV vaccination included not having employer/union sponsored health insurance, being from a racial/ethnic minority group, and receiving other adolescent vaccinations.[31]

Cervical cancer is the most common HPV-related cancer in women, and oropharyngeal cancer the most common in men.[21]

Geographic Variation of HPV Vaccination Coverage (%) by Gender, 2016

Geographic Variation of HPV Vaccination Coverage (%), Boys 13 to 17 Years of Age, 2016

Percent Up to Date*

20.0 – 29.4	29.5 – 35.8	35.9 – 41.2	41.3 – 45.6	45.7 – 69.0

Note: *Up to date (UTD) includes those who received ≥three doses and those who received two doses when the first HPV vaccine dose was initiated before age 15 years and the time between the first and second dose was at least five months minus four days.*
Source: *Walker TY, Elam-Evans LD, Singleton JA, et al. National, regional, state, and selected local area vaccination coverage among adolescents aged 13–17 years — United States, 2016. MMWR. 2017;66(33):874–82.*

Map 18

Despite the vaccine's benefits, uptake of HPV vaccination among adolescents continues to lag behind other ACIP-recommended vaccines, particularly for males.

Geographic Variation of HPV Vaccination Coverage (%), Girls 13 to 17 Years of Age, 2016
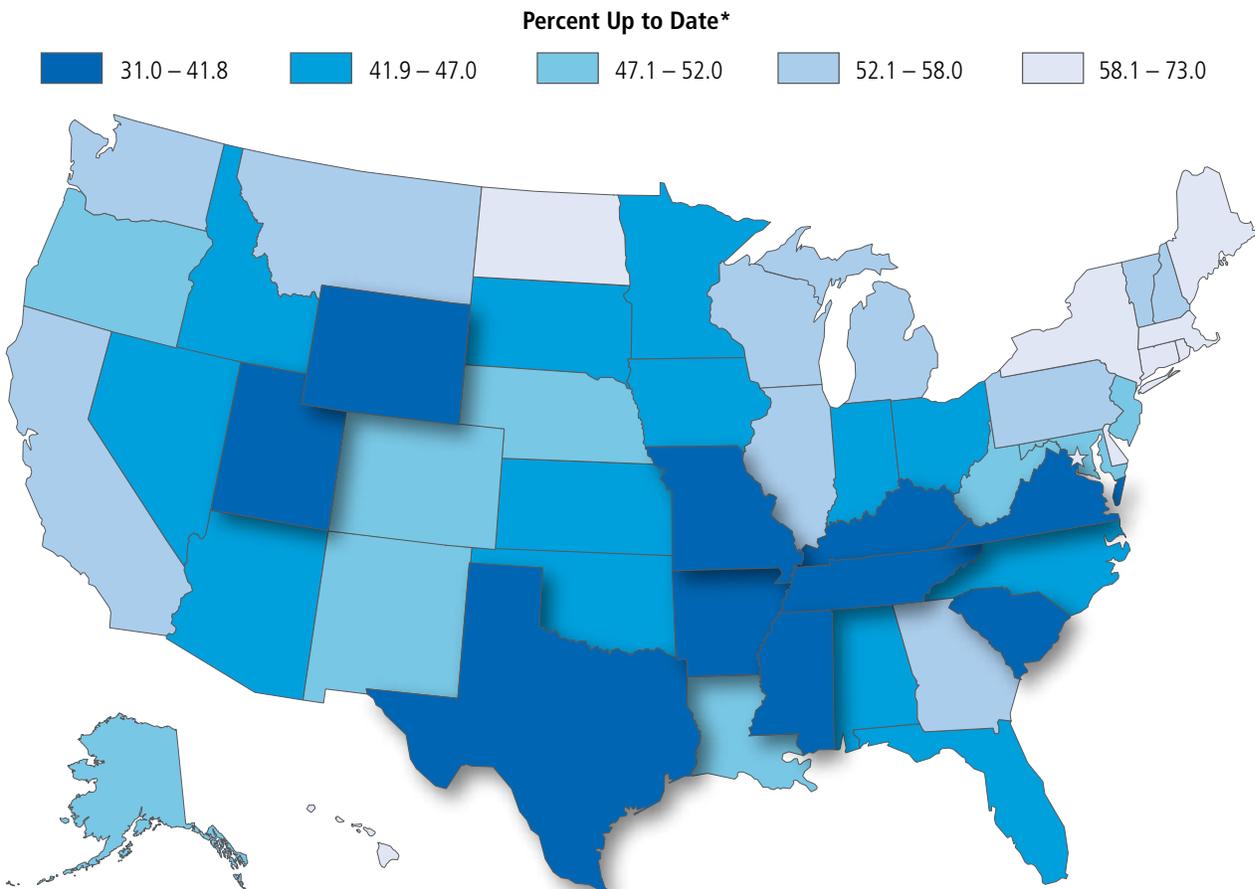
Percent Up to Date*

31.0 – 41.8	41.9 – 47.0	47.1 – 52.0	52.1 – 58.0	58.1 – 73.0

Note: *Up to date (UTD) includes those who received ≥three doses and those who received two doses when the first HPV vaccine dose was initiated before age 15 years and the time between the first and second dose was at least five months minus four days.*
Source: *Walker TY, Elam-Evans LD, Singleton JA, et al. National, regional, state, and selected local area vaccination coverage among adolescents aged 13–17 years — United States, 2016. MMWR. 2017;66(33):874–82.*

Map 19

Maps 18 and 19: HPV vaccination coverage in adolescent boys and girls varies across the US but patterns are similar. In general, Northeastern states have higher HPV vaccination coverage in adolescent boys and girls as compared to other regions.

Ultraviolet Radiation and Skin Cancer

Most cases of melanoma, the deadliest form of skin cancer, are caused by exposure to excessive ultraviolet radiation (UVR) from sunlight or tanning devices.[32, 33] Invasive melanoma represents only about 1 percent of all skin cancer cases, but accounts for the majority of skin cancer deaths. The incidence of melanoma in the US has been increasing for at least 30 years.[34, 35] A recent study estimated that 230,000 melanoma cases could be averted from 2020 to 2030 if a nationwide comprehensive skin cancer prevention program were implemented.[36]

The risk of melanoma is about 60 percent higher for people who began using indoor tanning devices before the age of 35, and risk increases with the number of total hours, sessions, or years that indoor tanning devices are used.[37, 38] A recent meta-analysis estimated that annually in the US, more than 410,000 cases of keratinocyte carcinoma (KC) (also referred to as basal cell and squamous cell carcinomas) and more than 6,000 cases of melanoma can be attributed to indoor tanning.[39]

Although Whites have higher incidence and mortality rates for melanoma of the skin than individuals from other racial/ethnic groups, minority racial/ethnic groups have been found to be disproportionately affected by later stage diagnosis and lower survival rates than Whites (see Figure 18, Page 42; Figure 20, page 45; and Figures 21 - 26, pages 46 and 47). This is, in part, due to the appearance of melanoma in atypical locations, general lack of awareness of the disease, as well as both patient and provider misconceptions around skin cancer in these populations.[40, 41, 42] Additionally, fewer racial/ethnic minority patients engage in skin cancer screening behaviors than Whites due to decreased awareness and knowledge about melanoma[43] and access to such information.

For more information on how to prevent and reduce risk for skin cancer, please visit https://www.cancer.org/cancer/skin-cancer/prevention-and-early-detection.html.

Use of an Indoor Tanning Device (%), Adults 18 Years and Older, US, 2015
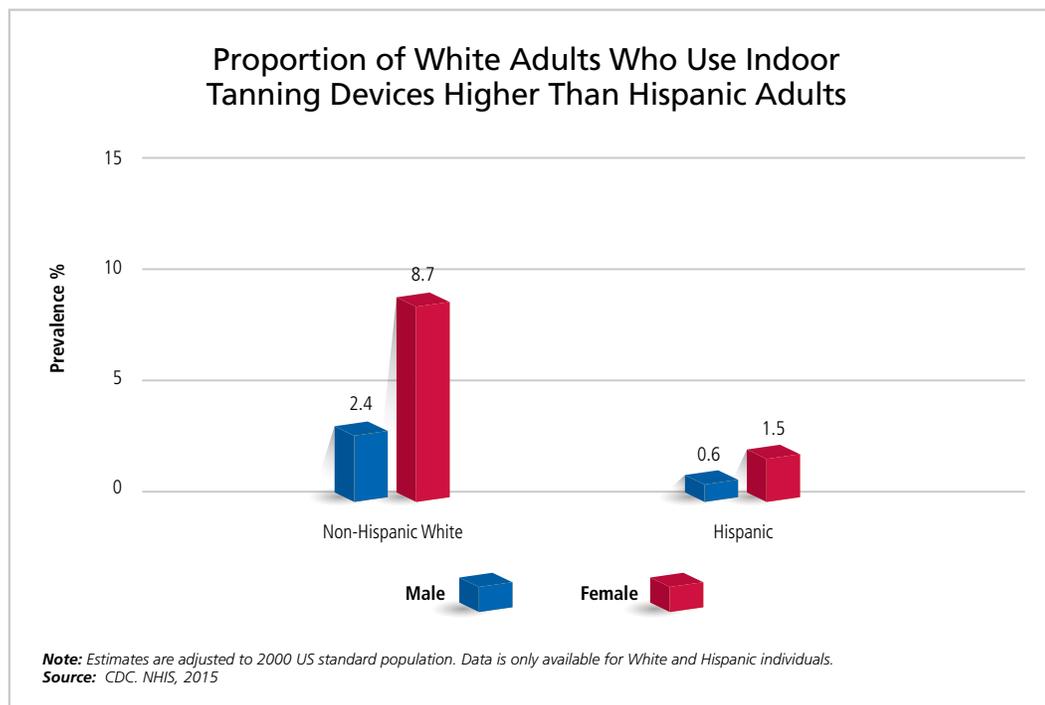
Figure 77: Among US adults, males had overall lower usage of indoor tanning devices than females. Non-Hispanic Whites (NHW) have higher usage of a tanning device than Hispanics. The percentage of NHW males using a tanning bed is four times higher than that of Hispanic males. The percentage for NHW females is nearly six times higher than their Hispanic counterparts. This partly helps to explain why Whites have higher rates of melanoma compared to other racial/ethnic groups (see Figure 18, page 42).

Indoor Tanning Device

Indoor tanning device is defined as items 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.

Prevalence of Sunburn

Prevalence of a sunburn is defined as at least once in the past 12 months having even a small part of the skin turning red or hurting for greater than or equal to 12 hours after being outside in the sun or after using a sunlamp or other indoor tanning device.

Prevalence of Sunburn (%) and Use of an Indoor Tanning Device (%), High School Students, US, 2015

Prevalence of Sunburns Higher among Non-Hispanic White High School Students than Other Racial/Ethnic Groups

Note: Non-Hispanic American Indian/Alaska Native estimates were not provided for boys and girls due to data instability.
Source: CDC. 2015 High School Youth Risk Behavior Survey Data. Available from URL: http://nccd.cdc.gov/youthonline/App/Default.aspx. Accessed October 14, 2016.

Figure 78: Overall, non-Hispanic White (NHW) high school students are more likely to report a sunburn than students of other racial/ethnic groups, partly explaining why NHWs have higher rates of melanoma compared to other races/ethnicities (see Figure 18, page 42). The prevalence of sunburn in NHW girls is nearly five times that of non-Hispanic Black (NHB) girls. Boys overall have lower rates of sunburn than girls, but the percentage of NHW boys who report a sunburn is still five times that of NHB boys.

Use of Indoor Tanning Device Highest among Non-Hispanic White Girls

Note: Non-Hispanic American Indian/Alaska Native estimates were not provided for boys and girls due to data instability.
Source: CDC. 2015 High School Youth Risk Behavior Survey Data. Available from URL: http://nccd.cdc.gov/youthonline/App/Default.aspx. Accessed October 14, 2016.
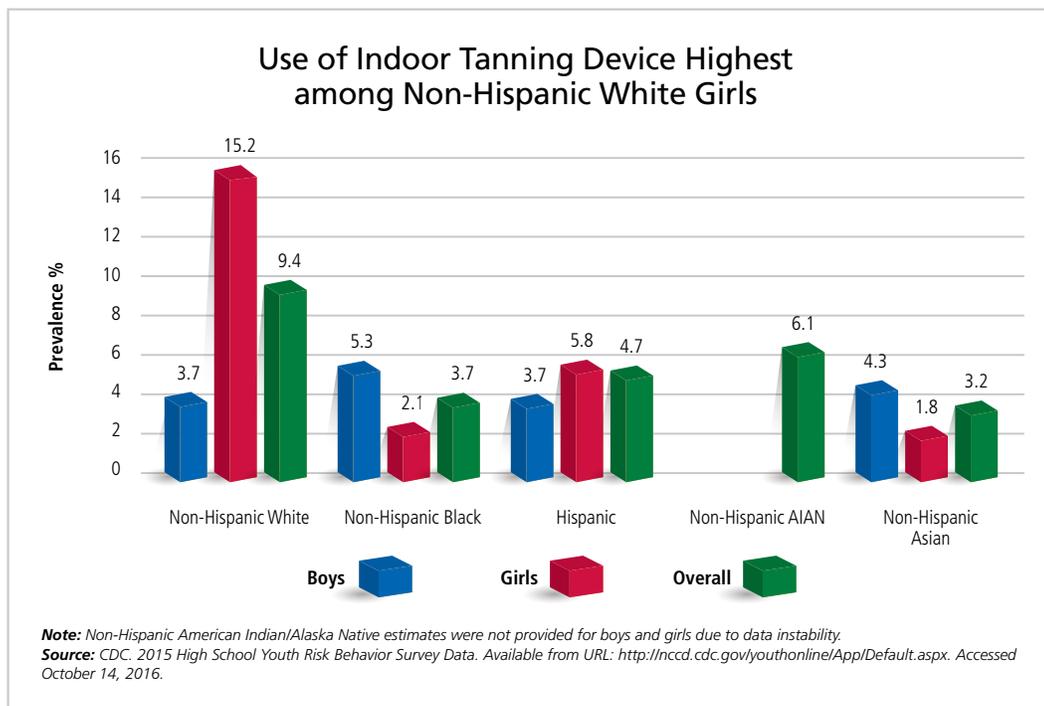
Figure 79: Overall, the prevalence of indoor tanning is highest among non-Hispanic White (NHW) high school students, with the percentage of tanning device use in NHW girls being over eight times that of non-Hispanic Asian girls (who have the lowest prevalence).

Excess Weight and Obesity, Physical Activity, and Nutrition

Researchers from the American Cancer Society recently estimated that about one-fifth of all cancers diagnosed in the US are caused by a combination of excess body weight, physical inactivity, excess alcohol consumption, and poor nutrition.[44] Thus, aside from not smoking cigarettes, important ways to reduce cancer risk include maintaining a healthy body weight throughout life, engaging in regular physical activity, adhering to a healthful diet, and avoiding or limiting alcohol consumption. Adults who most closely follow lifestyle cancer prevention recommendations for nutrition and physical activity are less likely to be diagnosed with and die from cancer.[45] The best way to achieve and maintain a healthy body weight is to balance energy intake (calories from food and beverages) with energy expenditure (physical activity).[46] Unfortunately, individuals with lower social economic status (SES) and Black, American Indian/Alaska Native, and Hispanic/Latino populations have significantly higher prevalence of overweight and obesity than their higher SES, White, and Asian/Native Hawaiian and other Pacific Islander (NHOPI) counterparts (see Figure 80 page 126; Figure 83, page 129; and Figure 85, page 131).[47, 48, 49, 50] This implies that these populations may not be receiving the recommended amount of physical activity or nutrition to help reduce their cancer risk compared to individuals with higher SES and from other racial/ethnic groups.

There are multiple reasons these populations may not be meeting the recommended amount of physical activity or nutrition to help prevent being overweight or obese. Studies indicate that fewer resources, such as recreational programs and parks; access to grocery stores and healthier foods (e.g., living near "food deserts"); and safe places to walk or exercise, contribute to the higher obesity rates found among these

populations.[51] The lack of accessible resources to these populations, as well as the higher cost of healthier foods, promotes consumption of low nutrition foods and insufficient levels of physical activity. Additionally, insufficient access to relevant information and effective programs to help change health behavior in these populations contributes to these disparities.

Lower-income and racial/ethnic minority communities tend to have a greater number of fast food restaurants and convenience stores— which tend to offer cheaper, less-healthy foods— than in areas of higher SES.[52] Studies have suggested that Blacks and Hispanic/Latinos, on average, eat more fast food and have poorer dietary habits than Whites.[53, 54]

SES may also have a role in disparities in physical activity and obesity. Recreational programs and parks are less available to people living in poor areas, and

people who live in poverty-dense regions may be less able to afford gym membership and/or exercise equipment.[55, 56] Finally, although not covered in this chartbook, the environment in poverty-dense areas may also explain the more sedentary lifestyles and greater obesity burden in these populations.[57]

The American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Prevention provide recommendations regarding individual behaviors related to weight control, physical activity, diet, and alcohol consumption.[58] These guidelines, scheduled to be updated in 2018, also include recommendations for community action because the physical and social environment has a substantial influence on individual food and activity behaviors. For more information on maintaining a healthy and active life to reduce risk from cancer, please see page 157 for the American Cancer Society's recommendations on healthy eating/active living.

Body Weight and Cancer Risk

There is sufficient evidence that being overweight or obese increases the risk of developing 13 cancers: uterine corpus, esophagus (adenocarcinoma), liver, stomach (gastric cardia), kidney (renal cell), brain (meningioma), multiple myeloma, pancreas, colorectum, gallbladder, ovary, female breast (postmenopausal), and thyroid.[59] There is limited evidence that excess body weight also increases risk of non-Hodgkin lymphoma (diffuse large B-cell lymphoma), male breast cancer, and fatal prostate cancer. Mounting evidence suggests that overweight/obesity also decreases survival for several cancers.[60, 61]

Half of all adults in the United States are projected to be obese by 2030.[62] According to the 2015 to 2016 National Health and Nutrition Examination Survey (NHANES), 39.8 percent of US adults and 18.5 percent of youth were obese.[63] The prevalence of obesity was higher among youth six to 11 years of age (18.4 percent) and adolescents 12 to 19 years of age (20.6 percent) compared to children aged two to five years (13.9 percent).[64] As presented in the charts on pages 126 and 127, Black, American Indian/Alaska Native (AIAN), and Hispanic adults have substantially higher rates of obesity and being overweight than their White and Asian and Native Hawaiian Other Pacific Islander (NHOPI) counterparts.

Overweight and Obesity Prevalence (%) for Adults by Race/Ethnicity, 2016

Overweight or Obesity – Adults

An adult who has a body mass index (BMI) between 25 and 29.9 is considered overweight. An adult who has a BMI of 30 or higher is considered obese.

Prevalence of Overweight and Obesity (BMI ≥25) Higher among Blacks, American Indians/Alaska Natives, and Hispanics than Other Racial/Ethnic Group

Source: Kaiser Family Foundation analysis of the CDC's BRFSS 2016 Survey Results. Accessed March 2018. https://www.kff.org/other/state-indicator/adult-overweightobesity-rate-by-re/.
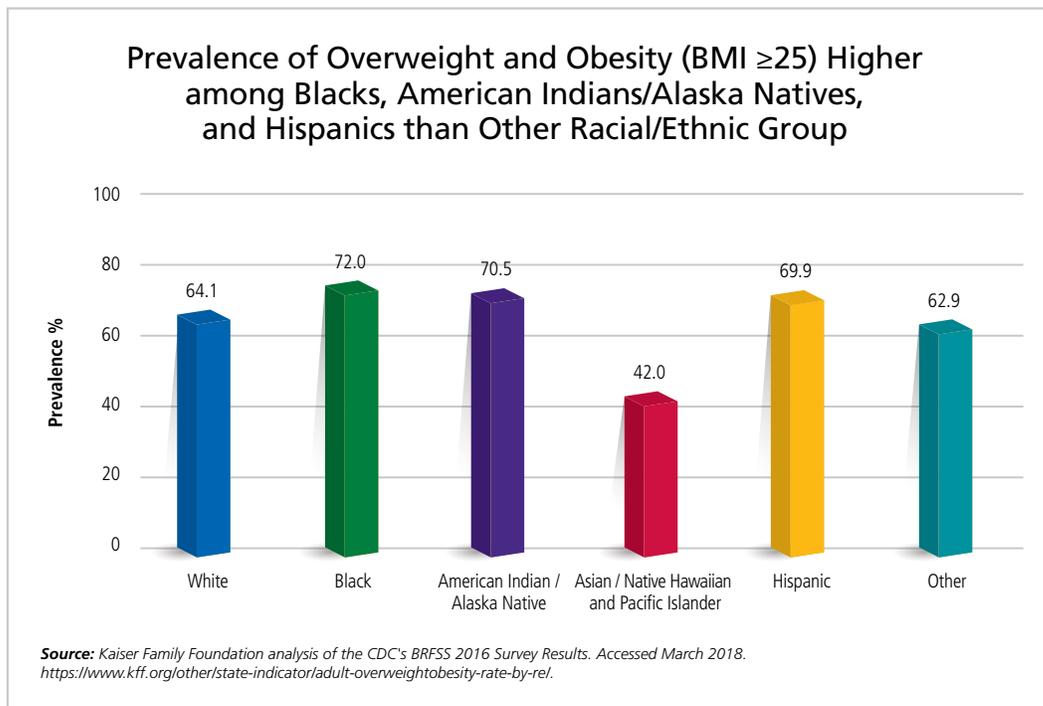
Figure 80: Black, American Indian/Alaska Native, and Hispanic populations have substantially higher rates of obesity and being overweight than their White and Asian/Native Hawaiian and other Pacific Islander (NHOPI) counterparts.

Note: Racial/ethnic groups are mutually exclusive. Percentages are weighted to reflect population characteristics. National estimates presented do not include data from territories. The following states/territories did not have sufficient data for inclusion for Whites: Puerto Rico; Blacks: Alaska, Hawaii, Idaho, Maine, Montana, New Hampshire, New Mexico, North Dakota, Oregon, South Dakota, Utah, Vermont, Wyoming, Guam, Puerto Rico; Hispanics: Alabama, Maine, Mississippi, New Hampshire, North Dakota, Vermont, West Virginia; Asian/NHOPI: Alabama, Arizona, Arkansas, Delaware, District of Columbia, Georgia, Idaho, Iowa, Kansas, Kentucky, Louisiana, Maine, Mississippi, Missouri, Montana, Nebraska, New Hampshire, New Mexico, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Rhode Island, South Carolina, South Dakota, Tennessee, Vermont, West Virginia, Wisconsin, Wyoming, Puerto Rico, Virgin Islands; AIAN: Alabama, Alaska, Arizona, California, Colorado, Connecticut, Delaware, Florida, Idaho, Illinois, Kansas, Maine, Maryland, Minnesota, Mississippi, Missouri, North Dakota, Ohio, Pennsylvania, Tennessee, Texas, Vermont, Virginia, Washington, Wisconsin, Wyoming, Guam, Virgin Islands. Data based on the Behavioral Risk Factor Surveillance System. The information is available at http://www.cdc.gov/brfss/index.html.

Obesity (%) Trends among Adults Aged 20 to 74, US, 1976 to 2016
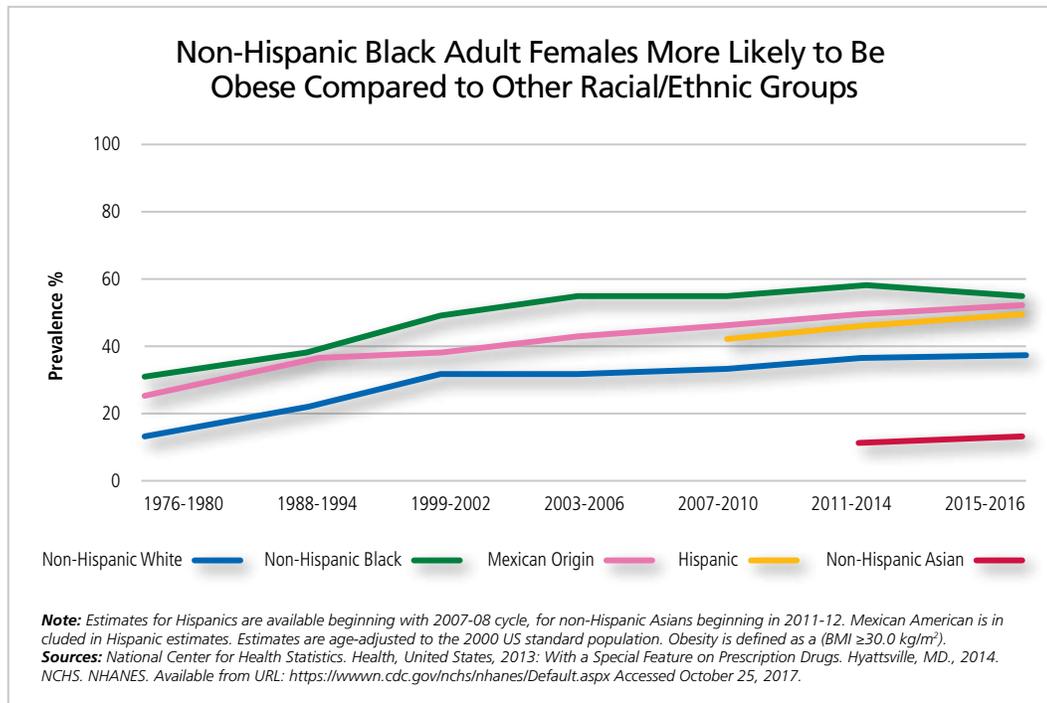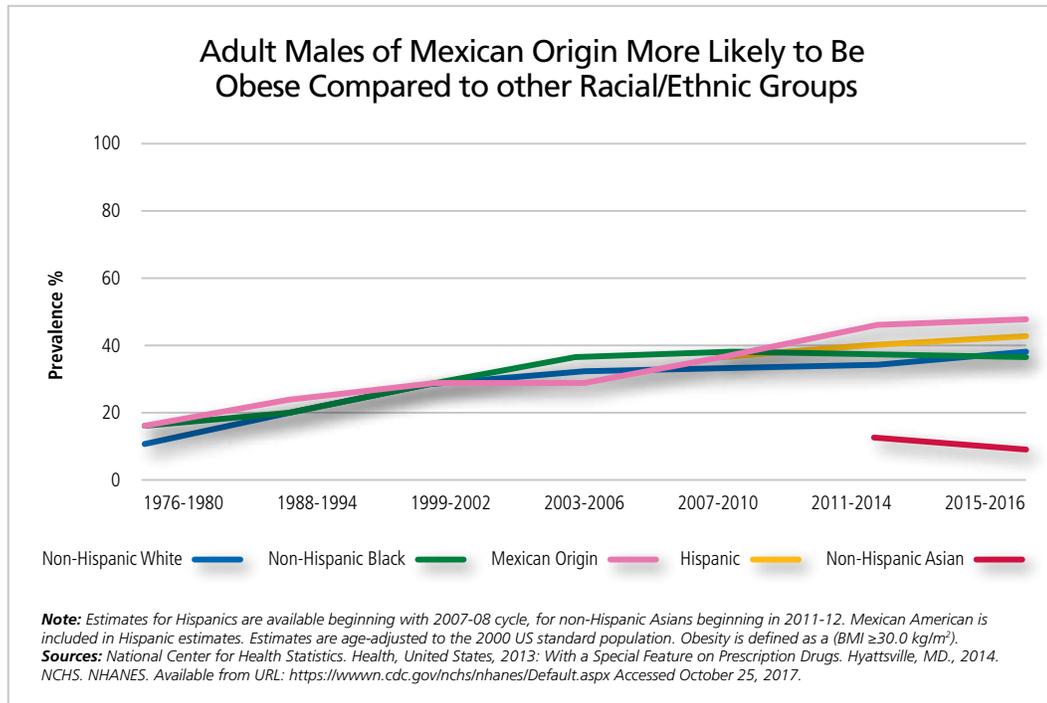
Figures 81 and 82: Overall, obesity has steadily increased over time across most racial and ethnic groups for males and females. Non-Hispanic Blacks (NHB) and populations of Hispanic or Mexican origin are more likely to be obese compared to non-Hispanic Whites and non-Hispanic Asians. Obesity prevalence overall is highest among NHB females.

Geographic Variation of Overweight and Obesity (%) among Adults, 2016

Geographic Variation of Overweight and Obesity (%) among Adults 18 Years and Older, 2016

| 53.4 – 62.4 | 62.5 – 64.6 | 64.7 – 66.7 | 66.8 – 68.3 | 68.4 – 71.3 |

Note: Overweight and obesity defined as body mass index 25.0 kg/m² or greater.
Source: Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System (BRFSS), 2016. Public-use data file and documentation. Available from URL: https://www.cdc.gov/brfss/index.html.

Map 20: The percentage of overweight or obese adults (BMI ≥25.0 kg/m²) in the US is highest in Mississippi (71.3 percent) and West Virginia (71 percent) and lowest in the District of Columbia (53.4 percent). Prevalence of excess body weight is highest in parts of the South and Midwest. Parts of the Northeast and West have an overall lower percentage of overweight and obese adults compared to the rest of the nation.

Obesity (%) among Children and Adolescents Aged 2 to 19 Years, 2015 to 2016

Non-Hispanic Black and Hispanic Children and Adolescents Have Higher Obesity Prevalence than Other Racial/Ethnic Groups

Non-Hispanic White: 14.1
Non-Hispanic Black: 22
Non-Hispanic Asian: 11
Hispanic: 25.8

Prevalence Below Poverty %

Note: Obesity in youth was defined as a BMI of greater than or equal to the age- and sex-specific 95th percentile of the 2000 Centers for Disease Control and Prevention growth charts.
Source: Hales CM, Carroll MD, Fryar CD, Ogden CL. Prevalence of Obesity Among Adults and Youth: United States, 2015-2016. NCHS Data Brief, no 288. Hyattsville, MD: National Center for Health Statistics, 2017.

Figure 83: Overall, prevalence of obesity among youths age two to 19 years was highest among Hispanics (25.8 percent) and non-Hispanic Blacks (NHB) (22.0 percent) compared to 14.1 percent among non-Hispanic Whites and 11.0 percent among non-Hispanic Asians. Prevalence of obesity in Hispanics and NHB is about twice that of non-Hispanic Asians.

Obesity among Adolescents Aged 12 to 19 Years, US, 1988 to 2016

Obesity Prevalence among Adolescent Males and Females Higher in Hispanics, Non-Hispanic Blacks, and Those of Mexican Origin

Note: Obesity is defined as body mass index at or above the 95th percentile from the 2000 CDC Growth Charts: United States. Estimates for Hispanic or Latino are available beginning with 2007-08 cycle, for non-Hispanic Asians beginning in 2011-12. Mexican American is included in Hispanic estimates.
Sources: National Center for Health Statistics. Health, United States, 2016: With Chartbook on Longterm Trends in Health. Hyattsville, MD, 2017. NCHS. NHANES. Available from URL: https://wwwn.cdc.gov/nchs/nhanes/Default.aspx. Accessed October 25, 2017.

Figure 84: There are variable trends in childhood and adolescent obesity by race/ethnicity. However, like adults, the prevalence of obesity is higher among non-Hispanic Black and Hispanic/Mexican origin adolescents (12 to 19 years) compared to non-Hispanic Whites and Asians.

Prevalence of Obesity Highest among Adolescents Living in Households Making <200 Percent FPL

Below 100% FPL · 100%-199% FPL · 200-399% FPL · 400% FPL or More

Note: FPL=federal poverty level. FPL varies depending on the year. 100% FPL for 2014 was $11,670 for an individual and $23,850 for a family of four. 400% FPL was $46,680 for an individual and $95,400 for a family of four. Estimates for 400% or more 1988-1994 and 2011-2014 are omitted due to instability.
Source: National Center for Health Statistics. Health, United States, 2016: With Chartbook on Longterm Trends in Health. Hyattsville, MD, 2017.

Figure 85: Obesity prevalence among adolescents is lowest among those with family incomes of at least 400 percent of the federal poverty level (FPL). Obesity prevalence has been highest for children in families whose incomes are less than 200 percent of FPL.

Individuals with lower SES and Black, American Indian/Alaska Native, and Hispanic/Latino populations have significantly higher prevalence of overweight and obesity than their higher SES, White, and Asian/Native Hawaiian and other Pacific Islander counterparts.


Overweight or Obesity – Children and Adolescents

Obesity for children and adolescents is defined as a body mass index (BMI) greater than or equal to the 95th percentile for age and sex. Overweight is defined as a BMI greater than or equal to the 85th percentile and <95th percentile for age and sex.

Geographic Variation of Overweight and Obesity (%) among High School Students, 2015

Geographic Variation of Overweight (%) among High School Students, 2015

13.3 – 14.6	14.7 – 15.1	15.2 – 15.8	15.9 – 17.0	17.1 – 18.2	Data Unavailable

Note: Overweight defined as body mass index at or above 85th percentile but below 95th percentile of CDC growth chart.

Source: Kann L, McManus T, Harris WA, et al. Youth Risk Behavior Surveillance — United States, 2015. MMWR Surveill Summ. *2016;65(No. SS-6):1–174.*

Map 21

Geographic Variation of Obesity (%) among High School Students, 2015

10.3 – 12.2	12.3 – 13.0	13.1 – 14.0	14.1 – 16.3	16.4 – 18.9	Data Unavailable

Note: Obesity defined as body mass index at or above 95th percentile of CDC growth chart.
Source: Kann L, McManus T, Harris WA, et al. *Youth Risk Behavior Surveillance — United States, 2015.* MMWR Surveill Summ. *2016;65(No. SS-6):1–174.*

Map 22

Maps 21 and 22: Nationwide, 13.9 percent of high school students were obese and 16 percent of students were overweight. Among high school students, prevalence of both overweight and obesity is higher in Southern states compared to other regions.

Physical Activity and Cancer Risk

According to the World Cancer Research Fund, there is convincing evidence that physical activity decreases the risk of colon (but not rectal) cancer and it probably also decreases the risk of endometrial and postmenopausal breast cancer.[65] Accumulating evidence suggests that physical activity may also reduce the risk of other cancers, including liver, lung, and kidney.[66] In addition, regular physical activity helps maintain a healthy body weight by balancing caloric intake with energy expenditure and thus also indirectly reduces the risk of developing obesity-related cancers. The benefits of physical activity are even observed among people who are overweight, obese, or have a history of smoking.[67] Being active is thought to reduce cancer risk largely by improving energy metabolism and reducing circulating concentrations of estrogen, insulin, and insulin-like growth factors. The health benefits of a physically active lifestyle also include reducing the risk of mortality and other chronic diseases, such as heart disease, type 2 diabetes,

osteoporosis, and hypertension.[68, 69, 70] Increased levels of physical activity can help offset the increased risk of death associated with sedentary behavior, which has become increasingly common in the workplace.[71, 72] Physical activity also improves the quality of life of cancer patients and has been associated with reduced cancer recurrence and overall mortality.

According to National Health Interview Survey (NHIS) data from 2016, only about one-half (total: 52.7 percent, men: 56.3 percent, women: 49.4 percent) of adults reported meeting recommended levels of aerobic activity (engaging in at least 150 minutes of moderate or 75 minutes of vigorous aerobic activity per week). As the next charts show, Black, American Indian/Alaska Native, and Hispanic adults are less likely to be physically active or meet recommendations for aerobic activity compared to adults from other racial/ethnic groups.

Physical Activity (%), Adults 18 Years and Older, US, 2016

Aerobic and Muscle Strengthening Activity

Aerobic activity includes 150 minutes of moderate intensity activity or 75 minutes of vigorous intensity activity each week. Muscle strengthening activity includes moderate or high intensity muscle strengthening activity involving all major muscle groups at least two days each week.

Non-Hispanic American Indian/Alaska Native, Non-Hispanic Black, and Hispanic Adults Least Likely to Meet Recommended Levels of Aerobic Activity

Prevalence %

	No leisure-time physical activity	Met recommended levels of aerobic activity	Met recommended levels of aerobic & muscle-strengthening activity
Non-Hispanic White	22.8	56.8	25.2
Non-Hispanic Black	36.7	44.6	21.0
Non-Hispanic AIAN	39.1	44.3	17.8
Non-Hispanic Asian	22.2	52.5	17.4
Hispanic	36.5	44.5	17.0

Note: *Estimates are age adjusted to 2000 US standard population. Estimate for Asians does not include Native Hawaiians or other Pacific Islanders.*
Source: *NCHS. NHIS, 2016. Public-use data file and documentation. Available from URL: http://www.cdc.gov/nchs/nhis/quest_data_related_1997_forward.htm Accessed October 23, 2017.*

Figure 86: Barely one in five adults meet the recommended muscle strengthening and levels of physical activity. But, the proportion of adults meeting recommended aerobic activity was highest among non-Hispanic Whites and non-Hispanic Asians (53 to 57 percent) compared to non-Hispanic American Indian/Alaska Native, non-Hispanic Black, and Hispanic (44 to 45 percent) adults.

Additional Disparities

- Physical activity level steadily decreases with age. About 12.2 percent of adults age 65 and older met the recommended levels of aerobic and muscle-strengthening activity.
- The proportion of college-educated adults meeting recommended levels of aerobic activity (64.9 percent) was more than double that of people with less than a high school education (32.4 percent).

Geographic Variation of Meeting Recommended Levels of Aerobic/Physical Activity (%) by Age, 2015

Geographic Variation for Meeting Recommended Levels of Aerobic Activity (%) among Adults 18 Years and Older, 2015

| | 38.0 – 47.0 | | 47.1 – 50.2 | | 50.3 – 53.6 | | 53.7 – 56.7 | | 56.8 – 60.6 |

Note: Aerobic activity includes 150 minutes of moderate-intensity activity or 75 minutes of vigorous-intensity activity each week.
Source: Centers for Disease Control and Prevention (CDC). Behavioral Risk Factor Surveillance System (BRFSS), 2015. Public-use data file and documentation. Available from URL: https://www.cdc.gov/brfss/index.html.

Map 23: The Southern, Midwestern, and Atlantic regions have a lower percentage of adults who met the recommended aerobic activity level as compared to the Western half of the US and Hawaii. Based on 2015 Behavioral Risk Factor Surveillance System (BRFSS) data, Mississippi (38.0 percent) had the lowest proportion of adults who reported meeting recommended levels of aerobic activity, while Colorado (60.6 percent) had the highest.

Geographic Variation for Meeting Recommended Levels of Physical Activity (%) among High School Students, 2015

Legend:
- 16.0 – 21.5
- 21.6 – 24.5
- 24.6 – 25.4
- 25.5 – 28.2
- 28.3 – 32.2
- Data Unavailable
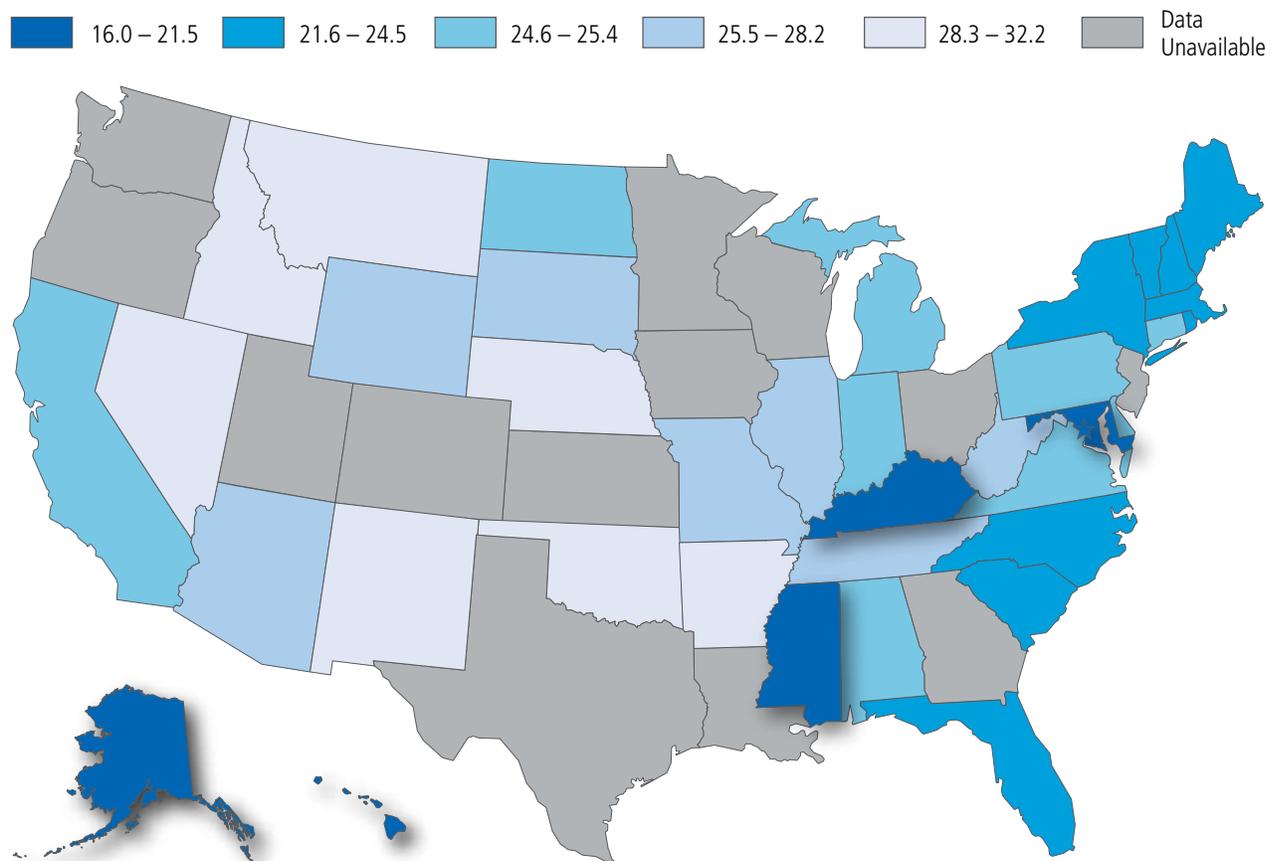
Note: Meeting the recommended physical activity level means being physically active at least 60 minutes per day on all seven days.
Source: Kann L, McManus T, Harris WA, et al. Youth Risk Behavior Surveillance — United States, 2015. MMWR Surveill Summ. 2016;65 (No. SS-6):1–174.

Map 24: Among those states with available data, those in the South and Northeast have lower percentages of high school students meeting the recommended physical activity level as compared to the West and Midwest. The proportion of high school students meeting recommended physical activity levels in 2015 ranged from 16.0 percent in the District of Columbia to 32.2 percent in Oklahoma.

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. The availability of routine, high-quality physical education programs is a critically important way of increasing physical activity among youth.

Nutrition and Cancer Risk

The scientific study of nutrition and cancer is challenging, because eating patterns are complex and difficult to assess.[73] However, adhering to a diet that contains a variety of fruits and vegetables, whole grains, and fish or poultry and fewer red and/or processed meats is associated with reduced cancer risk. Unfortunately, the majority of Americans do not follow these recommendations and would need to substantially reduce added sugar, trans and saturated fats, refined grain, and sodium intake, as well as increase consumption of fruits, vegetables, whole grains, and low-fat dairy products to meet the *2015-2020 Dietary Guidelines for Americans*.[74]

According to 2015 Behavioral Risk Factor Surveillance System (BRFSS) data,* in the US, 12.2 percent of adults met fruit intake recommendations, ranging from 7.3 percent in West Virginia to 15.5 percent in the District of Columbia.[75] Only 9.3 percent of adults met vegetable intake recommendations, ranging

from 5.8 percent in West Virginia to 12 percent in Alaska.[76] Similar findings can also be found among adolescents. Based on the 2015 Youth Risk Behavior Surveillance System (YRBSS),[†] 31.5 percent of high school students consumed 100 percent fruit juice or fruit two or more times a day, ranging from 21.0 percent in Kentucky to 34.3 percent in Vermont.[77] Only 14.8 percent of high school students reported consuming vegetables three or more times per day, ranging from 9.1 percent in South Carolina to 18.1 percent in Vermont.[78]

As Figure 91 (page 143) shows, individuals in rural communities, those with lower SES, and/or are Black or Hispanic are more likely to live in a food desert or have food insecurity (defined on page 142).

*Note: Questions pertaining to fruit and vegetable consumption were not included in 2016 BRFSS.

†Note: YRBSS only conducted in odd-numbered years; 2017 data not yet available.

Additional Disparities

- Fifteen percent of females compared to 9 percent of males reported meeting the federal recommendation for fruit intake.
- Individuals 31 to 50 years of age had a higher prevalence of reporting that they met the federal recommendation for fruit intake (14 percent) when compared to individuals 18 to 30 years old and individuals 51 years and older.

Percentage of Adults Meeting Federal Fruit and Vegetable Intake Recommendations, 2015

Non-Hispanic White Adults Report Meeting Recommended Fruit Intake Less Frequently than Other Racial/Ethnic Groups

Non-Hispanic White	11.2
Non-Hispanic Black	14.3
Hispanic	15.7

Prevalence %

Source: Lee-Kwan SH, Moore LV, Blanck HM, Harris DM, Galuska D. Disparities in state-specific adult fruit and vegetable consumption — United States, 2015. MMWR. 2017;66(45):1241–47.
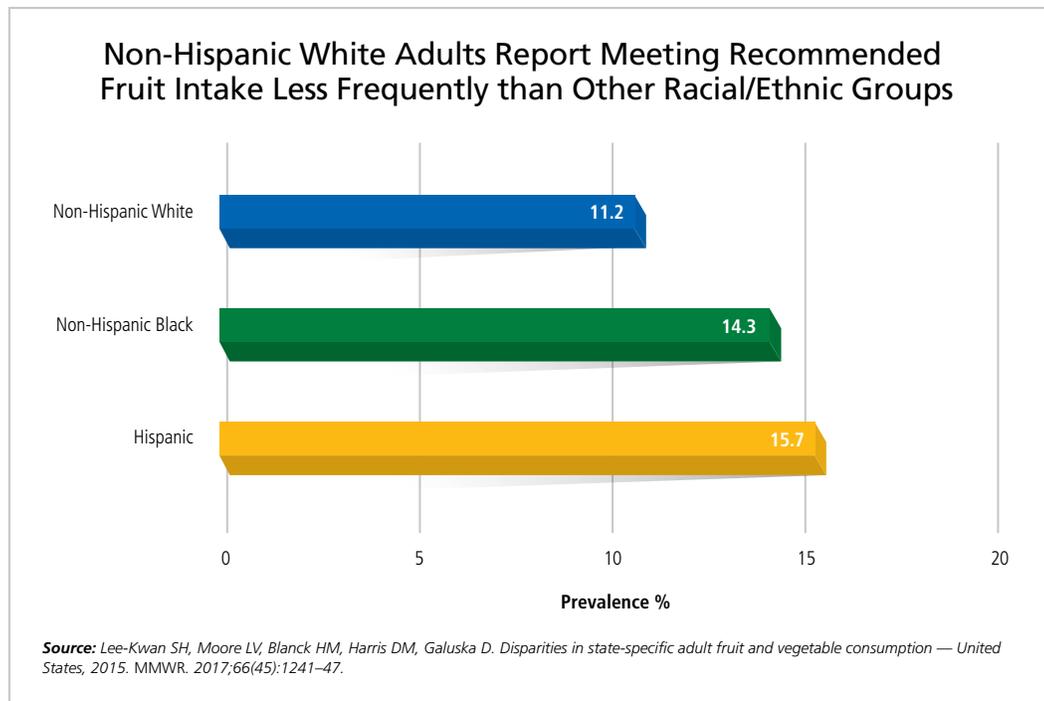
Figure 87: Overall, the prevalence of meeting the federal recommendation for fruit intake in the US is extremely low, with the prevalence ranging from 11.2 percent in non-Hispanic White adults to 15.7 percent in Hispanic adults.

Percent of Non-Hispanic Black Adults Meeting Recommended Vegetable Intake Lower than Non-Hispanic White and Hispanic Adults

Non-Hispanic White — 9.5

Non-Hispanic Black — 5.5

Hispanic — 10.5

Prevalence %

Source: Lee-Kwan SH, Moore LV, Blanck HM, Harris DM, Galuska D. Disparities in state-specific adult fruit and vegetable consumption — United States, 2015. MMWR. 2017;66(45):1241–47.

Figure 88: Overall, the prevalence of meeting the federal recommendation for vegetable intake in the US is extremely low. For example, the prevalence among non-Hispanic Blacks adults was just 5.5 percent.

Additional Disparities

- Nearly 11 percent of females compared to eight percent of males reported meeting the federal recommendation for vegetable intake.
- Individuals 51 years and older had a higher prevalence of reporting that they met the federal recommendation for vegetable intake (10.9 percent) compared to individuals 18 to 30 and 31 to 50 years old.

Percentage of High School Students Who Ate Fruit or Vegetables Three or More Times per Day, 2015
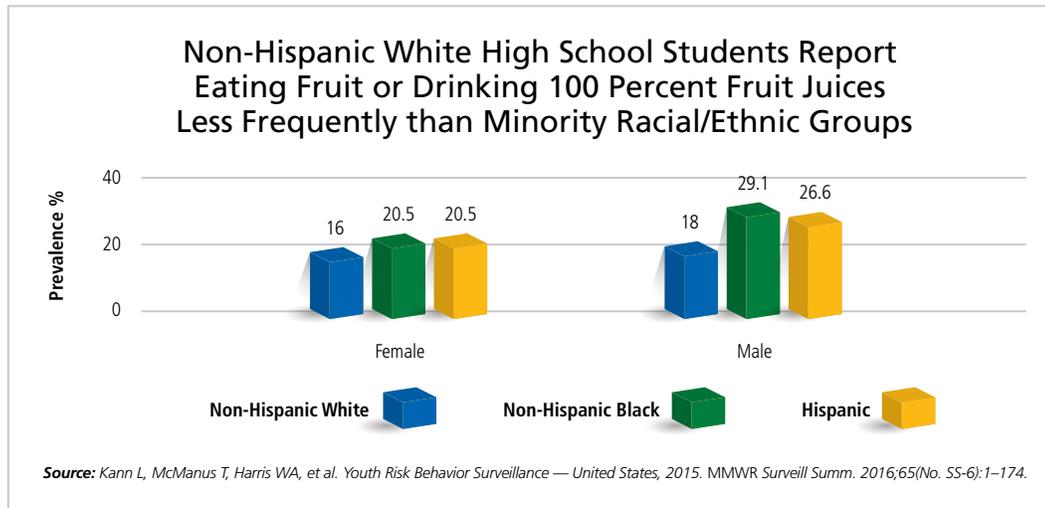
Figure 89: Non-Hispanic White female and male high school students have lower percentages of reporting that they ate or drank 100 percent fruit juices three or more times/day when compared to minority racial/ethnic groups.
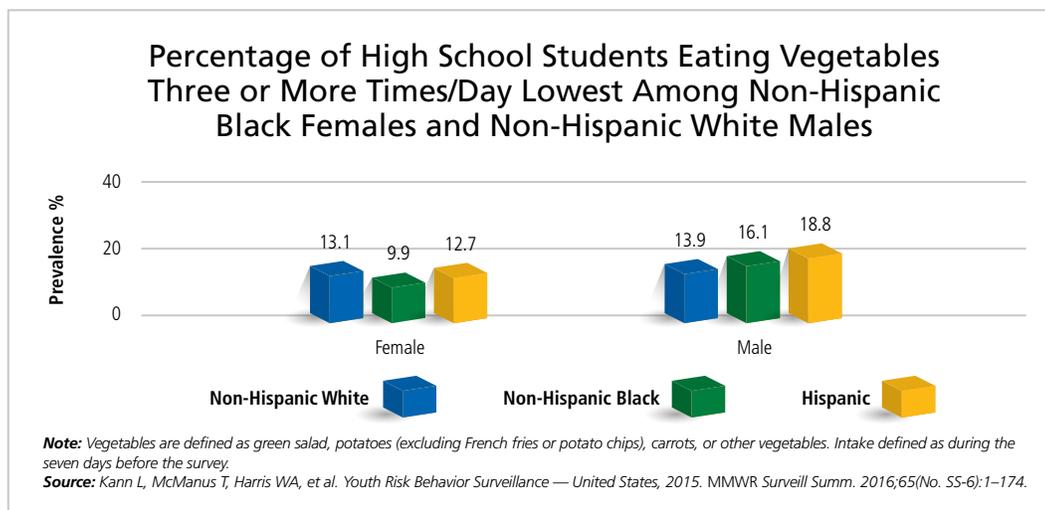
Figure 90: The prevalence of having eaten vegetables three or more times per day was higher among male high school students than females. Among females, only about 10 percent of Non-Hispanic Black students reported eating vegetables three or more times per day compared to about 13 percent of Non-Hispanic White (NHW) students. Among males, vegetable consumption ranged from about 14 percent in NHW students to about 19 percent in Hispanics.

The American Cancer Society recommends that individuals eat at least two-and-a-half cups of vegetables and fruits each day.

Prevalence of Food Insecurity in the United States, 2015 and 2016

While the science between nutrition and cancer is challenging to study, individuals should consume a diet containing a variety of fruits and vegetables, whole grains, and fish or poultry, and fewer red and/or processed meats. This type of diet is associated with reduced cancer risk. However, those individuals and families who are food insecure have less access to healthful foods, which places them at an increased risk for becoming overweight/obese and facing chronic health conditions, such as cancer, later in their life. An estimated 12.3 percent of US households in 2016 were considered food-insecure – unable to provide enough food for all their members due to a lack of resources.

Figure 91 (facing page): The prevalence of food insecurity was highest for households with incomes near or below the Federal poverty line (FPL) compared to the national prevalence. The prevalence of food insecurity was higher than the national estimate for households with children headed by single women or single men, women and men living alone, non-Hispanic Black- and Hispanic-headed households, and households in principal cities and nonmetropolitan areas.

Prevalence of Food Insecurity, 2015 and 2016

All households
Household composition
With children < 18 yrs
With children < 6 yrs
Married-couple families
Female head, no spouse
Male head, no spouse
With no children < 18 yrs
More than one adult
Women living alone
Men living alone
With elderly
Elderly living alone
Race/ethnicity of households:
White, non-Hispanic *
Black, non-Hispanic
Hispanic
Other, non-Hispanic
Household income-to-poverty ratio:
Under 1.00
Under 1.30
Under 1.85
1.85 and over
Area of residence:
Inside metropolitan area
In principal cities
Not in principal cities *
Outside metropolitan area
Census geographic region:
Northeast
Midwest
South
West

2015
2016

Households %

*Change from 2015 to 2016 was statistically significant with 90-percent confidence (t > 1.645).
Source: USDA, Economic Research Service using date from US Department of Commerce, US Census Bureau, 2015 and 2016 Current Population Survey Food Security Supplement. Coleman-Jensen A, Rabbitt MP, Gregory CA, Singh A. Household food security in the United States in 2016. United States Department of Agriculture. Economic Research Report. September 2017. (237). As represented in report retrieved at https://www.ers.usda.gov/webdocs/publications/84973/err-237.pdf?v=42979, Coleman-Jensen A, Rabbitt MP, Gregory CA, Singh A. Household Food Security in the United States in 2016. United States Department of Agriculture. Economic Research Report. September 2017. (237).

Figure 91

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Researchers from the American Cancer Society recently estimated that about one-fifth of all cancers diagnosed in the US are caused by a combination of excess body weight, physical inactivity, excess alcohol consumption, and poor nutrition.[43]

Incidence, Mortality, and Survival

The sources of data used for this section of this report are from government-sponsored national and state systems of cancer surveillance, as well as previous publications produced by the American Cancer Society:

Estimated New Cancer Cases and Deaths in 2018

The number of new cancer cases diagnosed and the number of cancer deaths expected to occur in the current year are produced annually by researchers at the American Cancer Society. For more information, please refer to:

- Siegel RL, Miller KD, Jemal A. Cancer Statistics, 2018. *CA Cancer J Clin.* 2018; 68(1):7-30.

Incidence Rates

Incidence rates are defined as the number of people who are diagnosed with cancer divided by the number of people who are at risk for the disease in the population during a given time period, usually one year. Annual incidence rates in this publication are presented per 100,000 people and are age-adjusted to the 2000 US standard population. Cancer incidence data in the United States are collected and reported by the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) Program and the Centers for Disease Control and Prevention's National Program for Cancer Registries. Many of the

incidence rates provided in this publication were previously published in the following:

- Copeland G, Lake A, Firth R, et al. Cancer in North America: 2010-2014. Vol 1. *Combined Cancer Incidence for the United States, Canada and North America.* Springfield, IL: North American Association of Central Cancer Registries Inc; 2017.
- Copeland G, Lake A, Firth R, et al. Cancer in North America: 2010-2014. Vol 2. *Registry-Specific Cancer Incidence in the United States and Canada.* Springfield, IL: North American Association of Central Cancer Registries Inc; 2017.
- Howlader N, Noone AM, Krapcho M, et al (eds). *SEER Cancer Statistics Review, 1975-2014*, National Cancer Institute. Bethesda, MD, https://seer.cancer.gov/csr/1975_2014/, based on November 2016 SEER data submission, posted to the SEER web site, April 2017.

Mortality Rates

Mortality rates, or death rates, are defined as the number of people who die from cancer divided by the number of people at risk in the population during a given time period, usually one year. Annual mortality rates in this publication are based on cancer death counts compiled by the National Center for Health Statistics and presented per 100,000 people and are age-adjusted to the 2000 US standard population.

Survival

This report describes survival in terms of five-year relative or cause-specific survival rates. Relative survival adjusts for normal life expectancy by comparing survival among cancer patients to survival in people of the same age, race, and sex who were not diagnosed with cancer. Many of the survival rates presented in this publication were previously published in the *CSR 1975-2014* and are based on cancer patients diagnosed in the SEER program registries.

Prevalence

Cancer prevalence is the number of people living with a history of a cancer diagnosis who were diagnosed within a certain time period. Complete prevalence, which is used in this report as the number of cancer survivors in the US, is the number of people living who have ever been diagnosed with cancer. For more information, please refer to:

- Miller KD, Siegel RL, Lin CC, et al. Cancer Treatment and Survivorship Statistics, 2016. *CA Cancer J Clin.* 2016; 2016 Jul; 66(4):271-89.

Access to Coverage

The sources of data used for this section varied and are included individually for each figure and map.

Cancer Screening, Early Detection, and Prevention

The sources of data used for the screening and prevention sections of this report are from government-sponsored national and state systems of behavioral and health surveillance. These systems employ standardized techniques for sampling and use specific survey research methodology to survey targeted population groups on an ongoing basis. 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. More information about the publicly available data sources used for this report can be accessed via the websites listed below:

- **Behavioral Risk Factor Surveillance System (BRFSS).**
  BRFSS website: cdc.gov/brfss/

- **National Health and Nutrition Examination Survey (NHANES).**
  NHANES website: cdc.gov/nchs/nhanes.htm
- **National Health Interview Survey (NHIS).**
  NHIS website: cdc.gov/nchs/nhis/index.htm
- **National Immunization Survey-Teen (NIS-Teen).**
  NIS-Teen website: cdc.gov/vaccines/imz-managers/nis/about.html
- **National Youth Tobacco Survey (NYTS).**
  NYTS website: cdc.gov/TOBACCO/data_statistics/surveys/NYTS/
- **Youth Risk Behavior Surveillance System (YRBSS).**
  YRBSS website: cdc.gov/HealthyYouth/yrbs/index.htm

American Cancer Society Facts & Figures

The most recent American Cancer Society Facts & Figures publications and interactive Cancer Statistics Center (https://cancerstatisticscenter.cancer.org/) were utilized for this report. The following Facts & Figures reports can be accessed at https://www.cancer.org/research/cancer-facts-statistics.html.

Cancer Facts & Figures
https://www.cancer.org/content/dam/cancer-org/research/cancer-facts-and-statistics/annual-cancer-facts-and-figures/2018/cancer-facts-and-figures-2018.pdf

Cancer Prevention & Early Detection Facts & Figures
https://www.cancer.org/content/dam/cancer-org/research/cancer-facts-and-statistics/cancer-prevention-and-early-detection-facts-and-figures/cancer-prevention-and-early-detection-facts-and-figures-tables-and-figures-2018.pdf

Colorectal Cancer Facts & Figures
https://www.cancer.org/content/dam/cancer-org/research/cancer-facts-and-statistics/colorectal-cancer-facts-and-figures/colorectal-cancer-facts-and-figures-2017-2019.pdf

Breast Cancer Facts & Figures
https://www.cancer.org/content/dam/cancer-org/research/cancer-facts-and-statistics/breast-cancer-facts-and-figures/breast-cancer-facts-and-figures-2017-2018.pdf

Cancer Facts & Figures for Hispanics/Latinos
https://www.cancer.org/content/dam/cancer-org/research/cancer-facts-and-statistics/cancer-facts-and-figures-for-hispanics-and-latinos/cancer-facts-and-figures-for-hispanics-and-latinos-2015-2017.pdf

Cancer Facts & Figures for African Americans
https://www.cancer.org/content/dam/cancer-org/research/cancer-facts-and-statistics/cancer-facts-and-figures-for-african-americans/cancer-facts-and-figures-for-african-americans-2016-2018.pdf

Cancer Treatment & Survivorship Facts & Figures
https://www.cancer.org/content/dam/cancer-org/research/cancer-facts-and-statistics/cancer-treatment-and-survivorship-facts-and-figures/cancer-treatment-and-survivorship-facts-and-figures-2016-2017.pdf

The largest contributor to racial and ethnic disparities in cancer occurrence and care is poverty. According to the US Census Bureau, in 2016, 22 percent of Blacks and 19 percent of Hispanics lived below the FPL, compared to 9 percent of non-Hispanic Whites and 10 percent of Asians.

Screening increases the chances of detecting certain cancers early, when they might be easier to treat. The American Cancer Society recommends certain cancer screening guidelines which can all be accessed at: https://www.cancer.org/healthy/find-cancer-early/cancer-screening-guidelines.html. The American Cancer Society guidelines presented here are current as of April 1, 2018. The American Cancer Society updates guidelines from time to time to reflect current trends and statistics. The most recent guidelines for healthy eating and active living can be accessed at https://www.cancer.org/healthy/eat-healthy-get-active.html.

American Cancer Society Recommendations for the Early Detection of Cancer in Average-risk Asymptomatic People*

Cancer Site	Population	Test or Procedure	Recommendation
Breast	Women, ages 40 to 54	Mammography	Women should undergo regular screening mammography starting at age 45. Women ages 45 to 54 should be screened annually. Women should have the opportunity to begin annual screening between the ages of 40 and 44.
	Women, ages 55+		Transition to biennial screening, or have the opportunity to continue annual screening. Continue screening as long as overall health is good and life expectancy is 10+ years.
Cervix	Women, ages 21 to 29	Pap test	Screening should be done every 3 years with conventional or liquid-based Pap tests.
	Women, ages 30 to 65	Pap test & HPV DNA test	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 66+	Pap test & HPV DNA test	Women ages 66+ who have had greater than or equal to 3 consecutive negative Pap tests or greater than or equal to 2 consecutive negative HPV and Pap tests within the past 10 years, with the most recent test occurring in the past 5 years should stop cervical cancer screening.
	Women who have had a total hysterectomy		Stop cervical cancer screening.
Endometrial	Women at menopause		Women should be informed about risks and symptoms of endometrial cancer and encouraged to report unexpected bleeding to a physician.

Cancer Site	Population	Test or Procedure	Recommendation
Colorectal[‡][♦]	Men and women, ages 50+	Guaiac-based fecal occult blood test (gFOBT) with at least 50% sensitivity or fecal immunochemical test (FIT) with at least 50% sensitivity, **OR**	Annual testing of spontaneously passed stool specimens. Single stool testing during a clinician office visit is not recommended, nor are "throw in the toilet bowl" tests. 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.
		Multi-target stool DNA test, **OR**	Every 3 years
		Colonoscopy, **OR**	Every 10 years
		CT Colonography, **OR**	Every 5 years
		Flexible sigmoidoscopy (FSIG), **OR**	Every 5 years alone, or consideration can be given to combining FSIG performed every 5 years with a highly sensitive gFOBT or FIT performed annually.
		Double-contrast barium enema	Every 5 years
Lung	Current or former smokers ages 55 to 74 in good health with 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 annual lung cancer screening with apparently healthy patients ages 55 to 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+	Prostate-specific antigen test with or without digital rectal examination	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. African American men should have this conversation with their provider beginning at age 45.

CT-Computed tomography. *All individuals should become familiar with the potential benefits, limitations, and harms associated with cancer screening.
†All positive tests (other than colonoscopy) should be followed up with colonoscopy.
♦The ACS released new colorectal cancer screening guidelines in May 2018. They can be accessed at: Wolf AMD, Fontham ETH, Church TR, et al. Colorectal cancer screening for average-risk adults: 2018 guideline update from the American Cancer Society. CA Cancer J Clin. 2018; 68. The colorectal cancer screening data provided throughout this Chartbook is reflective of the previous guidelines as of April 1, 2018. https://onlinelibrary. wiley.com/doi/full/10.3322/caac.21457

American Cancer Society Guidelines on Screening and Surveillance for the Early Detection of Colorectal Adenomas and Cancer in People at Increased Risk or High Risk

Increased Risk – People Who Have a History of Polyps on Prior Colonoscopy

Risk category	When to test	Recommended test(s)	Comment
People with small rectal hyperplastic polyps	Same age as those at average risk	Colonoscopy, or other screening options at same intervals as for those at average risk	Those with hyperplastic polyposis syndrome are at increased risk for adenomatous polyps and cancer and should have more intensive follow-up.
People with one or two small (no more than 1 cm) tubular adenomas with low-grade dysplasia	Five to 10 years after the polyps are removed	Colonoscopy	Time between tests should be based on other factors such as prior colonoscopy findings, family history, and patient and doctor preferences.
People with three to 10 adenomas, or a large (at least 1 cm) adenoma, or any adenomas with high-grade dysplasia or villous features	Three years after the polyps are removed	Colonoscopy	Adenomas must have been completely removed. If colonoscopy is normal or shows only one or two small tubular adenomas with low-grade dysplasia, future colonoscopies can be done every five years.
People with more than 10 adenomas on a single exam	Within three years after the polyps are removed	Colonoscopy	Doctor should consider possible genetic syndrome (such as FAP or Lynch syndrome).
People with sessile adenomas that are removed in pieces	Two to six months after adenoma removal	Colonoscopy	If entire adenoma has been removed, further testing should be based on doctor's judgment.

Increased Risk – People Who Have Had Colorectal Cancer

Risk category	When to test	Recommended test(s)	Comment
People diagnosed with colon or rectal cancer	At time of colorectal surgery, or can be three to six months later if person doesn't have cancer spread that can't be removed	Colonoscopy to look at the entire colon and remove all polyps	If the tumor presses on the colon/rectum and prevents colonoscopy, CT colonoscopy (with IV contrast) or DCBE may be done to look at the rest of the colon.
People who have had colon or rectal cancer removed by surgery	Within one year after cancer resection (or one year after colonoscopy to make sure the rest of the colon/rectum was clear)	Colonoscopy	If normal, repeat in three years. If normal then, repeat test every five years. Time between tests may be shorter if polyps are found or there's reason to suspect Lynch syndrome. After low anterior resection for rectal cancer, exams of the rectum may be done every three to six months for the first two to three years to look for signs of recurrence.

Increased Risk – People with a Family History

Risk category	When to test	Recommended test(s)	Comment
Colorectal cancer or adenomatous polyps in any first-degree relative before age 60, or in two or more first-degree relatives at any age (if not a hereditary syndrome).	Age 40, or 10 years before the youngest case in the immediate family, whichever is earlier	Colonoscopy	Every five years.
Colorectal cancer or adenomatous polyps in any first-degree relative aged 60 or older, or in at least two second-degree relatives at any age	Age 40	Same test options as for those at average risk.	Same test intervals as for those at average risk.

High Risk

Risk category	When to test	Recommended test(s)	Comment
Familial adenomatous polyposis (FAP) diagnosed by genetic testing, or suspected FAP without genetic testing	Age 10 to 12	Yearly flexible sigmoidoscopy to look for signs of FAP; counseling to consider genetic testing if it hasn't been done	If genetic test is positive, removal of colon (colectomy) should be considered.
Lynch syndrome (hereditary non-polyposis colon cancer or HNPCC), or at increased risk of Lynch syndrome based on family history without genetic testing	Age 20 to 25 years, or 10 years before the youngest case in the immediate family	Colonoscopy every 1 to 2 years; counseling to consider genetic testing if it hasn't been done	Genetic testing should be offered to first-degree relatives of people found to have Lynch syndrome mutations by genetic tests. It should also be offered if 1 of the first 3 of the modified Bethesda criteria is met.*
Inflammatory bowel disease: – Chronic ulcerative colitis – Crohn's disease	Cancer risk begins to be significant 8 years after the onset of pancolitis (involvement of entire large intestine), or 12-15 years after the onset of left-sided colitis	Colonoscopy every 1 to 2 years with biopsies for dysplasia	These people are best referred to a center with experience in the surveillance and management of inflammatory bowel disease.

* The Bethesda criteria can be found in *Genetic Testing, Screening, and Prevention for People with a Strong Family History of Colorectal Cancer.*
https://www.cancer.org/content/cancer/en/cancer/colon-rectal-cancer/causes-risks-prevention/genetic-tests-screening-prevention.html

American Cancer Society Guideline for HPV Vaccinations, 2017

As of February 2017, the American Cancer Society recommends a two-dose human papillomavirus vaccine schedule for girls and boys who initiate the vaccination series at ages nine through 14 years. The second dose should be administered six to 12 months after the first dose. Three doses remain recommended for those who initiate the vaccination series at ages 15 through 26 years and for immunocompromised persons.

- Routine HPV vaccination for girls and boys should be started at age 11 or 12. The vaccination series can be started as early as age nine.
- HPV vaccination is also recommended for females 13 to 26 years old and for males 13 to 21 years old who have not started the vaccines, or who have started but not completed the series. Males 22 to 26 years old may also be vaccinated.*
- HPV vaccination is also recommended through age 26 for men who have sex with men and for people with weakened immune systems (including people with HIV infection), if they have not previously been vaccinated.

*For people 22 to 26 years old who have not started the vaccines, or who have started but not completed the series, it is important to know that vaccination at older ages is less effective in lowering cancer risk.

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 meats 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 alcoholic 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.

The underlying causes of disparities in cancer care are complex and include interrelated social, economic, cultural, environmental, and health system factors. Eliminating disparities in health care is an overarching goal of the American Cancer Society and the American Cancer Society Cancer Action Network.

This publication attempts to summarize current scientific research related to the US population and its experience with health issues. Except when specified, the summaries are not intended to represent the official positions of ACS CAN or the American Cancer Society.

Questions regarding this publication should be directed to https://www.acscan.org/about-our-organization/contact-us.

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