CANCER IN CALIFORNIA, 1988-2017

ASSESSING THE BURDEN OF CANCER AMONG CALIFORNIANS

This report was prepared by the California Cancer Reporting and Epidemiologic Surveillance (CalCARES) Program, University of California Davis Health, for the Chronic Disease Surveillance and Research Branch (CDSRB), California Department of Public Health (CDPH), Pursuant to CDPH Grant Number 17-10097.

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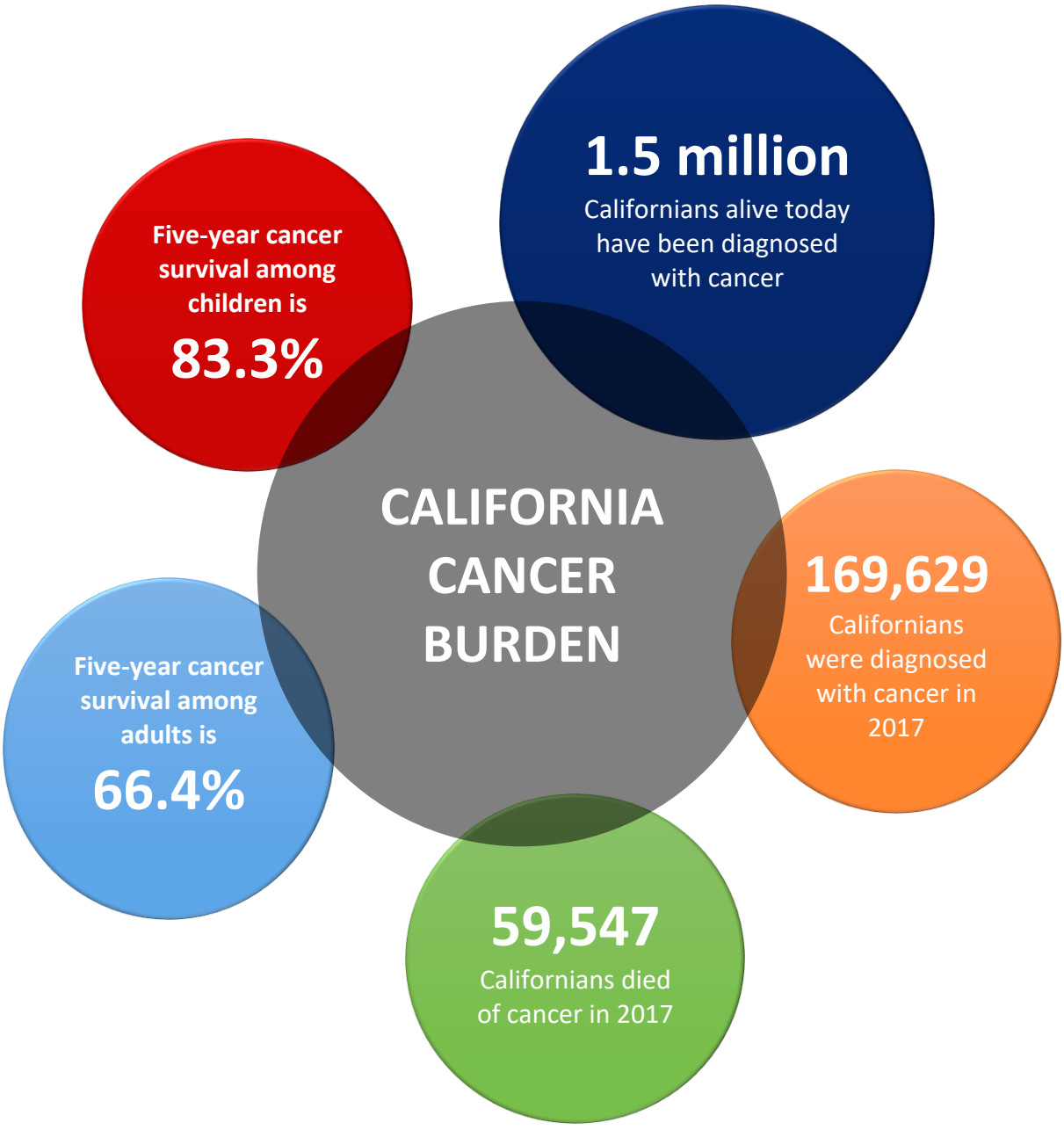
EXECUTIVE SUMMARY

This report provides a broad overview of the cancer burden in California with chapters dedicated to incidence, mortality, and survival. The final chapter evaluates progress toward meeting objectives outlined in CDPH's, CWP. CWP objectives evaluated were those designed to reduce the overall cancer burden and eliminate existing disparities.



Key findings of this report include:

- Approximately 1.5 million Californians alive today have been diagnosed with cancer at some point in their lives.
- In 2017, 169,629 new cancer cases and 59,547 cancer deaths occurred among Californians.
- Since 1988, overall cancer incidence and mortality rates significantly decreased in California by 13.9 percent and 33.4 percent, respectively.
- The most commonly diagnosed cancers among men were prostate, lung, colorectal, melanoma, and bladder. The most commonly diagnosed cancers among women were breast, lung, colorectal, corpus uterine, and thyroid.
- Men had higher cancer incidence (409.0 per 100,000) and mortality (160.0 per 100,000) rates than women (377.5 per 100,000 and 120.1 per 100,000, respectively). However, decreases in cancer incidence rates were greater among men (2.0 percent per year) than women (0.5 percent per year).
- The risk of certain types of cancer varied by age. Among children under 14 years, leukemia and brain tumors were the most commonly diagnosed cancers. Among adults aged 50 years and older, breast, prostate, lung, and colorectal were the most commonly diagnosed cancers.
- Non-Latino/Hispanic Whites had the highest cancer incidence rate (429.7 per 100,000) compared to Black/African Americans (401.5 per 100,000), American Indians (396.6), Latino/Hispanics (318.4 per 100,000), and Asian/Pacific Islanders (287.2 per 100,000).
- American Indians were the only racial/ethnic group for whom cancer incidence significantly increased by 2.7 percent per year.
- American Indians (176.5 per 100,000) and Black/African Americans (175.3 per 100,000) had the highest cancer mortality rates, followed by non-Latino/Hispanic Whites (147.9 per 100,000), Latino/Hispanics (118.5 per 100,000), and Asian/Pacific Islanders (102.4 per 100,000).
- American Indians were the only racial/ethnic group for whom cancer mortality significantly increased by 2.2 percent per year.
- Five-year cancer survival among California adults aged 20 years and older was 66.4 percent, whereas five-year cancer survival among children aged birth to 19 years was 83.3 percent.

- Among men, five-year survival was highest for prostate (96.8 percent), testicular (94.1 percent), and thyroid (93.8 percent) cancers and lowest for pancreatic (8.4 percent), lung (14.8 percent), and liver (17.5 percent) cancers. Among women, five-year survival was highest for thyroid (98.3 percent), melanoma (92.8 percent), and breast (90.1 percent) cancers and lowest for pancreatic (8.4 percent), liver (18.9 percent), and lung (21.3 percent) cancers.
- Five-year cancer survival increased among each racial/ethnic group in California between 1988 and 2012. However, Black/African Americans had the lowest cancer survival (61.6 percent) in 2012 compared to non-Latino/Hispanic Whites (67.2 percent), Latino/Hispanics (66.0 percent), and Asian/Pacific Islanders (64.9 percent).
- Cancers detected at an early stage have the best prognosis. Seven screen-detectable cancers have the greatest possibility of early diagnosis, including female breast, cervical, prostate, colorectal, melanoma, oral, and lung. However, more oral (61 percent), colorectal (54 percent), and cervical (49 percent) cancers are diagnosed at a late- versus early-stage.

Summary Evaluation of California Wellness Plan (CWP) Goals

The 2014 CWP had several objectives aimed at decreasing the cancer burden as well as eliminating existing disparities. The progress achieved toward reaching the plan's objectives is highlighted in the table below.

CWP Goal	Target	Most Recent Data (2017)	Progress
By 2015, increase the proportion of early-stage diagnoses of breast cancer among all women by 29 percent, from 69 percent in 2008 to 89 percent.	89%	71%	
By 2015, decrease the proportion of late-stage diagnoses of colorectal cancer among Californians by 15 percent, from 47.1 percent in 2008 to 40 percent.	40%	58%	
By 2015, decrease the proportion of late-stage diagnoses of colorectal cancer among Black/African Americans and Asian/Pacific Islanders by 20 percent, from 51.5 percent in 2008 to 41.2 percent for Black/African Americans, and from 51.8 percent in 2008 to 41.1 percent for Asian/Pacific Islanders.	Black/African Americans, 41.2% Asian/Pacific Islanders, 41.1%	Black/African Americans, 57% Asian/Pacific Islanders, 59%	 
By 2015, reduce the mortality rate of female breast cancer by 10 percent, from 21.4 per 100,000 in 2008 to 19.3 per 100,000.	19.3 per 100,000	19.4 per 100,000	

 Red X: CWP goal <u>not</u> met or trend worsening.
 Blue Cross: Some progress made, but CWP goal not met.
 Green Star: CWP goal met.

CWP Goal*	Target	Most Recent Data (2017)	
By 2015, decrease the mortality rate of colorectal cancer by 17.5 percent, from 14.5 per 100,000 in 2008 to 12 per 100,000.	12.0 per 100,000	12.1 per 100,000	
By 2015, decrease the mortality rate of prostate cancer by 10 percent, from 21.7 per 100,000 in 2008 to 19.5 per 100,000.	19.5 per 100,000	19.2 per 100,000	
By 2015, decrease the mortality rate of prostate cancer among Black/African American men by ten percent, from 51.6 per 100,000 in 2008 to 46.4 per 100,000.	46.4 per 100,000	43.4 per 100,000	
By 2020, decrease the mortality rate of lung cancer from 36.2 per 100,000 in 2012 to 32.6 per 100,000.	32.6 per 100,000	26.7 per 100,000	
By 2020, decrease the incidence of lung cancer from 44.8 per 100,000 in 2012 to 31.3 per 100,000.	31.3 per 100,000	39.0 per 100,000	
By 2015, decrease the incidence of cervical cancer by 15 percent, from 8.2 per 100,000 in 2008 to 7.0 per 100,000.	7.0 per 100,000	7.3 per 100,000	

 Red X: CWP goal not met or trend worsening.
 Blue Cross: Some progress made, but CWP goal not met.
 Green Star: CWP goal met.

INTRODUCTION

In 2012, California kicked-off the Let's Get Healthy California (LGHC) campaign with the goal of making California the healthiest state in the nation by 2022. LGHC aims to improve the health of all Californians by controlling health care costs, promoting personal responsibility for individual health, and advancing health equity.[1] In response to LGHC, California Department of Public Health (CDPH) developed the California Wellness Plan (CWP) to coordinate efforts among public and private chronic disease prevention and health promotion programs to decrease the burden of chronic disease among all Californians.[2] As a whole, chronic diseases are the leading cause of death in California and have a significant impact on quality of life and productivity. More specifically, heart disease and cancer each account for approximately 23 percent of all deaths in California.

This report focuses on the burden of cancer in California. Approximately 1.5 million Californians living today have been diagnosed with cancer and each year approximately 169,000 new cases are diagnosed. As the number of older adults (age 60 years and older) continues to grow, the number of new cancer cases will also increase. The toll cancer takes on the patient, their loved ones, and society is high. The emotional, psychological, and physical burdens associated with cancer are difficult to measure but should not be understated. The financial costs of cancer to the individual and society are substantial as well. Medical costs associated with diagnosing and treating cancer in the United States in 2020 were estimated at 157.8 billion dollars. This is a 26.7 percent increase in cost from 2010.[3] The loss of productivity from cancer mortality in the United States in 2020 was estimated at 147.6 billion dollars which was a 27.5 percent increase from 2000.[4] However, approximately 40 percent of cancers are preventable and efforts to reduce the cancer burden through prevention need to be made.[5]

Cancer disproportionally affects subgroups of our population. Many factors contribute to an individual's risk of developing and surviving cancer, including genetics, personal behaviors, and social determinants of health.[6] The World Health Organization defines social determinants of health as the conditions in which people are born, grow, live, work, and age.[7] More specifically, social determinants of health include socioeconomic status, education, employment, access to health care, neighborhood attributes, community attributes, and social support systems.[8] Many of these risk factors are modifiable and progress toward reducing or eliminating them could lessen the burden of cancer. This report provides detailed information on cancer incidence, mortality, and survival by sex, race/ethnicity, and age and identifies areas where disparities exist, and more work needs to be done to ensure progress in reducing the cancer burden is experienced by all subgroups of our population.

Data in this report came from the California Cancer Registry (CCR). CCR is a program of the CDPH, Chronic Disease Surveillance and Research Branch (CDSRB). CCR is a comprehensive, statewide, cancer surveillance system. Enacted into law in 1985 (Health & Safety Code Sections 103875-103885), CCR was established to monitor the burden of cancer in California. CCR's mission is to serve the public by collecting timely, standardized, statewide data across the cancer continuum to target action toward high impact data use. CCR is recognized for its high-quality data and routinely meets the standards of NCI, Surveillance, Epidemiology, and End Results (SEER) program, the Centers for Disease Control and Prevention's, National Program of Cancer Registries (NPCR), and the North American Association of Central Cancer Registries (NAACCR). Since 2012, CCR has partnered with the California Cancer Reporting and Epidemiologic Surveillance (CalCARES) Program at UC Davis Health to manage the day-to-day operations of CCR.

Chapter 1. CANCER INCIDENCE AND PREVALENCE

Incidence is an important measure of the cancer burden; it represents the number of new cancer cases diagnosed in a population in a defined time period. Incidence informs health care providers, public health professionals, policy makers, and other stakeholders on the effectiveness of **primary** and **secondary prevention** measures. **Prevalence** is a measure of existing cases in a population at a defined point or period in time. Prevalence is useful for determining how many resources are needed to diagnose and treat cancer, and where resources should be directed to minimize disparities in the cancer burden. In 2017, 169,629 new cancers were diagnosed among Californians. This corresponds to an **age-adjusted incidence rate (AAIR)** of 388.3 per 100,000. Since 1988, the AAIR of all cancers has decreased significantly by 13.9 percent or 0.6 percent per year.

Incidence by Sex

In 2017, 86,702 women and 82,927 men were diagnosed with cancer. The most commonly diagnosed cancers among women were breast (27,650), lung (8,626), colorectal (7,006), corpus uterus (6,336), and thyroid (3,918), whereas the most commonly diagnosed cancers among men were prostate (20,085), lung (8,192), colorectal (7,640), melanoma (5,912), and bladder (5,313) (Table 1.1).

The AAIR of all cancers combined among men (409.0 per 100,000; 95 percent Confidence Interval (CI), 406.1 - 411.8) was higher than among women (377.5 per 100,000; 95 percent CI, 375.0 – 380.10), indicating that men have a higher burden of cancer incidence than women.

Since 1988, cancer incidence significantly declined in California by 13.9 percent.

Key Terms

Incidence is the number of new cancer cases diagnosed in a population in a defined time period.

Primary Prevention refers to measures that can prevent cancer before it starts such as healthy behaviors and HPV vaccines.

Secondary Prevention refers to measures that can diagnose and control cancer at an early stage such as screening tests and effective treatment.

Prevalence is a measure of existing cases in a population at a defined point or period in time.

Age-adjusted Incidence Rate (AAIR) is the number of new cancer cases diagnosed in a population in a defined time period per 100,000 people, **standardized** to the age structure of the 2000 U.S. Standard Population.

Standardization is a method used to adjust age-specific rates using the age distribution of a standard population. Standardization allows for the comparison of rates between population groups.

Average Annual Percent Change (AAPC) is a summary measure of the trend in cancer incidence or mortality over a predetermined time interval.

A **risk factor** is something that increases a person's chance of developing cancer.

Table 1.1 Most Common Types of Cancer Incidence and Prevalence among Men and Women in California, 2017

MEN
82,927
NEW CASES
AAIR* = 409.0

WOMEN
86,702
NEW CASES
AAIR* = 377.5

CANCER TYPE	NEW CASES	AAIR*	EXISTING CASES	CANCER TYPE	NEW CASES	AAIR*	EXISTING CASES
Prostate	20,085	93.8	291,912	Breast	27,650	121.7	347,422
Lung	8,192	42.1	20,506	Lung	8,626	36.2	27,141
Colorectal	7,640	38.0	67,394	Colorectal	7,006	30.1	64,673
Melanoma	5,912	29.8	59,080	Corpus Uterus	6,336	26.7	67,694
Bladder	5,313	27.6	47,329	Thyroid	3,918	18.9	57,092
Non-Hodgkin Lymphoma	4,185	21.1	36,635	Melanoma	3,912	17.1	50,954
Kidney	4,126	20.1	31,661	Non-Hodgkin Lymphoma	3,408	14.7	31,935
Leukemia	2,821	14.6	23,510	Kidney	2,415	10.5	19,555
Oral	3,058	14.5	25,259	Ovary	2,399	10.5	21,488
Liver	2,920	13.6	7,999	Pancreas	2,465	10.3	3,808
Pancreas	2,641	13.2	3,792	Leukemia	2,006	9.0	17,323
Stomach	1,809	9.2	7,060	Cervix	1,503	7.3	25,062
Myeloma	1,431	7.1	7,288	Bladder	1,554	6.4	14,777
Brain & Other Nervous System	1,422	7.0	7,838	Stomach	1,317	5.8	5,576
Thyroid	1,325	6.5	15,900	Oral	1,276	5.5	11,689
Testis	1,256	6.2	24,189	Liver	1,298	5.4	3,424
Esophagus	1,150	5.7	3,003	Brain & Other Nervous System	1,020	4.7	6,790
Soft Tissue	891	4.5	7,440	Myeloma	1,117	4.7	5,649
Larynx	637	3.1	6,171	Soft Tissue	702	3.2	6,513
Hodgkin Lymphoma	472	2.3	8,861	Vulva	486	2.1	3,901

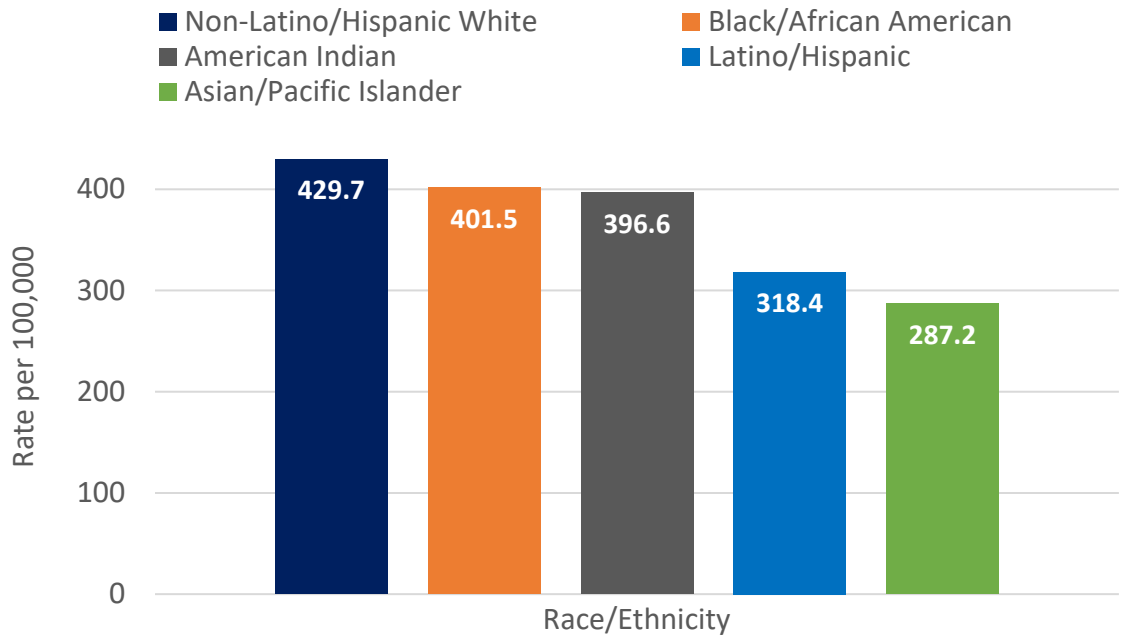
*AAIR: Age-adjusted incidence rate

Source: California Cancer Registry, California Department of Public Health

Incidence by Race/Ethnicity

Cancer incidence varies by race/ethnicity. In 2017, non-Latino/Hispanic Whites had the highest cancer incidence compared to other racial/ethnic groups in the state. The AAIR of invasive cancer among non-Latino/Hispanic Whites was 429.7 per 100,000 (95 percent CI, 426.9 – 432.6) compared to 401.5 per 100,000 (95 percent CI, 393.6 – 409.5) among Black/African Americans, 396.6 per 100,000 (95 percent CI, 370.6 – 424.1) among American Indians, 318.4 per 100,000 (95 percent CI, 314.9 – 321.8) among Latino/Hispanics, and 287.2 per 100,000 (95 percent CI, 283.2 – 291.2) among Asian/Pacific Islanders (Figure 1.1).

Figure 1.1 Age-adjusted Incidence Rate of Invasive Cancer by Race/Ethnicity, California, 2017



Source: California Cancer Registry, California Department of Public Health

Since 1988, every racial/ethnic group has experienced a significant decline in cancer incidence except for American Indians. The AAIR of invasive cancer among American Indians significantly increased by 73.7 percent or 2.7 percent per year. The AAIR of invasive cancer among non-Latino/Hispanic Whites decreased significantly by 10.8 percent or 0.5 percent per year; among Black/African Americans by 16.1 percent or 0.8 percent per year; among Latino/Hispanics by 0.7 percent or 0.3 percent per year; and among Asian/Pacific Islanders by 11.2 percent or 0.5 percent per year.

Tables 1.2 and 1.3 show the distribution of the five most commonly diagnosed cancers among fifteen detailed racial/ethnic groups by sex. Among men in ten racial/ethnic groups, prostate, lung, and colorectal cancer were the three most commonly diagnosed cancers. Notable exceptions were in Latino/Hispanic men where kidney cancer was one of the three most commonly diagnosed cancers; Kampuchean, Laotian/Hmong, and Vietnamese men where liver cancer was one of the three most commonly diagnosed cancers; and non-Latino/Hispanic White men where melanoma was one of the three most commonly diagnosed cancers. Among women, breast cancer was the most commonly diagnosed cancer in each racial/ethnic group. For women in ten racial/ethnic groups, lung and colorectal cancers were among the top three most commonly diagnosed cancers. Notable exceptions were Filipino, Hawaiian, Latino/Hispanic, Pacific Islander, and South Asian women where corpus uterine cancer was one of the three most commonly diagnosed cancers.

Since 1988, cancer incidence significantly increased among American Indians and significantly decreased among Asian/Pacific Islanders, Black/African Americans, Latino/Hispanics, and non-Latino/Hispanic Whites.

Table 1.2 Number of Cases for the Five Most Commonly Diagnosed Cancers among California Men by Detailed Race/Ethnicity, 2013-2017

Rank	1	2	3	4	5
American Indian	Prostate (391)	Lung (260)	Colorectal (221)	Liver (201)	Kidney (126)
Black/African American	Prostate (8,224)	Lung (3,108)	Colorectal (2,435)	Kidney (1,347)	Liver (1,067)
Chinese	Prostate (1,945)	Lung (1,910)	Colorectal (1,583)	Liver (781)	NHL* (675)
Filipino	Prostate (2,150)	Lung (1,496)	Colorectal (1,147)	NHL* (566)	Liver (528)
Hawaiian	Prostate (120)	Lung (75)	Colorectal (58)	Liver (34)	NHL* (28)
Japanese	Prostate (659)	Colorectal (459)	Lung (362)	NHL* (220)	Stomach (192)
Kampuchean	Colorectal (96)	Lung (79)	Liver (76)	Prostate (27)	NHL* (20)
Korean	Colorectal (574)	Lung (530)	Prostate (431)	Stomach (364)	Liver (251)
Laotian/ Hmong	Lung (95)	Colorectal (92)	Liver (92)	Oral (34)	NHL* (31)
Latino/Hispanic	Prostate (17,046)	Colorectal (8,640)	Kidney (5,326)	Lung (5,248)	Liver (4,550)
Non-Latino/Hispanic White	Prostate (53,216)	Lung (26,531)	Melanoma (24,658)	Colorectal (20,443)	Bladder (19,272)
Pacific Islander^	Prostate (213)	Lung (127)	Colorectal (99)	Liver (59)	Bladder (50)
South Asian†	Prostate (772)	Colorectal (370)	Lung (288)	NHL* (245)	Bladder (225)
Thai	Prostate (62)	Colorectal (52)	Lung (36)	Liver (34)	NHL* (24)
Vietnamese	Lung (999)	Liver (776)	Colorectal (715)	Prostate (616)	NHL* (295)

^Pacific Islander includes Micronesian, Chamorran, Guamanian, Polynesian, Tahitian, Samoan, Tongan, Melanesian, Fiji Islander, New Guinean, and Pacific Islander (not otherwise specified).

†South Asian Includes: Asian Indian and Pakistani

*NHL: Non-Hodgkin Lymphoma

Source: California Cancer Registry, California Department of Public Health

Table 1.3 Number of Cases for the Five Most Commonly Diagnosed Cancers among California Women by Detailed Race/Ethnicity, 2013-2017

Rank	1	2	3	4	5
American Indian	Breast (719)	Lung (296)	Colorectal (234)	Corpus Uterus (211)	Kidney (116)
Black/African American	Breast (8,395)	Lung (3,097)	Colorectal (2,502)	Corpus Uterus (1,889)	Pancreas (911)
Chinese	Breast (4,567)	Lung (1,664)	Colorectal (1,373)	Corpus Uterus (886)	Thyroid (829)
Filipino	Breast (5,846)	Corpus Uterus (1,387)	Lung (1,191)	Thyroid (1,122)	Colorectal (1,106)
Hawaiian	Breast (308)	Corpus Uterus (99)	Colorectal (71)	Lung (62)	Thyroid (36)
Japanese	Breast (1,564)	Colorectal (536)	Lung (484)	Corpus Uterus (261)	NHL* (223)
Kampuchean	Breast (135)	Colorectal (80)	Lung (57)	Liver (45)	Thyroid (27)
Korean	Breast (1,230)	Colorectal (508)	Lung (328)	Thyroid (316)	Stomach (255)
Laotian/ Hmong	Breast (101)	Colorectal (79)	Lung (56)	Corpus Uterus (45)	Cervix (41)
Latino/Hispanic	Breast (26,885)	Colorectal (7,581)	Corpus Uterus (7,034)	Thyroid (6,336)	Lung (5,047)
Non-Latino/Hispanic White	Breast (76,850)	Lung (28,994)	Colorectal (19,114)	Corpus Uterus (15,977)	Melanoma (15,134)
Pacific Islander^	Breast (462)	Corpus Uterus (255)	Lung (110)	Colorectal (97)	Thyroid (64)
South Asian†	Breast (1,565)	Thyroid (319)	Corpus Uterus (311)	Colorectal (208)	NHL* (171)
Thai	Breast (212)	Colorectal (68)	Lung (64)	Thyroid (43)	Corpus Uterus (36)
Vietnamese	Breast (1,532)	Lung (651)	Colorectal (583)	Thyroid (348)	Corpus Uterus (296)

^Pacific Islander includes Micronesian, Chamorran, Guamanian, Polynesian, Tahitian, Samoan, Tongan, Melanesian, Fiji Islander, New Guinean, and Pacific Islander (not otherwise specified).

†South Asian Includes: Asian Indian and Pakistani

*NHL: Non-Hodgkin Lymphoma

Source: California Cancer Registry, California Department of Public Health

Incidence by Age

Advancing age is a **risk factor** for cancer. Overall, cancer is more common among older than younger persons with incidence peaking between the ages of 80 and 84 years (2,046.3 per 100,000; 95 percent CI, 2,011.5 – 2,081.4) (Figure 1.2). Among those under 24 years, cancer incidence rates did not differ significantly by sex. However, among those aged 25 to 49 years, women had significantly higher cancer incidence rates than men and, among those aged 60 years and older, men had significantly higher cancer incidence rates than women.

The risk of certain types of cancer varies by age. Among children under 14 years, leukemia (37.8 percent) and brain tumors (19.4 percent) were the most commonly diagnosed cancers. Among adolescents aged 15 to 29 years, the most commonly diagnosed cancers were testicular (16.3 percent) and thyroid (15.4 percent). Among adults aged 30 to 49 years, breast (27.3 percent) and thyroid (ten percent) cancers were the most common. For adults aged 50 to 69 years, the most commonly diagnosed cancers were breast (17.9 percent) and prostate (15.4 percent). Among adults aged 70 to 84 years, the most commonly diagnosed cancers were lung (14.9 percent), breast (12.9 percent), and prostate (12.8 percent). Among adults aged 85 years and older, lung (14.1 percent), colorectal (12.0 percent), and breast (10.2 percent) were the most common (Figure 1.3).

Screening methods can prevent some cancers before they start or detect some cancers early when they are more likely to respond to treatment. United States Preventive Services Task Force recommends individuals of average risk get screened for colorectal cancer beginning at age 50 and continue through age 75.[9] In 2017, 14,646 new cases of colorectal cancer were diagnosed among Californians. Among those individuals, 8,628 (59 percent) were diagnosed between the ages of 50 and 75 years and 35 percent of those tumors were diagnosed at an early stage. Additionally, the task force recommends women of average risk get screened for breast cancer beginning at age 50 and continue through age 74.[10] In 2017, 27,650 women were diagnosed with breast cancer in California. Among those women, 17,305 (63 percent) were diagnosed between the ages of 50 and 74 years and 67 percent of those tumors were diagnosed at an early stage. Better adherence to screening guidelines could decrease the incidence of colorectal cancer through the removal of precancerous adenomatous polyps as well as increase the proportion of colorectal and female breast cancers diagnosed at an early stage.

Figure 1.2 Age-Specific Cancer Incidence Rates by Sex, California, 2017

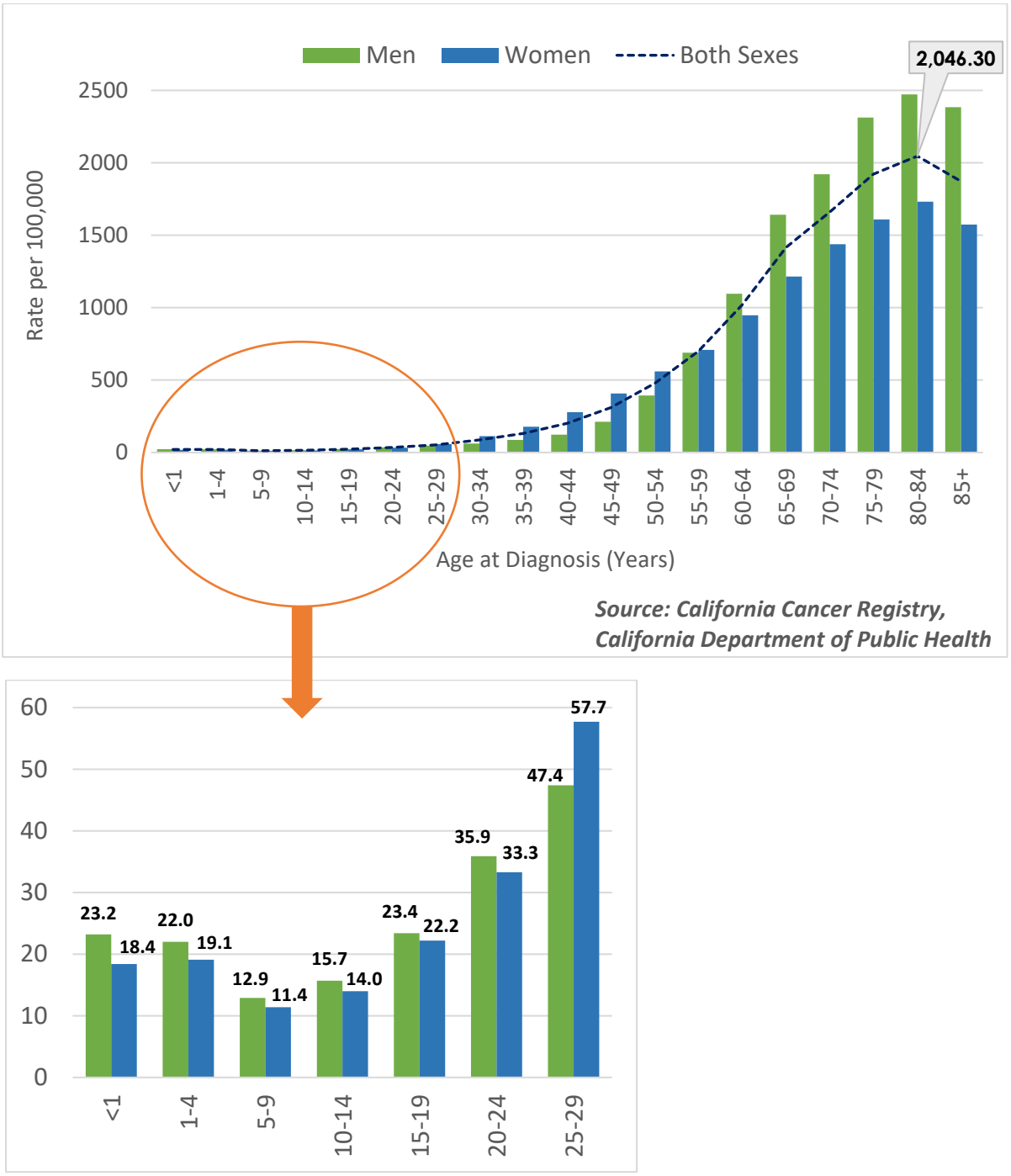
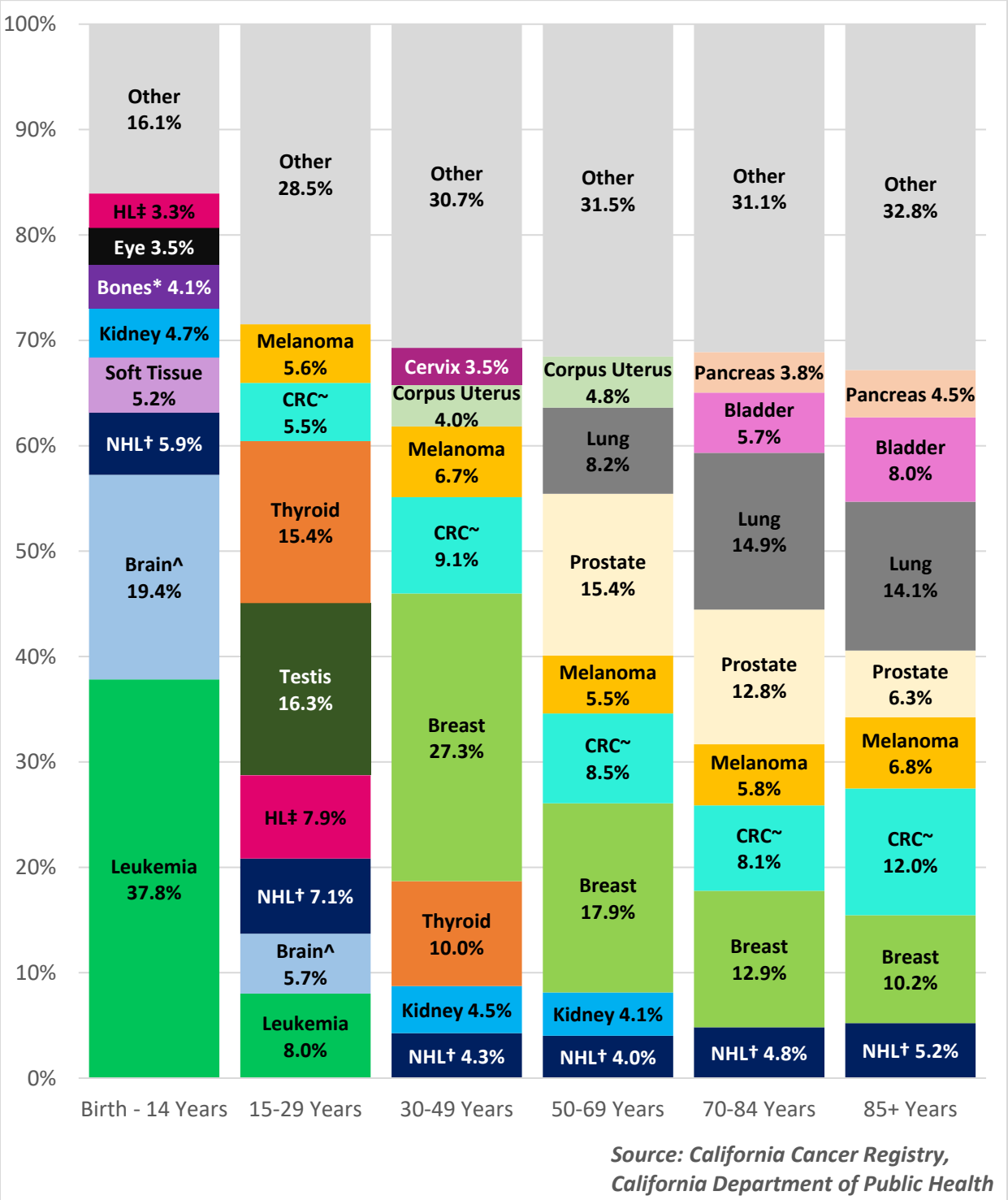


Figure 1.3 Distribution of New Cancer Cases by Age at Diagnosis, California, 2017



HL‡: Hodgkin Lymphoma; Bones*: Bones & Joints; NHL†: Non-Hodgkin Lymphoma; Brain^: Brain and Other Nervous System; CRC~: Colorectal.

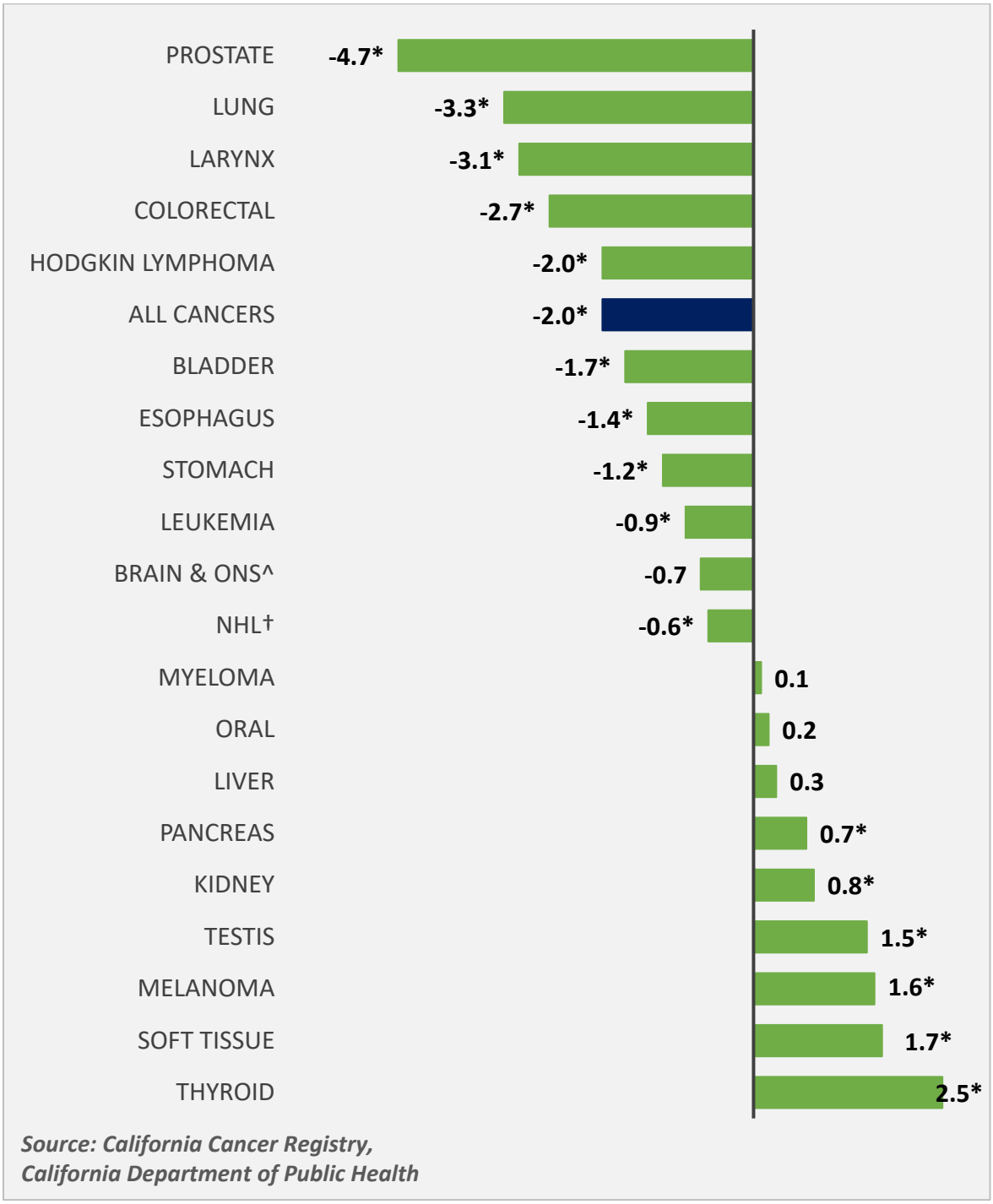
Incidence Trends

Monitoring cancer trends provides useful information regarding the efficacy of cancer control efforts. Incidence trends for the most recent ten-year period are presented to highlight current progress in reducing the cancer burden or areas where more work needs to be done. The **average annual percent change (AAPC)** provides a summary measure of the trend in cancer incidence over a predetermined time interval. All trends described below had a p-value < 0.05 and were thus statistically significant. Between 2008 and 2017, overall cancer incidence among men in California decreased significantly by 2.0 percent per year. Of the 20 most commonly diagnosed cancers among men, ten decreased significantly and six increased significantly. Cancers that decreased significantly include: prostate, lung, larynx, colorectal, Hodgkin lymphoma, bladder, esophagus, stomach, leukemia, and non-Hodgkin lymphoma. Cancers that increased significantly include: pancreas, kidney, testis, melanoma, soft tissue, and thyroid (Figure 1.4).

Between 2008 and 2017, overall cancer incidence among women in California decreased significantly by 0.5 percent per year. Of the 20 most commonly diagnosed cancers among women, eight decreased significantly and four increased significantly. Cancers that decreased significantly include: colorectal, bladder, lung, ovary, leukemia, oral, cervix, and non-Hodgkin lymphoma. Cancers that increased significantly include: melanoma, soft tissue, thyroid, and corpus uterus (Figure 1.5).

Between 2008 and 2017, the incidence rate of 13 cancers significantly decreased and the incidence rate of seven cancers significantly increased.

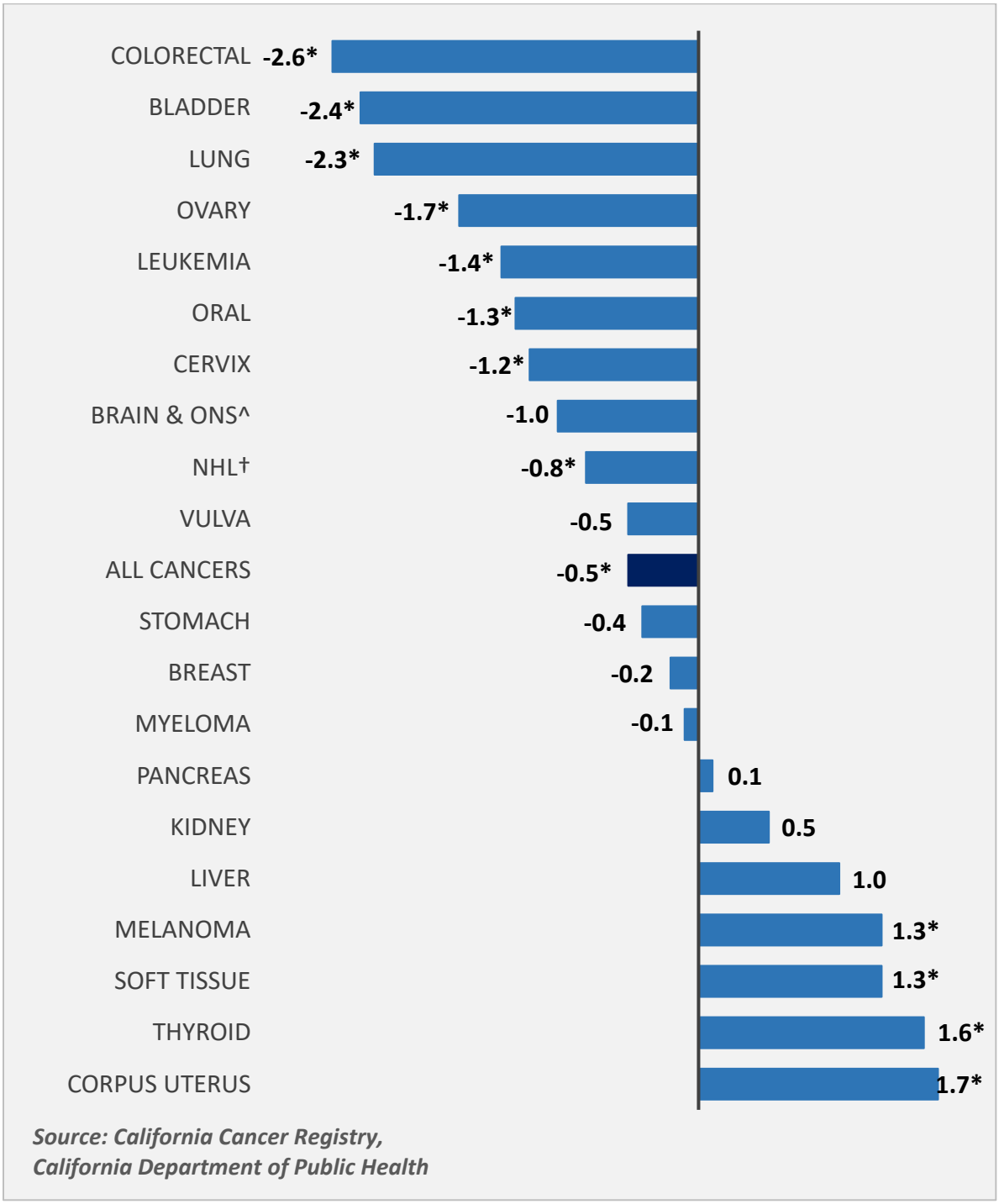
Figure 1.4 Average Annual Percent Change (AAPC) in Cancer Incidence among Men, California, 2008-2017



Source: California Cancer Registry, California Department of Public Health

*The AAPC is significantly different from zero at $p < 0.05$.
^ONS: Other Nervous System
†NHL: Non-Hodgkin Lymphoma

Figure 1.5 Average Annual Percent Change (AAPC) in Cancer Incidence among Women, California, 2008-2017



*The AAPC is significantly different from zero at $p < 0.05$.
^ONS: Other Nervous System
†NHL: Non-Hodgkin Lymphoma

Chapter 2. CANCER MORTALITY

Mortality refers to the number of deaths that occur due to cancer. Mortality is a strong indicator of progress in cancer control, and informs health care providers, public health professionals, policy makers, and other stakeholders on the effectiveness of **secondary prevention** measures and treatment regimens. In 2017, 59,547 Californians died of cancer. This corresponds to an **age-adjusted mortality rate (AAMR)** of 136.9 per 100,000. Since 1988, the AAMR of all cancers combined has decreased significantly by 33.4 percent or 1.4 percent per year.

Mortality by Sex

In 2017, more men (30,740) than women (28,807) died of cancer. The most common types of cancer death among men were: lung (6,068), prostate (3,468), colorectal (2,730), pancreas (2,334), and liver (2,264), whereas the most common types of cancer death among women were: lung (5,493), breast (4,589), colorectal (2,555), pancreas (2,193), and ovary (1,636) (Table 2.1).

The AAMR of all cancers combined among men (160.0 per 100,000; 95 percent CI, 158.2 – 161.8) was higher than among women (120.1 per 100,000; 95 percent CI, 118.6 – 121.5), indicating that men have a higher burden of cancer mortality than women.

Since 1988, cancer mortality significantly declined in California by 33.4 percent.

Key Terms

Mortality is the number of deaths due to cancer in a population.

Secondary Prevention refers to measures that can diagnose and control cancer at an early stage such as screening tests and effective treatment.

Age-adjusted Mortality Rate (AAMR) is the number of cancer deaths in a population in a defined time period per 100,000 people, **standardized** to the age structure of the 2000 U.S. Standard Population.

Standardization is a method used to adjust age-specific rates using the age distribution of a standard population. Standardization allows for the comparison of rates between population groups.

Average Annual Percent Change (AAPC) is a summary measure of the trend in cancer incidence or mortality over a predetermined time interval.

Table 2.1 Most Common Types of Cancer Mortality among Men and Women in California, 2017

MEN
30,740
DEATHS
AAMR* = 160.0

WOMEN
28,807
DEATHS
AAMR* = 120.1

CANCER TYPE	DEATHS	AAMR*	CANCER TYPE	DEATHS	AAMR*
Lung	6,068	31.8	Lung	5,493	22.8
Prostate	3,468	19.2	Breast	4,589	19.4
Colorectal	2,730	14.0	Colorectal	2,555	10.6
Pancreas	2,334	11.9	Pancreas	2,193	9.1
Liver	2,264	10.9	Ovary	1,636	6.8
Leukemia	1,381	7.5	Corpus Uterus	1,204	5.0
Non-Hodgkin Lymphoma	1,254	6.7	Liver	1,198	5.0
Bladder	1,167	6.5	Leukemia	998	4.2
Esophagus	1,024	5.1	Non-Hodgkin Lymphoma	968	4.0
Brain and Other Nervous System	1,023	5.1	Brain and Other Nervous System	779	3.3
Stomach	951	4.9	Stomach	691	2.9
Kidney	903	4.6	Myeloma	525	2.2
Oral	761	3.8	Cervix	490	2.2
Myeloma	686	3.6	Kidney	519	2.1
Melanoma	556	2.9	Bladder	483	2.0
Soft Tissue	291	1.5	Oral	291	1.2
Larynx	197	1.0	Esophagus	284	1.2
Mesothelioma	177	1.0	Soft Tissue	266	1.1
Bones and Joints	113	0.6	Melanoma	264	1.1
Thyroid	110	0.6	Gallbladder	198	0.8

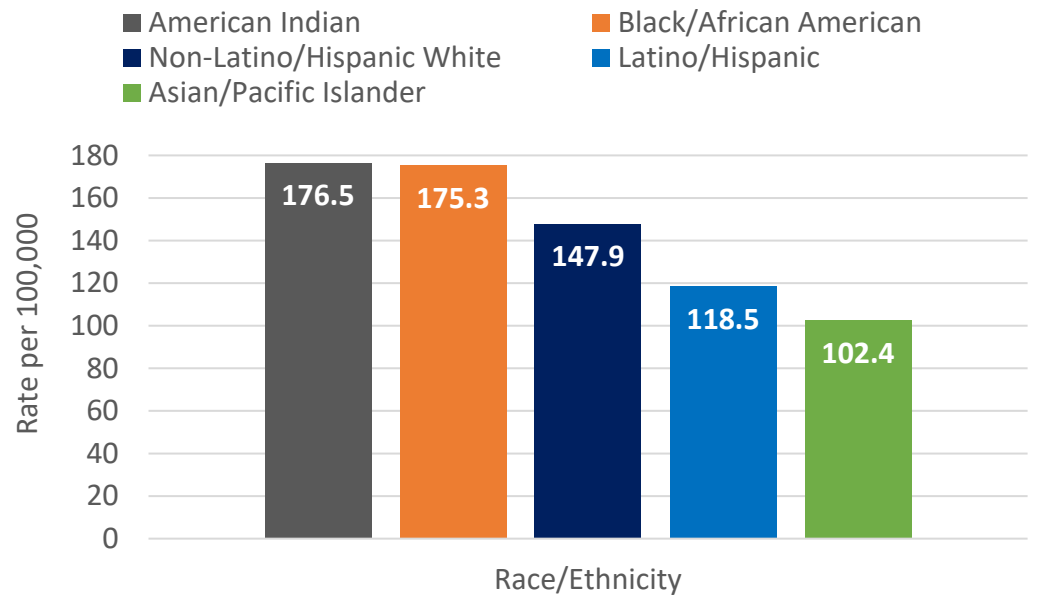
*AAMR: Age-adjusted mortality rate

Source: California Cancer Registry, California Department of Public Health

Mortality by Race/Ethnicity

Cancer mortality varies by race/ethnicity. In 2017, American Indians and Black/African Americans had higher age-adjusted mortality rates (176.5 per 100,000; 95 percent CI, 159.1 – 195.5 and 175.3 per 100,000; 95 percent CI, 170.0 – 180.8, respectively) compared to non-Latino/Hispanic Whites (147.9 per 100,000; 95 percent CI, 146.3 – 149.5), Latino/Hispanics (118.5 per 100,000; 95 percent CI, 116.3 – 120.8), and Asian/Pacific Islanders (102.4 per 100,000; 95 percent CI, 100.0 – 104.8) (Figure 2.1).

Figure 2.1 Age-adjusted Mortality Rate of Cancer by Race/Ethnicity, California, 2017



Source: California Cancer Registry, California Department of Public Health

Since 1988, every racial/ethnic group experienced a significant decline in cancer mortality except for American Indians. The AAMR of cancer among American Indians significantly increased by 75.5 percent or 2.2 percent per year. The AAMR of cancer among Black/African Americans decreased by 35.7 percent or 1.6 percent per year; among Asian/Pacific Islanders by 31.8 percent or 1.2 percent per year; among non-Latino/Hispanic Whites by 31.3 percent or 1.3 percent per year; and among Latino/Hispanics by 18.8 percent or 0.9 percent per year.

Tables 2.2 and 2.3 show the distribution of the five most common types of cancer mortality among five racial/ethnic groups by sex. Among men, lung cancer was the most common cause of cancer mortality for each racial/ethnic group. Among Latino/Hispanic, Asian/Pacific Islander, and American Indian men, liver cancer was the second leading cause of cancer mortality, followed by colorectal cancer. Among Black/African American and non-Latino/Hispanic White men, prostate cancer was the second leading cause of cancer mortality followed by colorectal

cancer. Among non-Latino/Hispanic white, Black/African American, Asian/Pacific Islander, and American Indian women, lung cancer was the leading cause of cancer mortality followed by breast and colorectal cancers. Among Latino/Hispanic women, breast cancer was the leading cause of cancer mortality followed by lung and colorectal cancers.

Table 2.2 Number of Deaths for the Five Most Common Types of Cancer Mortality among Men by Race/Ethnicity, California, 2013-2017

Rank	1	2	3	4	5
American Indian	Lung (180)	Liver (118)	Colorectal (78)	Prostate (78)	Pancreas (54)
Asian/Pacific Islander	Lung (4,415)	Liver (2,142)	Colorectal (1,808)	Pancreas (1,235)	Prostate (1,199)
Black/African American	Lung (2,502)	Prostate (1,846)	Colorectal (1,093)	Liver (792)	Pancreas (784)
Latino/Hispanic	Lung (3,879)	Liver (3,178)	Colorectal (2,941)	Prostate (2,792)	Pancreas (2,028)
Non-Latino/Hispanic White	Lung (20,404)	Prostate (10,742)	Colorectal (7,655)	Pancreas (6,754)	Liver (4,703)

Source: California Cancer Registry, California Department of Public Health

Table 2.3 Number of Deaths for the Five Most Common Types of Cancer Mortality among Women by Race/Ethnicity, California, 2013-2017

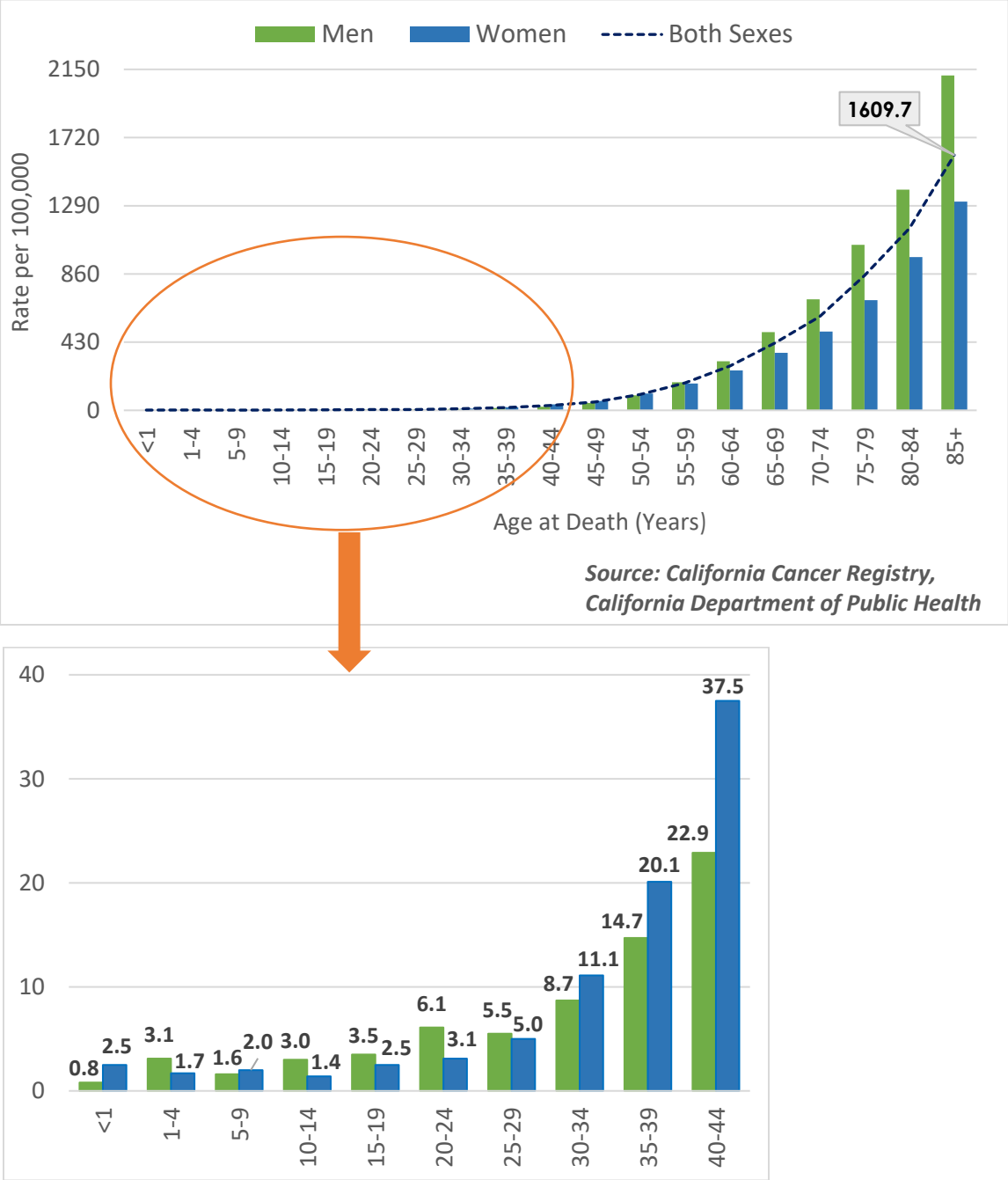
Rank	1	2	3	4	5
American Indian	Lung (189)	Breast (106)	Colorectal (78)	Liver (65)	Pancreas (55)
Asian/Pacific Islander	Lung (3,197)	Breast (2,444)	Colorectal (1,673)	Pancreas (1,399)	Liver (1,085)
Black/African American	Lung (2,147)	Breast (1,998)	Colorectal (1,030)	Pancreas (769)	Corpus Uterus (611)
Latino/Hispanic	Breast (4,322)	Lung (3,229)	Colorectal (2,422)	Pancreas (2,153)	Liver (1,745)
Non-Latino/Hispanic White	Lung (19,979)	Breast (13,215)	Colorectal (7,427)	Pancreas (6,120)	Ovary (4,909)

Source: California Cancer Registry, California Department of Public Health

Mortality by Age

Cancer mortality increased with age, peaking in the oldest age group of 85 years and older (1,609.7 per 100,000; 95 percent CI, 1,580.8 – 1,639.0) (Figure 2.2). Among children under 14 years, cancer mortality did not vary significantly by sex. Among those aged 15 to 24 years and 60 years and older, men had significantly higher cancer mortality than women. Among those aged 35 to 54 years, women had significantly higher cancer mortality than men.

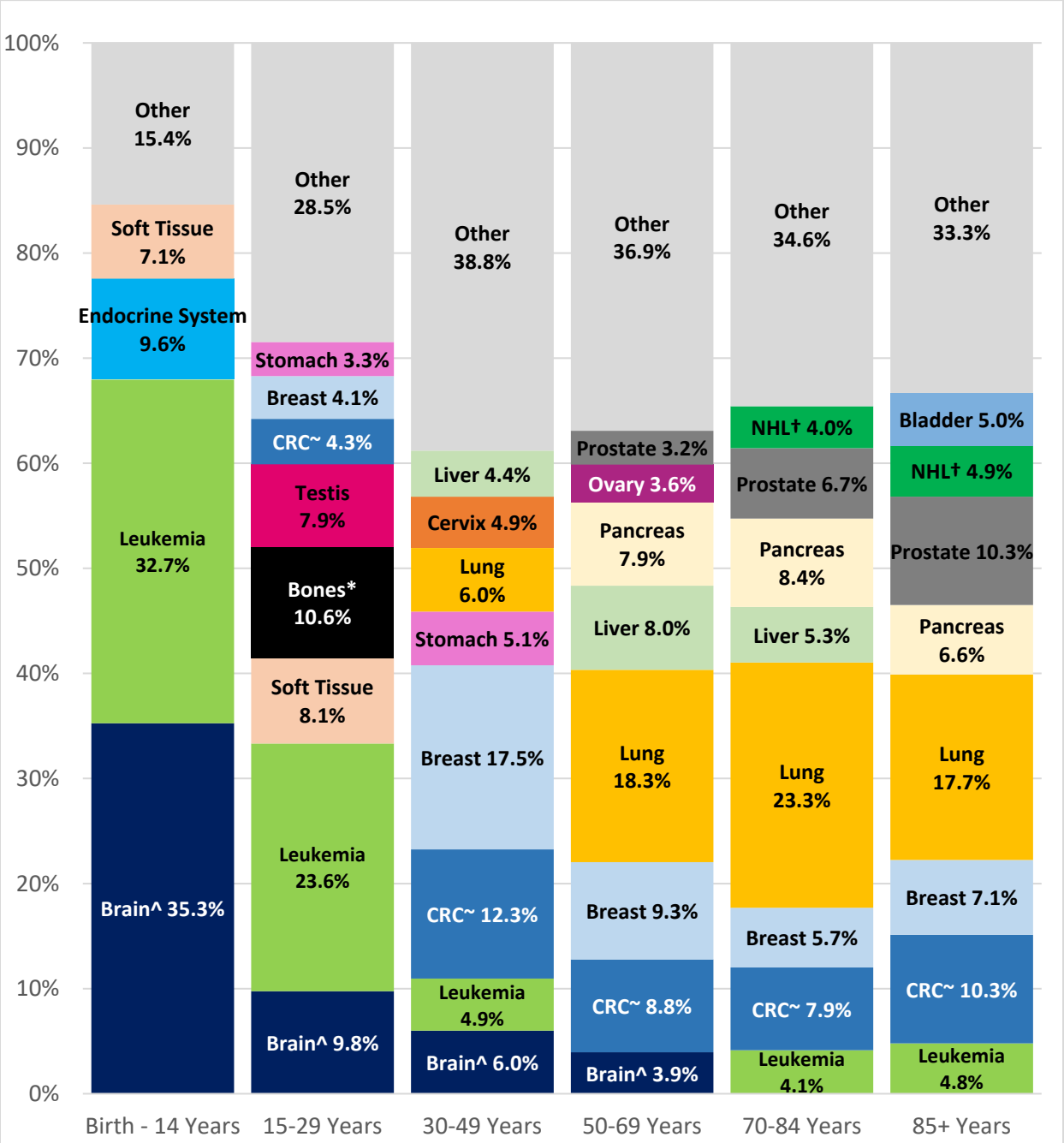
Figure 2.2 Age-Specific Cancer Mortality Rates by Sex, California, 2017



The distribution of cancer mortality type varied by age group (Figure 2.3). Among children under 14 years, brain tumors (35.3 percent) and leukemia (32.7 percent) accounted for the most cancer deaths. Among adolescents aged 15 to 29 years, leukemia (23.6 percent) and cancers of the bones and joints (10.6 percent) accounted for the most cancer deaths. Among adults aged 30 to 49 years, breast (17.5 percent) and colorectal (12.3 percent) cancers accounted for the most cancer deaths. Among adults aged 50 to 69 years, lung (18.3 percent) and breast (9.3 percent) cancers accounted for the most cancer deaths. Among adults aged 70 to 84 years, lung (23.3 percent) and pancreatic (8.4 percent) cancers accounted for the most cancer deaths. Finally, among adults aged 85 years and older, lung (17.7 percent), colorectal (10.3 percent), and prostate (10.3 percent) cancers accounted for the most cancer deaths.

Cancer mortality increased with age, peaking in the oldest age group of 85 years and older.

Figure 2.3 Distribution of Cancer Deaths by Age, California, 2017



Source: California Cancer Registry, California Department of Public Health

Bones*: Bones & Joints; NHL†: Non-Hodgkin Lymphoma; Brain^: Brain and Other Nervous System; CRC~: Colorectal.

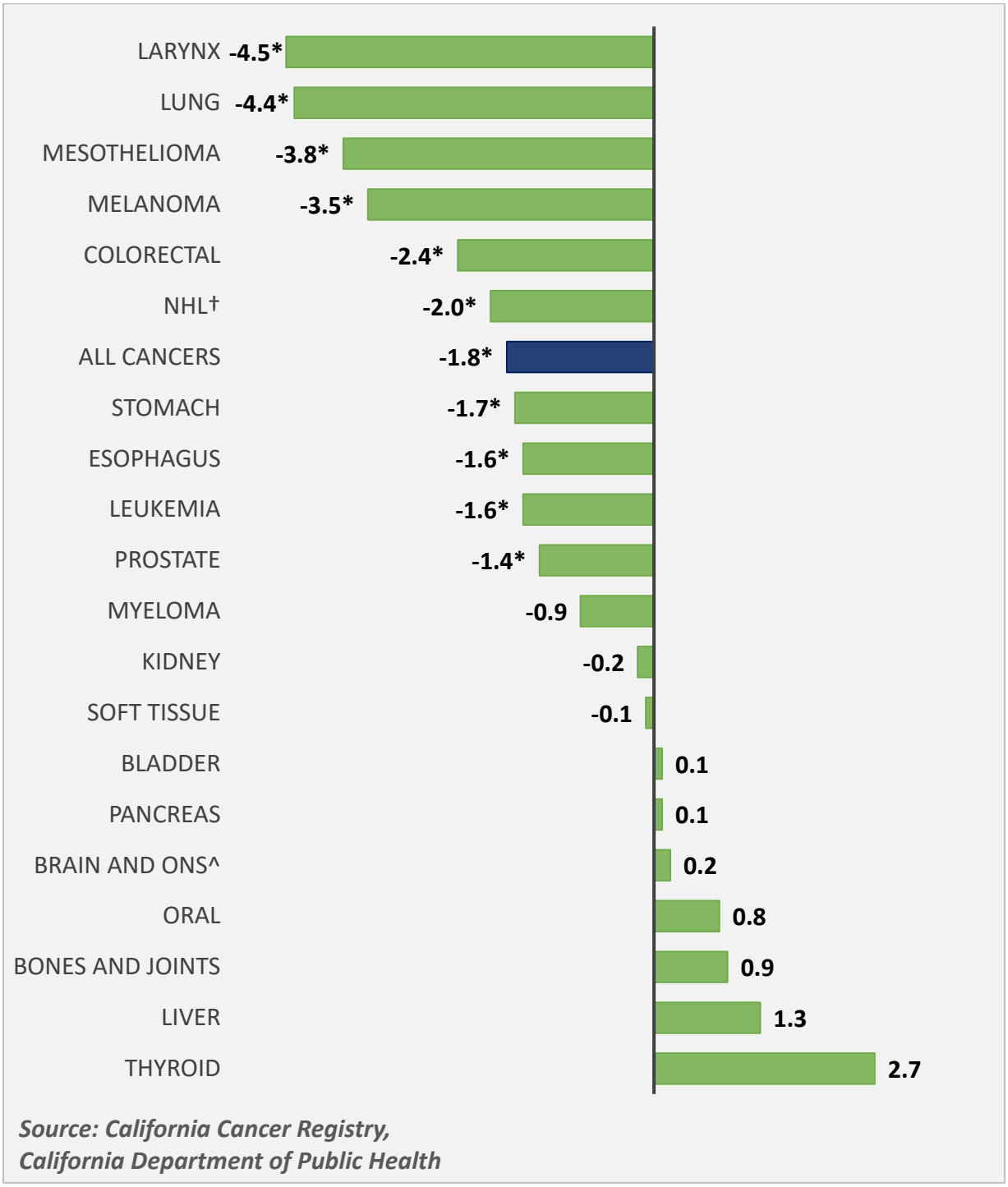
Mortality Trends

Between 2008 and 2017, overall cancer mortality among men in California decreased significantly by 1.8 percent per year. Significant decreases in mortality among men were observed for ten cancers, including cancer of the larynx, lung, stomach, esophagus, and prostate, as well as for mesothelioma, melanoma, colorectal cancer, non-Hodgkin lymphoma, and leukemia (Figure 2.4).

During the same time period, overall cancer mortality among women in California decreased significantly by 1.6 percent per year. Significant decreases in mortality among women were observed for ten cancers including cancer of the lung, esophagus, ovary, breast, and stomach, as well as melanoma, leukemia, colorectal cancer, non-Hodgkin lymphoma, and oral cancers. A significant increase in mortality was observed among women for cancers of the corpus uterus and liver (Figure 2.5).

Between 2008 and 2017, the mortality rate of 13 cancers significantly decreased and the mortality rate of two cancers significantly increased.

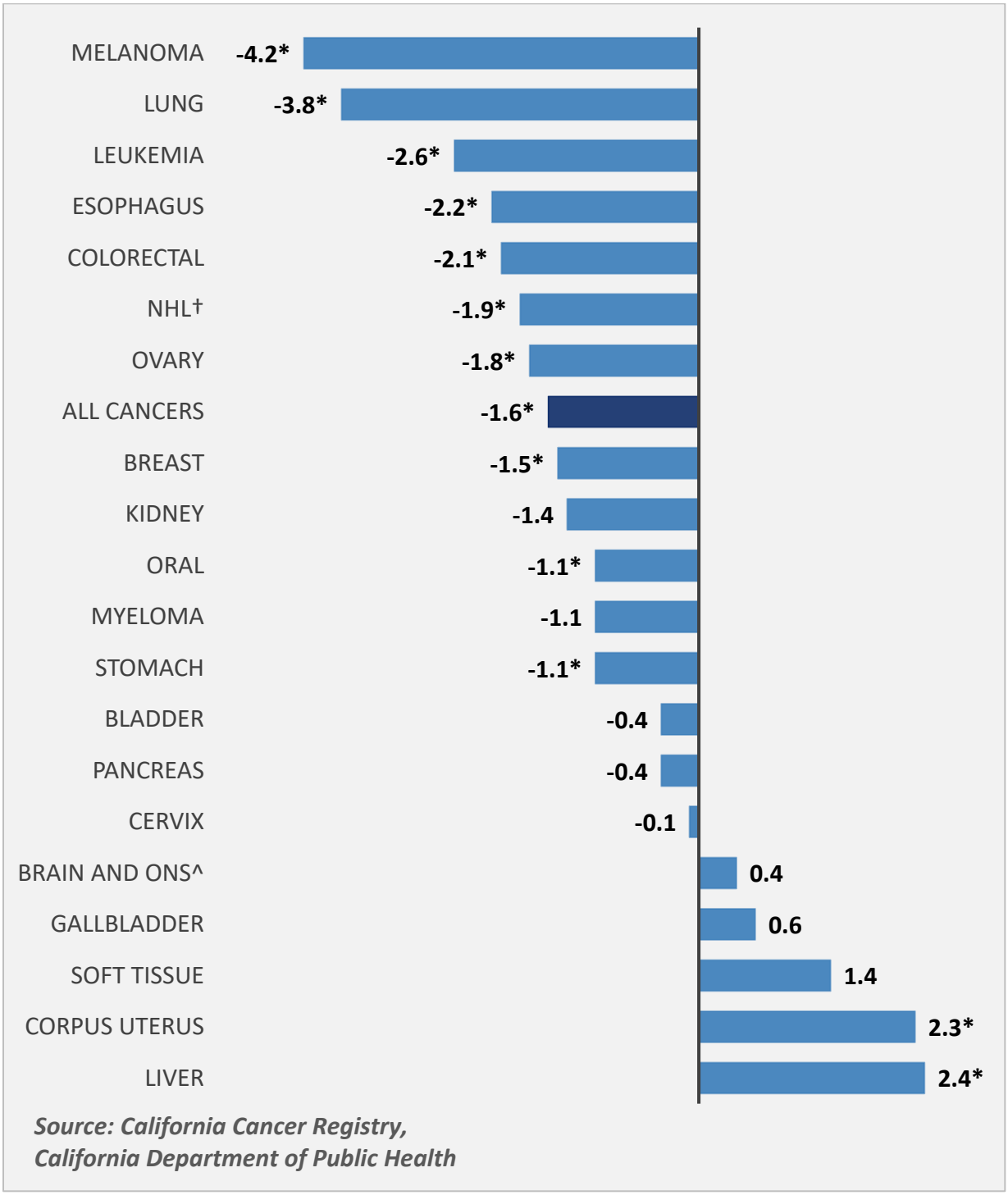
Figure 2.4 Average Annual Percent Change (AAPC) in Cancer Mortality among Men, California, 2008-2017



Source: California Cancer Registry, California Department of Public Health

*The AAPC is significantly different from zero at $p < 0.05$.
^ONS: Other Nervous System
†NHL: Non-Hodgkin Lymphoma

Figure 2.5 Average Annual Percent Change (AAPC) in Cancer Mortality among Women, California, 2008-2017



*The AAPC is significantly different from zero at $p < 0.05$.
^ONS: Other Nervous System
†NHL: Non-Hodgkin Lymphoma

Chapter 3. SURVIVAL

Survival measures how long a person lives after a cancer diagnosis and is a key measure of the effectiveness of cancer treatment and management.[11] Monitoring cancer survival in a population is essential to understanding whether or not all subgroups of the population benefit equally from advances in treatment and early detection or if disparities exist.[12] The measure of cancer survival presented in this report is five-year **relative survival** which estimates the probability of surviving cancer during the five-year period following diagnosis. California adults aged 20 years and older, diagnosed with cancer between 2008 and 2012, experienced a five-year relative survival of 66.4 percent (95 percent CI, 66.3 percent - 66.5 percent). California children age birth to 19 years, diagnosed with cancer during the same time period, experienced a five-year relative survival of 83.3 percent (95 percent CI, 82.4 percent - 84.0 percent).

Survival by Sex

Among adults, women had a slight survival advantage over men. The five-year relative survival for women diagnosed with cancer between 2008 and 2012 was 67.3 percent (95 percent CI, 67.1 percent - 67.5 percent), whereas the five-year relative survival for men was 65.5 percent (95 percent CI, 65.3 percent - 65.7 percent). Figures 3.1 and 3.2 show the five-year relative survival for the 20 most commonly diagnosed cancers among men and women, respectively. Among men, five-year relative survival was highest for cancers of the prostate, testis, and thyroid and lowest for cancers of the pancreas, lung, liver, and esophagus. Among women, five-year relative survival was highest for cancers of the thyroid, breast, and melanoma and lowest for cancers of the pancreas, liver, and lung.

Key Terms

Relative Survival estimates the probability of surviving cancer during a specified time period. Relative survival is the ratio (expressed as a percent) of cancer patients who survived for a given time period following diagnosis (observed survival rate) to the expected survival rate of a similar group of cancer-free individuals based on age, race/ethnicity, and sex. A relative survival of 100 percent means that patients diagnosed with cancer are just as likely to survive the specified time period as a similar group of individuals in the general population without cancer.

Stage at Diagnosis refers to how far a cancer has spread from its point of origin at the time of diagnosis.

Figure 3.1 Five-year Relative Survival among Men Aged 20 Years and Older by Cancer Type, California, 1988-2012

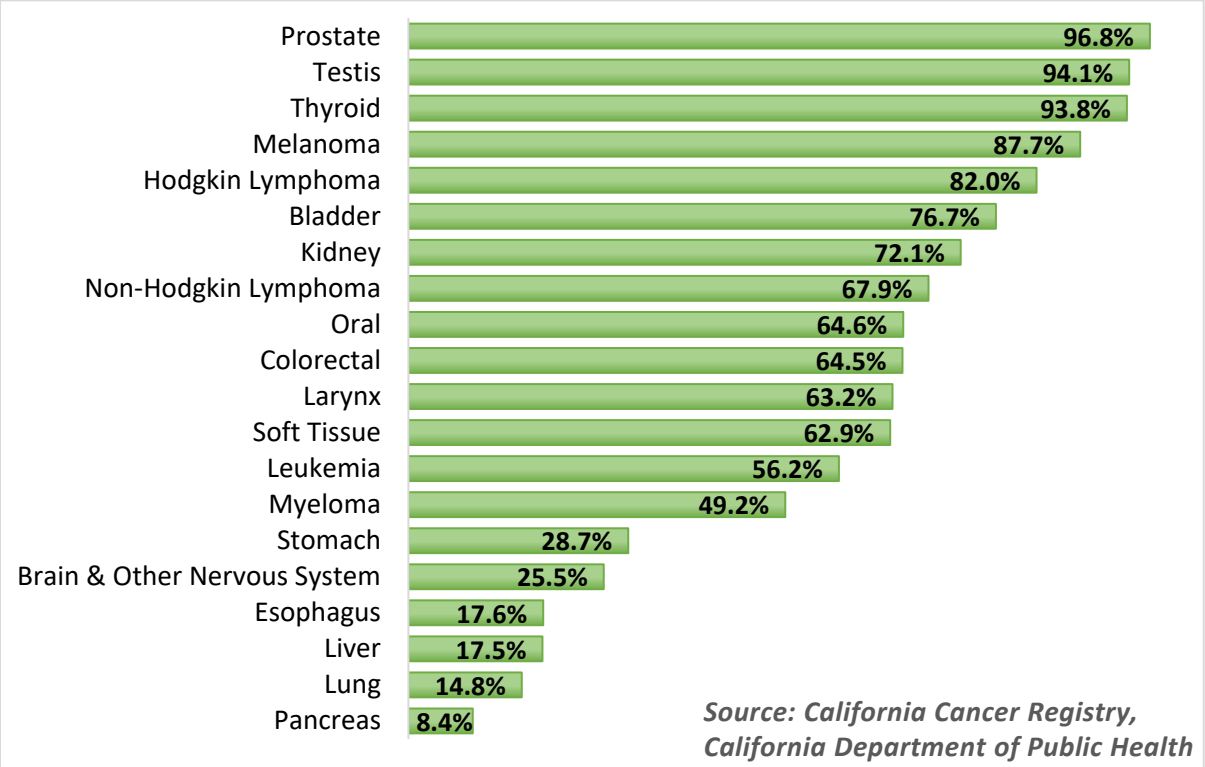
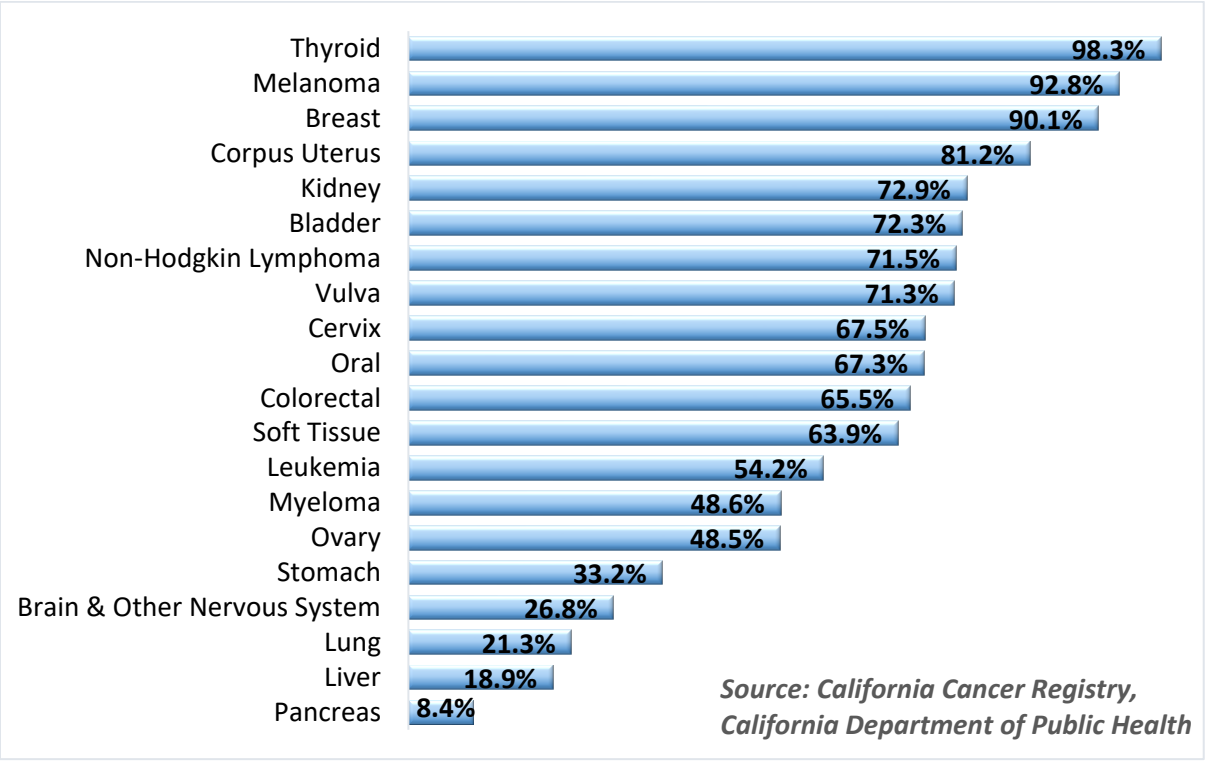


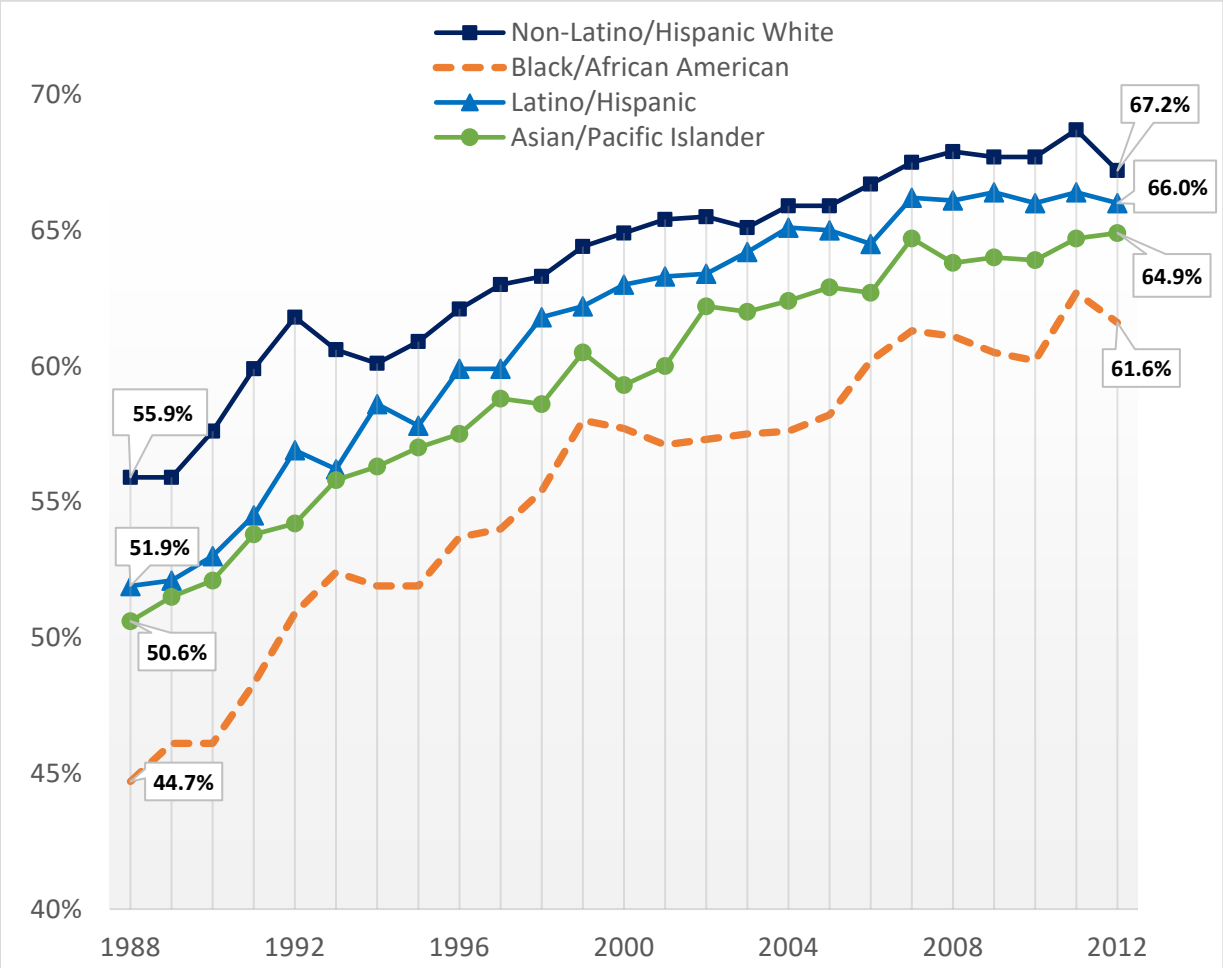
Figure 3.2 Five-year Relative Survival among Women Aged 20 Years and Older by Cancer Type, California, 1988-2012



Survival by Race/Ethnicity

Five-year relative survival of all cancers combined varied by race/ethnicity in California. From 1988 to 2012, non-Latino/Hispanic Whites had the highest five-year relative survival followed by Latino/Hispanics, Asian/Pacific Islanders, and Black/African Americans (Figure 3.3). Although survival disparities were observed, five-year relative survival increased over time among each racial/ethnic group. Despite this improvement, Black/African Americans still had the lowest five-year relative survival in 2012 (61.6 percent; 95 percent CI, 60.4 percent - 62.8 percent) compared to non-Latino/Hispanic Whites (67.2 percent; 95 percent CI, 66.8 percent - 67.6 percent), Latino/Hispanics (66.0 percent; 95 percent CI, 65.5 percent - 66.7 percent), and Asian/Pacific Islanders (64.9 percent; 95 percent CI, 64.1 percent - 65.8 percent).

Figure 3.3 Five-year Relative Survival by Race/Ethnicity, California, 1988-2012



Source: California Cancer Registry, California Department of Public Health

Survival by Stage at Diagnosis

In this section, the SEER Summary Stage system was utilized to categorize cancers into stage groups. Stage groups describe how far a tumor/cancer has spread at the time of diagnosis. The stage groups are defined as follows:

Localized: Includes tumors which have penetrated the basement membrane but are still confined to the organ in which they originated.

Regional: Includes tumors that have extended beyond the limits of the organ of origin by means of direct extension to adjacent tissue or via lymph node involvement.

Distant: Includes tumors that have spread to other parts of the body (metastasized).[13]

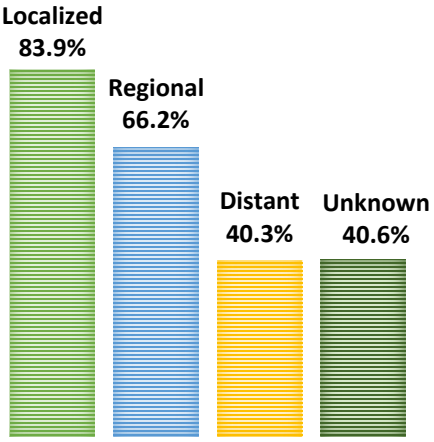
Stage at diagnosis is one of the strongest predictors of survival. Cancers detected at an early stage are more likely to respond to treatment and have the potential to be cured. Seven cancers have the greatest possibility for early diagnosis through screening, including female breast, cervical, prostate, colorectal, oral, lung, and melanoma. For each of these screen-detectable cancers, five-year relative survival was highest when the cancer was diagnosed at localized stage and lowest when diagnosed at distant stage (Figures 3.4a through 3.4g). The only exception was prostate cancer which had excellent five-year relative survival when diagnosed at localized (100 percent) and regional (100 percent) stage (Figure 3.4g).

Despite screening tests existing for these cancers, the majority of oral (61 percent), colorectal (54 percent), and cervical (49 percent) cancers were diagnosed at regional and distant stage (Figures 3.5a, 3.5b, 3.5f). Melanoma (83 percent), prostate (74 percent), and female breast (63 percent) each had a larger proportion of cases diagnosed at localized stage than at regional and distant stage (Figures 3.5d, 3.5g, and 3.5e).

It should be noted that the United States Preventive Services Task Force published lung cancer screening guidelines in 2013. The guidelines recommend annual screening for lung cancer with low-dose computed tomography in adults aged 55 to 80 years who have a 30 pack-year smoking history and currently smoke or have quit within the past 15 years.[14] From 2008-2012, 75 percent of lung cancers were diagnosed at regional or distant stage (Figure 3.5c), which is expected to decrease beginning with 2013 diagnoses when screening guidelines were published.

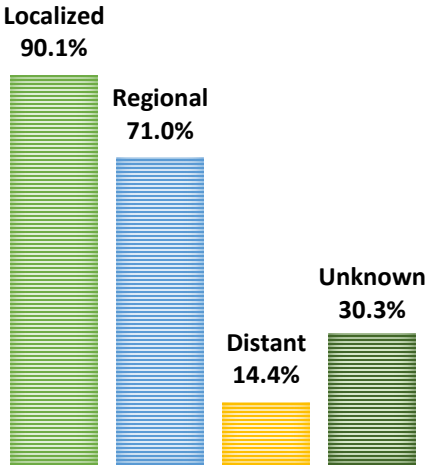
Figures 3.4a - 3.4g Five-year Relative Survival of Screen-Detectable Cancers by Stage at Diagnosis, California, 2008-2012

FIGURE 3.4A FIVE-YEAR RELATIVE SURVIVAL OF ORAL CANCER, CALIFORNIA, 2008-2012



Source: California Cancer Registry, California Department of Public Health

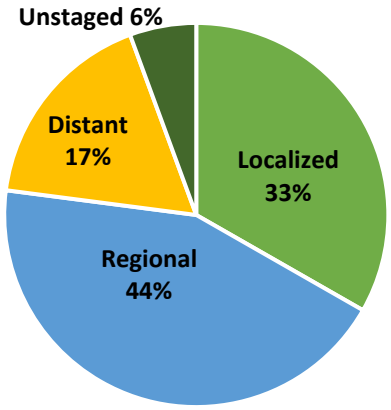
FIGURE 3.4B FIVE-YEAR RELATIVE SURVIVAL OF COLORECTAL CANCER, CALIFORNIA, 2008-2012



Source: California Cancer Registry, California Department of Public Health

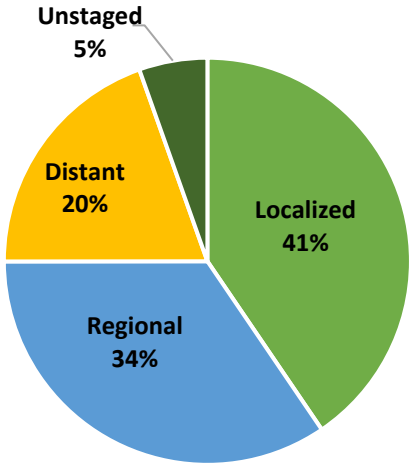
Figures 3.5a - 3.5g Percent of Screen-Detectable Cancers by Stage at Diagnosis, California, 2008-2012

FIGURE 3.5A PERCENT OF ORAL CANCER BY STAGE AT DIAGNOSIS, CALIFORNIA 2008-2012



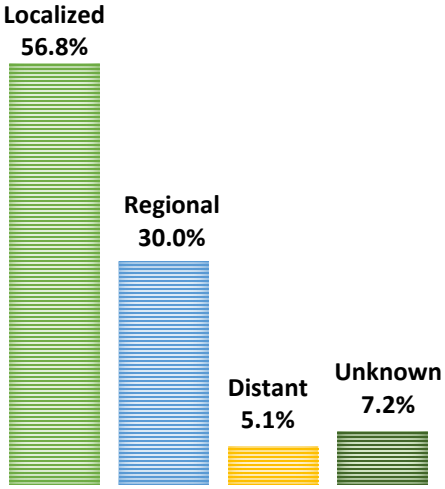
Source: California Cancer Registry, California Department of Public Health

FIGURE 3.5B PERCENT OF COLORECTAL CANCER BY STAGE AT DIAGNOSIS, CALIFORNIA, 2008-2012



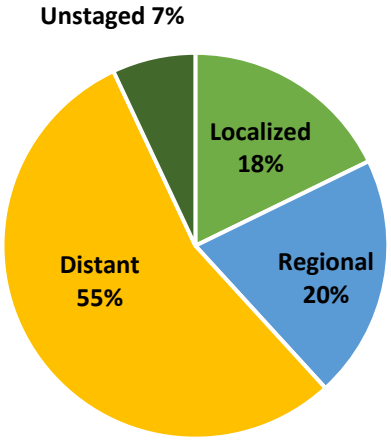
Source: California Cancer Registry, California Department of Public Health

FIGURE 3.4C FIVE-YEAR RELATIVE SURVIVAL OF LUNG CANCER, CALIFORNIA, 2008-2012



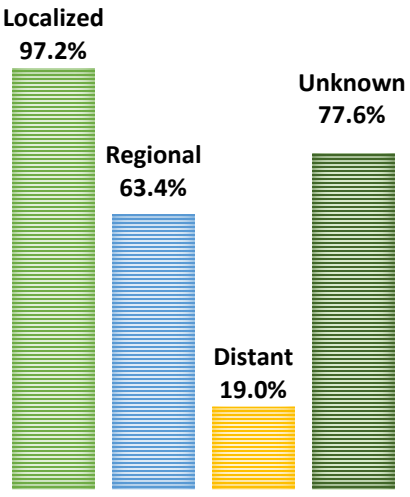
Source: California Cancer Registry, California Department of Public Health

FIGURE 3.5C PERCENT OF LUNG CANCER BY STAGE AT DIAGNOSIS, CALIFORNIA, 2008-2012



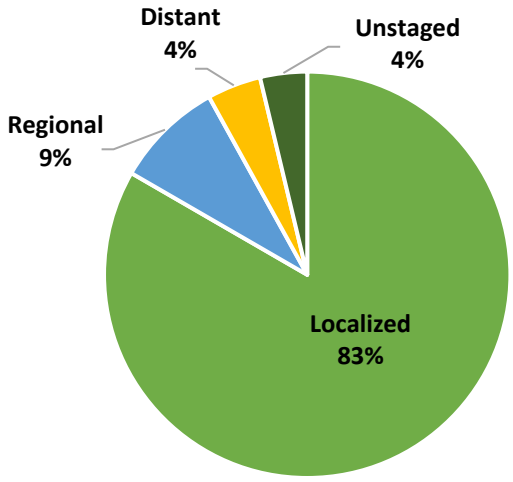
Source: California Cancer Registry, California Department of Public Health

FIGURE 3.4D FIVE-YEAR RELATIVE SURVIVAL OF MELANOMA, CALIFORNIA, 2008-2012



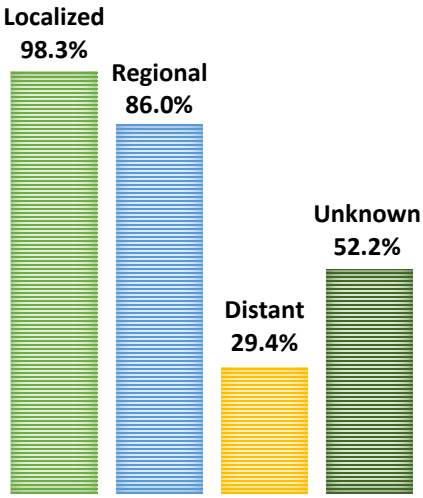
Source: California Cancer Registry, California Department of Public Health

FIGURE 3.5D PERCENT OF MELANOMA BY STAGE AT DIAGNOSIS, CALIFORNIA, 2008-2012



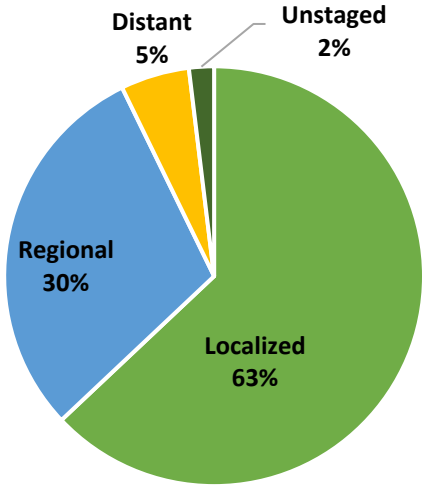
Source: California Cancer Registry, California Department of Public Health

FIGURE 3.4E FIVE-YEAR RELATIVE SURVIVAL OF FEMALE BREAST CANCER, CALIFORNIA, 2008-2012



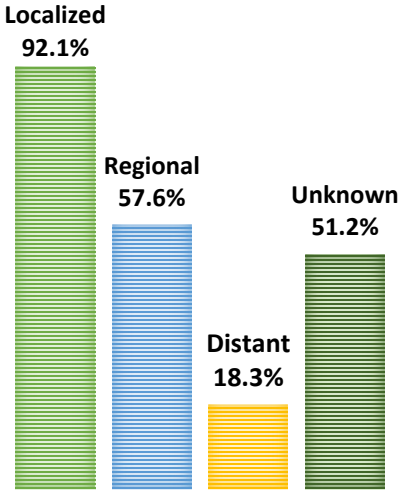
Source: California Cancer Registry, California Department of Public Health

FIGURE 3.5E PERCENT OF FEMALE BREAST CANCER BY STAGE AT DIAGNOSIS, CALIFORNIA, 2008-2012



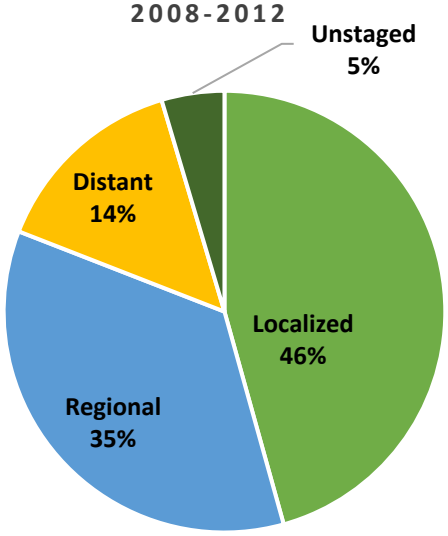
Source: California Cancer Registry, California Department of Public Health

FIGURE 3.4F FIVE-YEAR RELATIVE SURVIVAL OF CERVICAL CANCER, CALIFORNIA, 2008-2012



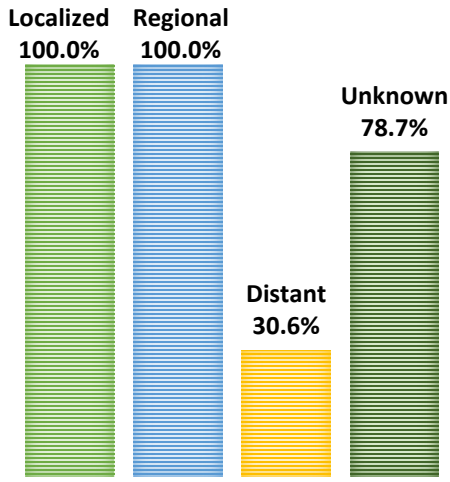
Source: California Cancer Registry, California Department of Public Health

FIGURE 3.5F PERCENT OF CERVICAL CANCER BY STAGE AT DIAGNOSIS, CALIFORNIA, 2008-2012



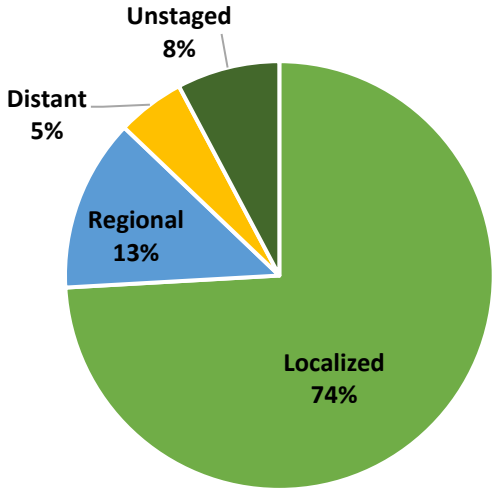
Source: California Cancer Registry, California Department of Public Health

FIGURE 3.4G FIVE-YEAR RELATIVE SURVIVAL OF PROSTATE CANCER, CALIFORNIA, 2008-2012



Source: California Cancer Registry, California Department of Public Health

FIGURE 3.5G PERCENT OF PROSTATE CANCER BY STAGE AT DIAGNOSIS, CALIFORNIA, 2008-2012



Source: California Cancer Registry, California Department of Public Health

Of screen-detectable cancers, melanoma (83 percent), prostate (74 percent), and female breast (63 percent) had a larger proportion of cases diagnosed early- versus late- stage.

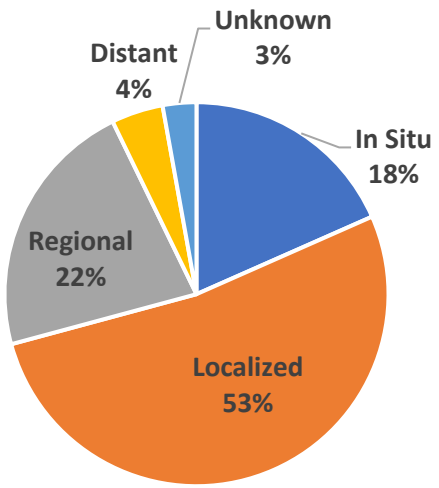
CHAPTER 4. PROGRESS TOWARD REDUCING THE CANCER BURDEN

The 2014 CWP had several objectives aimed at decreasing the cancer burden as well as eliminating existing disparities. This section focuses on those objectives and the progress California has made toward reaching them.

CWP Objective 2.2.4I: By 2015, increase the proportion of early-stage diagnoses of breast cancer among all women by 29 percent, from 69 percent in 2008 to 89 percent.

Early stage is defined as breast cancers diagnosed *in situ* or localized. As of 2017, California has not met the goal of increasing the proportion of early-stage female breast cancer diagnoses to 89 percent. In 2017, 71 percent of female breast cancers were diagnosed at an early stage (Figure 4.1).

Figure 4.1 Percent of Female Breast Cancer by Stage at Diagnosis, California, 2017



Source: California Cancer Registry, California Department of Public Health

California Wellness Plan

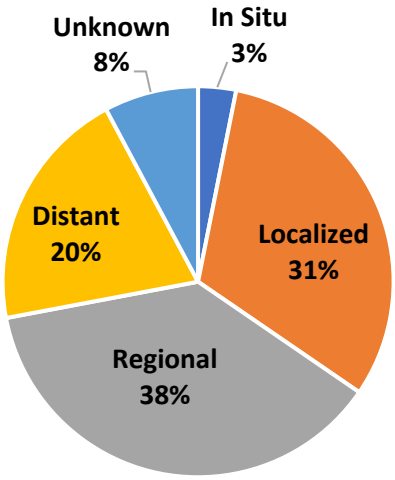
CDPH developed the CWP to coordinate efforts among public and private chronic disease prevention and health promotion programs to decrease the burden of chronic disease among all Californians.[2]

Several objectives in the CWP pertain to reducing the burden of cancer among Californians and eliminating existing disparities. CCR, California's statewide cancer surveillance system, is poised to monitor the burden of cancer and measure progress toward meeting the objectives in the CWP.

CWP Objective 2.2.5I: By 2015, decrease the proportion of late-stage diagnoses of colorectal cancer among Californians by 15 percent, from 47.1 percent in 2008 to 40 percent.

Late stage is defined as colorectal cancers diagnosed at regional or distant stage. As of 2017, California has not met the goal of decreasing the proportion of late-stage colorectal cancer diagnoses to 40 percent. In 2017, 58 percent of colorectal cancers were diagnosed late-stage (Figure 4.2).

Figure 4.2 Percent of Colorectal Cancer by Stage at Diagnosis, California, 2017

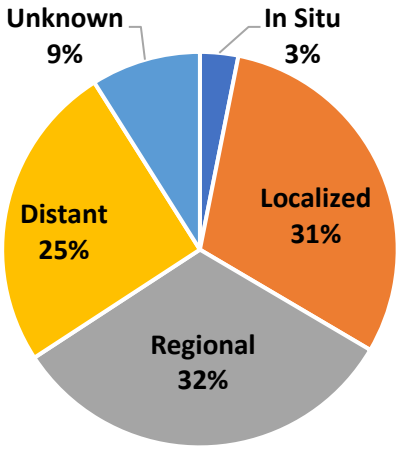


Source: California Cancer Registry, California Department of Public Health

CWP Objective 2.2.6I: By 2015, decrease the proportion of late-stage diagnoses of colorectal cancer among Black/African Americans and Asian/Pacific Islanders by 20 percent, from 51.5 percent in 2008 to 41.2 percent for Black/African Americans, and from 51.8 percent in 2008 to 41.1 percent for Asian/Pacific Islanders.

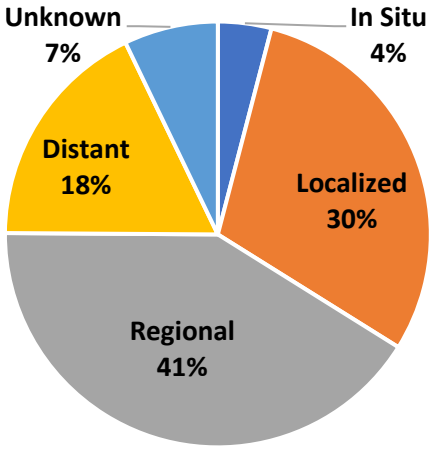
Late stage is defined as colorectal cancers diagnosed at regional or distant stage. California has not met the goal of decreasing the proportion of late-stage colorectal cancer diagnoses among Black/African Americans and Asian/Pacific Islanders to 41 percent. In 2017, 57 percent and 59 percent of colorectal cancers were diagnosed late-stage among Black/African Americans and Asian/Pacific Islanders, respectively (Figures 4.3 and 4.4).

Figure 4.3 Percent of Colorectal Cancer by Stage at Diagnosis among Black/African Americans, California, 2017



Source: California Cancer Registry, California Department of Public Health

Figure 4.4 Percent of Colorectal Cancer by Stage at Diagnosis among Asian/Pacific Islanders, California, 2017

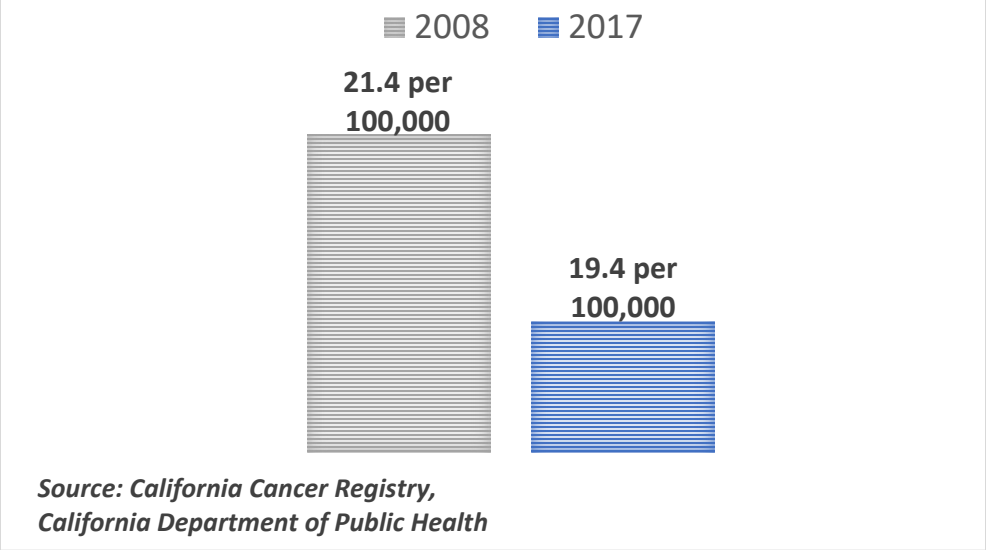


Source: California Cancer Registry, California Department of Public Health

CWP Objective 2.21L: By 2015, reduce the mortality rate of female breast cancer by ten percent, from 21.4 per 100,000 in 2008 to 19.3 per 100,000.

California made progress in reducing the mortality rate of female breast cancer but did not reach the goal of 19.3 per 100,0000. In 2017, the age-adjusted mortality rate of female breast cancer was 19.4 per 100,000 (Figure 4.5).

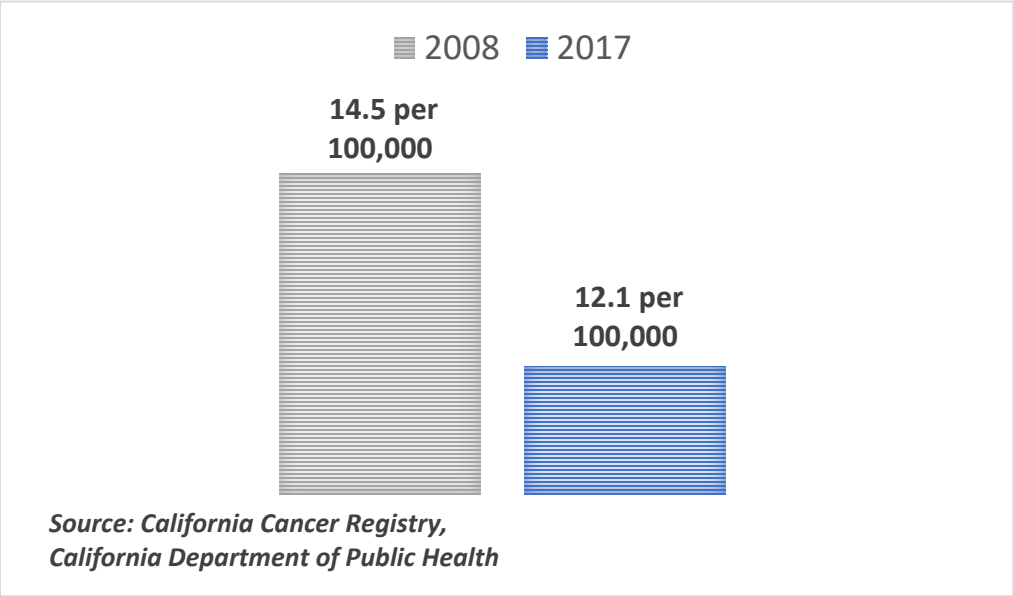
Figure 4.5 Age-adjusted Mortality Rate of Female Breast Cancer in California, 2008 versus 2017



CWP Objective 2.2.2L: By 2015, decrease the mortality rate of colorectal cancer by 17.5 percent, from 14.5 per 100,000 in 2008 to 12 per 100,000.

California made progress in reducing the mortality rate of colorectal cancer but did not reach the goal of 12 per 100,000. In 2017, the age-adjusted mortality rate of colorectal cancer was 12.1 per 100,000 (Figure 4.6).

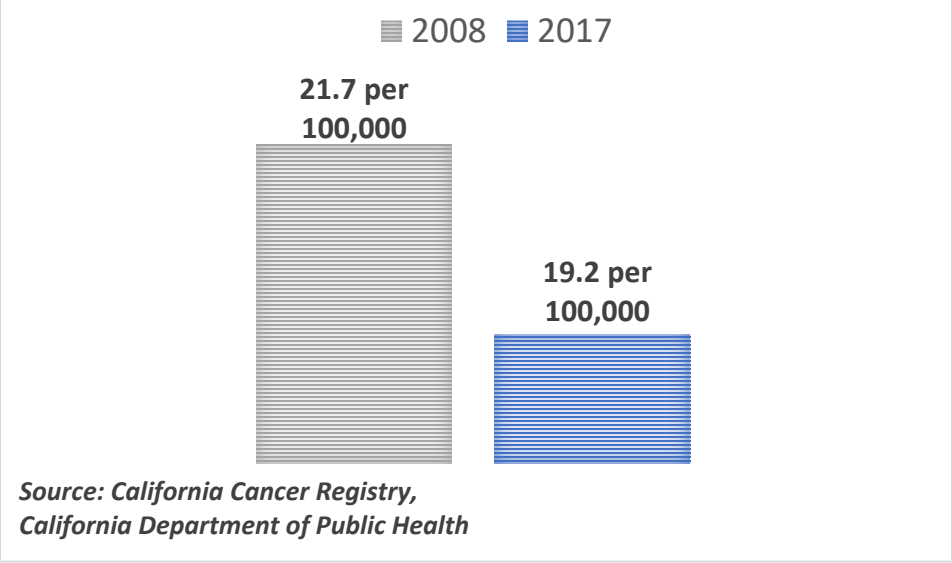
Figure 4.6 Age-adjusted Mortality Rate of Colorectal Cancer in California, 2008 versus 2017



CWP Objective 2.2.3L: By 2015, decrease the mortality rate of prostate cancer by ten percent, from 21.7 per 100,000 in 2008 to 19.5 per 100,000.

California met the goal of reducing the mortality rate of prostate cancer by ten percent. In 2017, the age-adjusted mortality rate of prostate cancer was 19.2 per 100,0000 (Figure 4.7).

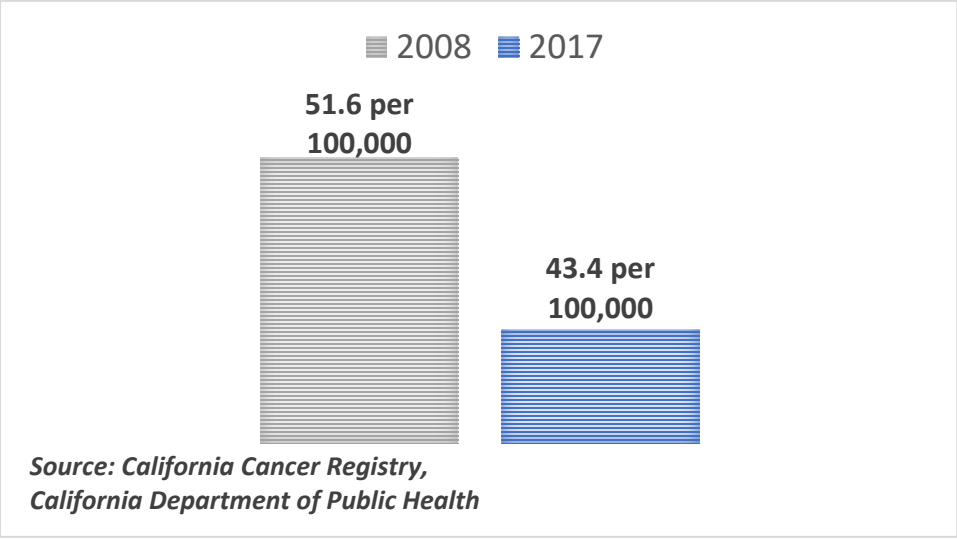
Figure 4.7 Age-adjusted Mortality Rate of Prostate Cancer in California, 2008 versus 2017



CWP Objective 2.2.4L: By 2015, decrease the mortality rate of prostate cancer among Black/African American men by ten percent, from 51.6 per 100,000 in 2008 to 46.4 per 100,000.

California exceeded the goal of reducing the mortality rate of prostate cancer among Black/African American men by ten percent. In 2017, the age-adjusted mortality rate of prostate cancer among Black/African American men was 43.4 per 100,000 (Figure 4.8).

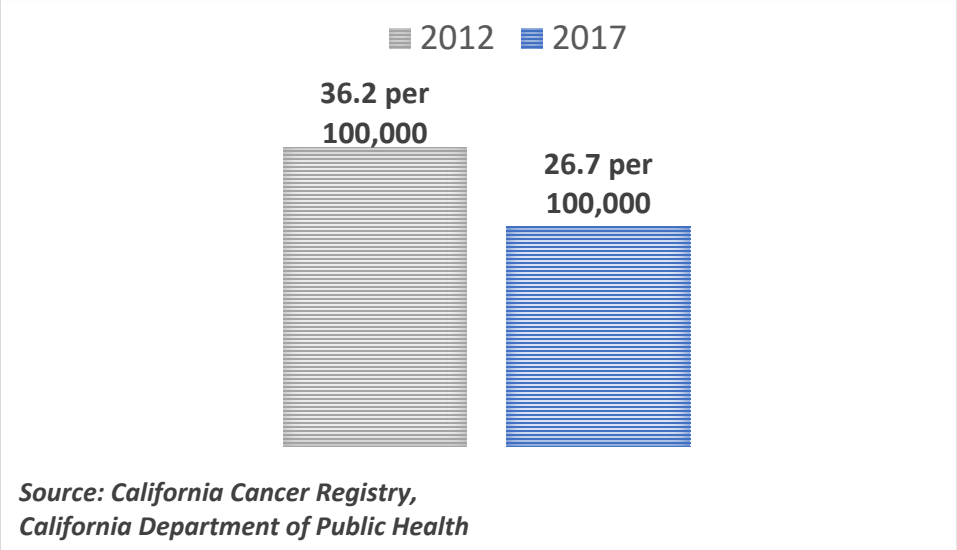
Figure 4.8 Age-adjusted Mortality Rate of Prostate Cancer among Black/African American Men in California, 2008 versus 2017



CWP Objective 2.2.5L: By 2020, decrease the mortality rate of lung cancer from 36.2 per 100,000 in 2012 to 32.6 per 100,000.

California exceeded the goal of reducing the mortality rate of lung cancer to 36.2 per 100,000 by 2020. In 2017, the age-adjusted mortality rate of lung cancer was 26.7 per 100,000 (Figure 4.9).

Figure 4.9 Age-adjusted Mortality Rate of Lung Cancer in California, 2012 versus 2017

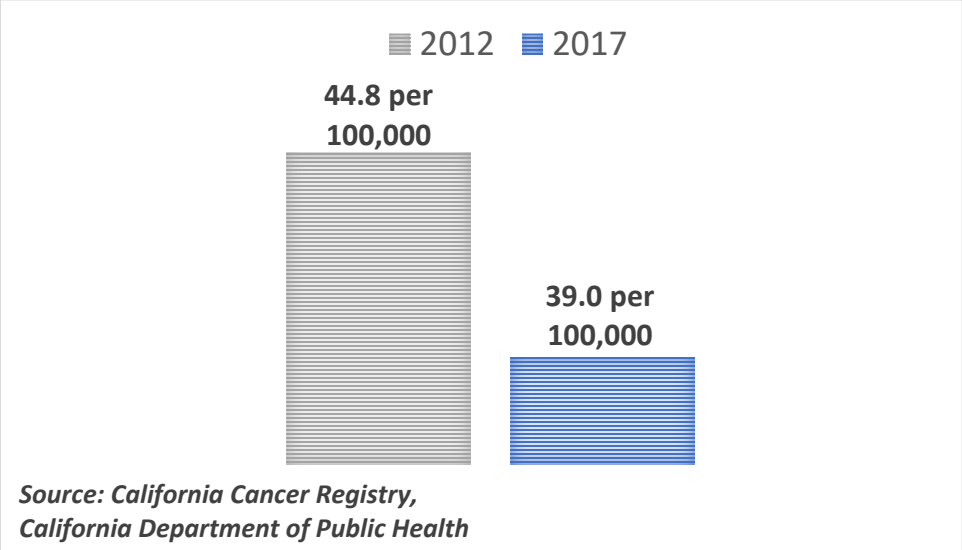


Source: California Cancer Registry, California Department of Public Health

CWP Objective 2.2.6L: By 2020, decrease the incidence of lung cancer from 44.8 per 100,000 in 2012 to 31.3 per 100,000.

California made progress toward decreasing the incidence of lung cancer to 31.3 per 100,000 by 2020. Lung cancer incidence significantly declined by 2.7 percent per year since 2012. In 2017, the age-adjusted incidence rate of lung cancer was 39.0 per 100,000 (Figure 4.10).

Figure 4.10 Age-adjusted Incidence Rate of Lung Cancer in California, 2012 versus 2017

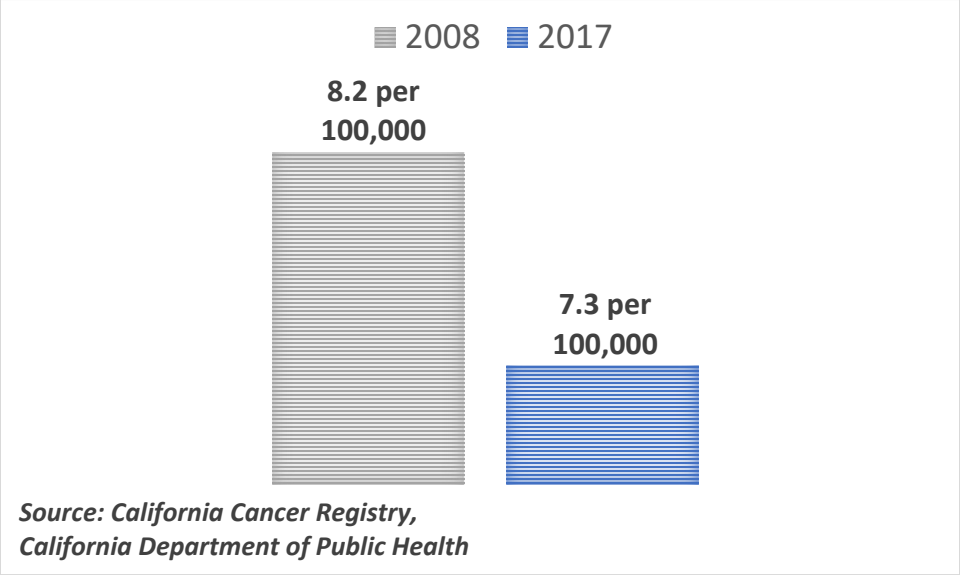


Source: California Cancer Registry, California Department of Public Health

CWP Objective 2.8.1L: By 2015, decrease the incidence of cervical cancer by 15 percent, from 8.2 per 100,000 in 2008 to 7.0 per 100,000.

California made progress in decreasing the incidence of cervical cancer but did not reach the goal of seven per 100,000. In 2017, the age-adjusted incidence rate of cervical cancer was 7.3 per 100,000 (Figure 4.11).

Figure 4.11 Age-adjusted Incidence Rate of Cervical Cancer in California, 2008 versus 2017



Source: California Cancer Registry, California Department of Public Health

CONCLUSION

Cancer accounts for nearly a quarter of all deaths in California, yet it has been estimated that 40 percent of all cancers are preventable.[5] Many factors contribute to an individual's risk of developing and surviving cancer including genetics, personal behaviors, and social determinants of health.[6] Many of these risk factors are modifiable and progress toward reducing or eliminating them could lessen the burden of cancer. Additionally, screening tests exist for seven cancers and better adherence to screening guidelines could prevent cancers or help detect cancer early when it has a better prognosis.

Findings from this report indicate that some progress has been made in reducing the cancer burden in California. However, other findings indicate the need for more targeted prevention efforts including:

- American Indians and Black/African Americans had higher cancer mortality rates compared to other racial/ethnic groups.
- Black/African Americans had the lowest cancer survival rate compared to other racial/ethnic groups.
- Since 1988, every racial/ethnic group experienced a significant decline in cancer incidence and mortality except American Indians. The AAIR of invasive cancer among American Indians significantly increased by 2.7 percent per year and the AAMR of cancer significantly increased by 2.2 percent per year.
- Lung cancer was among the top five most commonly diagnosed cancers in men of 15 racial/ethnic groups and among women of 14 racial/ethnic groups.
- Colorectal cancer was among the top five most commonly diagnosed cancers in men and women of 15 racial/ethnic groups.
- Melanoma was among the top five most commonly diagnosed cancers among non-Latino/Hispanic White men and women.
- Cervical cancer was among the top five most commonly diagnosed cancers among Laotian/Hmong women.
- Oral, colorectal, and cervical cancers had a larger proportion of cases diagnosed at a late- versus early-stage despite screening tests existing for these cancers.

Strategies to reduce modifiable risk factors of cancer and increase adherence to screening guidelines must not only target individual behavior but also aim to address inequities in the social determinants of health. Establishing policies that promote equitable social, economic, and environmental conditions and support healthy individual behaviors has the potential to improve health for the largest number of Californians.[8] Implementing policies that promote health equity is crucial to reducing the cancer burden equally among all Californians.

METHODS AND TECHNICAL NOTES

Incidence

This report includes cases of cancer diagnosed between January 1, 1988 and December 31, 2017 reported to CCR as of December 22, 2019. A "case" is defined as a primary cancer. Tumors that result from the spread, or metastasis, of a primary cancer to another organ are not considered new cases. Only invasive cancers (those that have infiltrated the tissue of the organ of origin) are included in this report except where noted. Regional registries covering the entire state report cancer incidence data to CCR, CDSRB of CDPH. Cases that were reported from the Department of Veterans Affairs were not included in this report. Standards for data abstracting, collection, and reporting are specified by CCR. Only cases diagnosed among California residents are included in this report. Individuals who were treated for cancer in California, but were residents of another state or country, are not included.

Mortality

Computerized files containing information on cancer-related deaths were obtained from the CDPH, Center for Health Statistics. From 1988 through 1998, cause of death was coded according to the International Classification of Diseases, Ninth Edition (ICD-9). Beginning in 1999, cause of death was coded according to the International Classification of Diseases, Tenth Edition (ICD-10). All mortality analyses presented in this report are the responsibility of the authors and were not reviewed or endorsed by the Center for Health Statistics prior to publication. Only deaths among California residents were included in these analyses.

Limited-Duration Prevalence (Existing Cases)

The number of existing cases, also known as prevalence, accounts for all Californians alive today that have a history of the specific cancer from January 1, 1988 to January 1, 2017. These existing cases include individuals that no longer have evidence of cancer and those undergoing treatment that still have evidence of disease. SEER*Stat software was used to calculate 29-year limited-duration prevalence.[15]

Relative-Survival

The measure of cancer survival used in this report was relative survival. Relative survival estimates the probability of surviving a particular type of cancer during a specified time period. Relative survival is the ratio (expressed as a percent) of cancer patients who survived for a given time period following diagnosis (observed survival rate) to the expected survival rate of a similar group of cancer-free individuals based on age, race/ethnicity, and sex. The expected survival rates used in this report were based on life tables specific to the California population. A relative survival of 100 percent means that patients diagnosed with a particular type of cancer are just as likely to survive the specified time period as a similar group of individuals in the general population without cancer. Survival was calculated using SEER*Stat software. [15]

Stage at Diagnosis

Stage at diagnosis was defined according to the SEER Program's Summary Stage classification scheme.[13] In this scheme, tumors are classified as *in situ*, localized, regional, or distant. *In situ* tumors are non-invasive and do not penetrate the basement membrane. Localized tumors are confined entirely to the organ of origin. Regional tumors extend into surrounding organs, tissues, or regional lymph nodes. Distant tumors have metastasized to other parts of the body. *In situ* tumors were excluded from survival calculations as they are detected through screening and are non-lethal.

Age-Adjusted Rates

Rates were calculated as the number of new cases (incidence) or deaths (mortality) in specific age groups per 100,000 persons each year and were age-adjusted to the 2000 United States standard population. Age-adjusted rates are weighted averages of age-specific rates, where the weights represent the age distribution of a standard population. Such adjustment eliminates differences in rates due to changes in the age of a population over time or differences in the age distribution between population groups. Rates in this report were calculated using SEER*Stat software.[15]

Joinpoint Analysis of Trends – Average Annual Percent Change

Joinpoint linear regression was used to determine trends in cancer incidence and mortality. In this analysis, a statistical algorithm detects joinpoints, or points in time where the slope of the regression line significantly changes. Thus, the model describes trends during different time segments, with the annual percent change (APC) estimated for each segment.

AAPC is a summary measure of a trend over a pre-specified fixed interval. It allows for the use of a single number to describe the average APCs over a period of multiple years. It is valid even if the joinpoint model indicates that there were changes in trends during those years. It is computed as a weighted average of the APCs from the joinpoint model, with the weights equal to the length of the APC interval. Joinpoint software was used for all the trend analyses in this report.[16]

Statistical Significance

The statistical significance of observed differences in age-adjusted rates was determined by comparing 95 percent confidence intervals around each rate. A 95 percent confidence interval is the range of values that is estimated to contain the true population value 95 percent of the time. Whenever confidence intervals overlapped differences were deemed non-significant, otherwise they were considered significant at alpha = 0.05.

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