



**CANCER IN  
CALIFORNIA**

**1988-2016**



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## Table of Contents

Overview.....	5
Leading Cancer Sites by Sex.....	7
Leading Cancer Sites by Sex and Race/Ethnicity.....	8
Cancer Incidence and Mortality Trends (2006-2015) .....	9
Five-Year Relative Survival by Stage at Diagnosis (2007-2016) .....	10
Cancer Screening in California .....	11
Childhood (Ages 0-14 years) and Adolescent (Ages 15-19 years) Cancers ...	12
Incidence Rates and Number of Cases by International Classification of Childhood Cancer (ICCC) Group (2012-2016).....	12
Childhood Cancer Incidence Trends by Sex and Cancer Type (2006-2015) .	13
Adolescent Incidence Trends by Sex and Cancer Type (2006-2015) .....	14
Childhood and Adolescent Incidence Trends by Age Group .....	14
(2006-2015) .....	14
Five-Year Relative Survival by ICCG Group (2007-2016).....	14
Tables and Graphs .....	15
Table 1: Most Common Types of Cancer Incidence and Prevalence Among California Males, 2016.....	15
Table 2: Most Common Types of Cancer Mortality Among California Males, 2016 .....	15
Table 3: Most Common Types of Cancer Incidence and Prevalence Among California Females, 2016.....	16
Table 4: Most Common Types of Cancer Mortality Among California Females, 2016 .....	16
Table 5: Ten Most Commonly Diagnosed Types of Cancer by Race/Ethnicity Among California Males, 2012-2016.....	17
Table 6: Ten Most Commonly Diagnosed Types of Cancer by Race/Ethnicity Among California Females, 2012-2016 .....	18

Figure 1: Average Annual Percent Change (AAPC) in Cancer Incidence and Mortality Trends Among California Males, 2006-2015 .....	19
Figure 2: Average Annual Percent Change (AAPC) in Cancer Incidence and Mortality Trends Among California Females, 2006-2015 .....	20
Table 7: Five-Year Relative Survival (Percentage) by Stage at Diagnosis, California Diagnosed, 2007-2016.....	21
Table 8: Percent of Cancer Diagnosed at Early* Stage by County Among California Males, 2012-2016 .....	22
Table 9: Percent of Cancer Diagnosed at Early* Stage by County Among California Females, 2012-2016 .....	23
Table 10: Childhood Cancer (0-14 years) Average Incidence Rates and Counts in California, 2012-2016 (including myelodysplastic syndromes and benign brain/CNS tumors) .....	24
Table 11: Adolescent Cancer (15-19 years) Average Incidence Rates and Counts in California, Both Sexes, 2012-2016 (Including myelodysplastic syndromes and benign brain/CNS tumors) .....	25
Table 12: Age-Adjusted Cancer Incidence Trends among Children and Adolescents in California by Age Group, 2006-2015† .....	28
Table 13: Five-Year Relative Survival (Percentage) by International Classification of Childhood Cancer (ICCC) Groups, Age, and Sex in California, 2007-2016.....	29
Technical Notes.....	30

## Overview

In 2016, there were 163,321 new cases of cancer diagnosed in California. This corresponds to an age-adjusted cancer incidence (new cases) rate of 381.6 cases per 100,000 people. The age-adjusted cancer incidence rate in California has decreased significantly by 15.4 percent, from 450.8 per 100,000 people, since statewide cancer reporting began in 1988.

From 1988 to 2016, the age-adjusted cancer incidence rate among California females decreased significantly by 10.3 percent, from 414.5 cases per 100,000 females in 1988 to 371.8 per 100,000 females in 2016. Interpreting the trend in the age-adjusted cancer incidence rate among males is complicated by changes in prostate cancer screening procedures that occurred in the late 1980s. The age-adjusted cancer incidence rate among California males increased from 519.5 cases per 100,000 males in 1988 to 601.9 cases per 100,000 males in 1992. This increase was partly due to the establishment and widespread use of the prostate specific antigen (PSA) test which increased the number of prostate cancers detected. After 1992, the cancer incidence rate among males declined, and the rate in 2016 was 400.7 cases per 100,000. Overall, between 1988 and 2016, the age-adjusted cancer incidence rate among California males decreased significantly by 22.9 percent.

In 2016, a total of 59,531 deaths among Californians were due to cancer. Despite cancer causing a large number of deaths, the age-adjusted cancer mortality (death) rate has decreased significantly by 31.8 percent, from 205.4 per 100,000 people in 1988 to 140.1 per 100,000 people in 2016. The age-adjusted cancer mortality rate has declined significantly among both males and females by 36.1 percent and 29.5 percent, respectively.

The risk of being diagnosed with or dying from cancer varies by race/ethnicity, although differences are not always statistically significant. In 2016, non-Hispanic white persons had the highest age-adjusted cancer incidence rate of 422.1 per 100,000, followed by African Americans (390.8 per 100,000), American Indians (371.9 per 100,000), Hispanics (314.5 per 100,000), and Asian/Pacific Islanders (283.0 per 100,000). American Indians were not significantly different from African Americans, but were significantly different from non-Hispanic whites, Hispanics and Asian/Pacific Islanders. Non-Hispanic whites, African Americans, Hispanics and Asian/Pacific Islander incidence rates were all statistically significantly different from one another. In 2016, African Americans had the highest overall age-adjusted cancer mortality rate of 180.2 per 100,000 persons, followed by American Indians (160.8 per 100,000), non-Hispanic whites

(151.0 per 100,000), Hispanics (120.3 per 100,000), and Asian/Pacific Islanders (106.9 per 100,000). American Indians were not significantly different from non-Hispanic whites or African Americans, but were significantly different from Hispanics and Asian/Pacific Islanders. African Americans, Non-Hispanic whites, Hispanics and Asian/Pacific Islander mortality rates were all statistically significantly different from one another.

When race/ethnicity was further analyzed by sex, African American males had the highest age-adjusted cancer mortality rate of 212.8 per 100,000, followed by American Indian males (179.2 per 100,000), non-Hispanic white males (176.5 per 100,000), Hispanic males (141.4 per 100,000), and Asian/Pacific Islander males (126.9 per 100,000). Non-Hispanic whites, African Americans, Hispanics and Asian/Pacific Islander mortality rates for males were all statistically significantly different; however, American Indians were not significantly different from non-Hispanic whites or African Americans. African American females had the highest age-adjusted cancer mortality rate of 159.9 per 100,000, followed by American Indian females (146 per 100,000), non-Hispanic white females (131.9 per 100,000), Hispanic females (106.0 per 100,000), and Asian/Pacific Islander females (92.5 per 100,000). American Indians were not significantly different from non-Hispanic whites or African Americans. Non-Hispanic whites, African Americans, Hispanics and Asian/Pacific Islander mortality rates for females significantly differed.

For more detailed information on annual statistical tables for California by site, please see:

<https://www.ccrca.org/retrieve-data/data-library/#205-wpfd-annual-statistical-tables-by-site-1988-2016>.

For a mapping tool to display age-adjusted incidence and mortality rates for the last five years by county, site, sex, and race/ethnicity, please see:

<https://www.cancer-rates.info/ca/>.

## Leading Cancer Sites by Sex

Tables 1 through 4 (pages 15-16) present incidence, prevalence, and mortality for the ten most common types of cancer among California males and females in 2016. These cancers accounted for 77.9 percent of all new cancer diagnoses and 74.4 percent of all cancer-related deaths. For males, prostate cancer remained the most commonly diagnosed cancer, accounting for 22.6 percent (17,975 cases) of all newly diagnosed cancers among males and the second leading cause of cancer-related death, accounting for 11.7 percent (3,606 deaths) of all cancer-related deaths among males. Prostate cancer was also the most prevalent cancer among males, which is



represented by the existing cases count. For females, breast cancer remained the most commonly diagnosed cancer, accounting for 31.7 percent (26,581 cases) of all newly diagnosed cancers among females and the second leading cause of cancer-related death, accounting for 15.0 percent (4,311 deaths) of all cancer-related deaths among females. Additionally, breast cancer was the most common (prevalent) cancer among females in California.

The second most commonly diagnosed cancer among both males and females was cancer of the lung and bronchus, which accounted for 10.2 percent (8,088 cases) of newly diagnosed cancers among males and 9.7 percent (8,159 cases) of newly diagnosed cancers among females. Lung and bronchus cancer was the leading cause of cancer-related death among both males and females and accounted for 19.7 percent (6,081 deaths) of all cancer-related deaths among males and 19.7 percent (5,664 deaths) of all cancer-related deaths among females. Colon and rectum cancer was the third most commonly diagnosed cancer and the third leading cause of cancer-related death among both males and females. Among males, colon and rectum cancer accounted for 9.4 percent (7,469 cases) of newly diagnosed cancers and 8.7 percent (2,697 deaths) of cancer-related deaths. Among females, colon and rectum cancer accounted for 8.3 percent (6,964 cases) of newly diagnosed cancers and 8.8 percent (2,516 deaths) of cancer-related deaths.

## Leading Cancer Sites by Sex and Race/Ethnicity

The ten most commonly diagnosed cancers in California from 2012 to 2016 among males and females in 15 racial/ethnic groups are displayed in tables 5 and 6 (pages 17-18). The race/ethnicity categories examined are: African American, American Indian, Chinese, Filipino, Hawaiian, Hispanic, Japanese, Kampuchean, Korean, Laotian/Hmong, Pacific Islander, South Asian, Thai, Vietnamese, and non-Hispanic white.

Prostate cancer was the most commonly diagnosed cancer among males in most racial/ethnic groups, with lung and bronchus cancer and colon and rectum cancer ranking second and third. Exceptions to this were Kampuchean males for whom colon and rectum cancer was the most commonly diagnosed cancer, followed by lung and bronchus cancer and liver and intrahepatic bile duct (IBD) cancer. Colon and rectum cancer was the most commonly diagnosed cancer among Korean males, followed by lung and bronchus cancer and prostate cancer. Laotian/Hmong and Vietnamese males were most commonly diagnosed with lung and bronchus cancer, with liver and IBD being the second most diagnosed, and colon and rectum cancer being third. For Thai males, liver and IBD cancer was the third most

commonly diagnosed cancer. Lastly, non-Hispanic white males were most commonly diagnosed with prostate cancer, with lung and bronchus being the second most diagnosed, and melanoma of the skin being the third.

For females in all of the 15 racial/ethnic groups, breast cancer was the most commonly diagnosed cancer. Colon and rectum cancer and lung and bronchus cancer were the second and third most commonly diagnosed cancers among females in most of the racial/ethnic groups. Exceptions were Filipino, Hawaiian, and Pacific Islander females for whom uterine cancer was the second most commonly diagnosed cancer; and Hispanic females for whom uterine cancer was the third most commonly diagnosed cancer. Additionally, thyroid cancer was the second most commonly diagnosed cancer among South Asian females, followed by uterine cancer. Among Korean females, cancers of the thyroid were the third most commonly diagnosed cancer.

## **Cancer Incidence and Mortality Trends (2006-2015)**

Figures 1 and 2 (pages 19-20) depict the trends in cancer incidence and mortality rates for the most common cancers, by sex, over the most recent ten-year period (2006-2015). Looking at cancer trends over the most recent time period allows for any new or emerging trends to become evident. A bar to the right of zero (i.e., a positive percentage) means that, on average, the rate increased and a bar to the left of zero (i.e., a negative percentage) means that the rate decreased, on average. An asterisk indicates that the change was statistically significant.

Although cancer remains a major cause of illness and death in California, the incidence and mortality rates for many of the common types of cancer declined among both males and females from 2006 to 2015. While all of the reasons for these declines are not known, some of the declines can be attributed to lower rates of smoking and the consequent decline of smoking-related cancers (e.g., cancers of the lung and bronchus, larynx, stomach, cervix uteri, and urinary bladder).

For males, when all cancers were examined together, there was a statistically significant decrease in incidence and mortality rates over the most recent ten-year period. When cancers were examined separately, the incidence of seven frequently diagnosed cancers decreased significantly including cancers of the prostate, lung and bronchus, larynx, colon and rectum (i.e., colorectal), and urinary bladder.

Additionally, mortality from numerous cancers also decreased significantly, including prostate, lung and bronchus, larynx, colorectal, non-Hodgkin

lymphoma, and stomach. The incidence of seven cancers increased significantly among males over the most recent ten-year period including cancers of the soft tissue, myeloma, melanoma of the skin, liver and IBD, and thyroid. Only mortality from liver and IBD cancer increased significantly among males during the time period.

Although the incidence of stomach cancer and non-Hodgkin lymphoma did not change significantly for males during the most recent ten-year period, mortality from these cancers decreased significantly.

For females, when all cancers were examined together, incidence did not significantly change and mortality decreased significantly during the most recent ten-year period. When cancers were examined separately, the incidence of five frequently diagnosed cancers among females decreased significantly including colorectal, lung and bronchus, cervix uteri, ovary, and urinary bladder.

Mortality decreased significantly for numerous cancers, including cancers of the colon and rectum, ovary, non-Hodgkin lymphoma, leukemia, and breast.

The incidence of two frequently diagnosed cancers among females increased significantly over the most recent ten-year period including cancers of the liver and IBD, and thyroid. However, mortality from these cancers did not increase significantly.

Although the incidence of non-Hodgkin lymphoma, leukemia and breast cancer did not change significantly for females during the most recent ten-year period, mortality for these cancers did change significantly. Mortality from non-Hodgkin lymphoma, leukemia and breast cancer decreased significantly.

## **Five-Year Relative Survival by Stage at Diagnosis (2007-2016)**

Cancer survival is usually expressed as a rate or percentage of all persons diagnosed with cancer during a particular time period who survive for a defined number of years after diagnosis. Five-year relative survival estimates the probability that an individual will not die from a given cancer during the first five years following diagnosis, after adjusting for the expected mortality from other causes. Over the past several decades in California, five-year relative survival has improved for many types of cancer.

One of the strongest predictors of survival is the stage at which the cancer is diagnosed. Stage refers to the degree the cancer has spread at the time of diagnosis. The following terms are used to describe the different stages of diagnosis used in this report:

- *Localized*: The tumor broke through the first layer of cells (the basement membrane), but is still confined to the organ in which it originated.
- *Regional*: The tumor has spread to lymph nodes or adjacent tissues.
- *Distant*: The tumor has spread to other parts of the body (metastasized).

Table 7 (page 21) presents data on five-year relative survival by stage at diagnosis for the most common types of cancer diagnosed between 2007 and 2016 in Californians. The percentages listed in the table represent the probability that an individual will not die from a given cancer during the five years after diagnosis.

## Cancer Screening in California

Screening means checking for a disease before it has caused symptoms. Screening tests may find diseases at an early stage when there is a better chance of curing or materially slowing the progress of the disease. Examples of cancer screening tests include the mammogram for breast cancer, the Pap smear for cervical cancer, and the PSA blood test for prostate cancer. Fecal occult blood tests, colonoscopy, or sigmoidoscopy are used to screen for colorectal cancers. Genetic tests can also be used to assess a person's risk of developing an inherited disease. For some cancers, screening not only detects tumors at an early stage, but may also prevent cancers from developing by removing pre-cancerous lesions. With the advancement of medical research and technology, most cancers of the cervix, colon, and rectum can be prevented by regular screening.

The four cancers where screening is commonly used are colorectal cancer in males and females, prostate cancer in males, and breast and cervical cancer in females. Cancer diagnosed at an early stage, including *in situ* and localized stages, can be an indication of screening use and early detection. Tables 8 and 9 (pages 22-23) examine the percent of these cancers that were diagnosed at an early stage for all Californians, and separately for the 15 most populous counties, which account for approximately 80 percent of the population in California.

For Californian males from 2012 to 2016, colorectal cancer was diagnosed at an early stage in 38.3 percent of cases, and prostate cancer was diagnosed at an early stage in 69.9 percent of cases. For females in California from 2012 to 2016, colorectal cancer was diagnosed at an early stage in 38.5 percent of cases, breast cancer was diagnosed at an early stage in 64.2 percent of cases, and cervical cancer was diagnosed at an early stage in 43.6 percent of cases.

## **Childhood (Ages 0-14 years) and Adolescent (Ages 15-19 years) Cancers**

Each year from 2012 to 2016, approximately 1,800 children and adolescents were diagnosed with cancer in California. These cases represent slightly more than one percent of all new cancer cases diagnosed per year among California residents during this time period. Although childhood and adolescent cancer incidence rates have increased since 1988, progress in treatment has resulted in improved five-year relative survival. Overall, children and adolescents diagnosed with cancer in California between 2007 and 2016 had a five-year relative survival of 82.4 percent and 83.8 percent, respectively.

## **Incidence Rates and Number of Cases by International Classification of Childhood Cancer (ICCC) Group (2012-2016)**

Childhood and adolescent cancers are classified differently than adult cancers; they are categorized according to the ICCC (additional information about the ICCC may be obtained from: <http://seer.cancer.gov/iccc/>). The classification of childhood and adolescent cancers is based on the form and structure of the tumor (more commonly referred to as the tumor morphology) and the primary site (e.g., lung, colon, etc.), with an emphasis on morphology. Adult cancers are also categorized based on morphology and primary site, but the emphasis is on primary site. The ICCC is broken down into the following 12 site groups:

- I. Leukemias, myeloproliferative diseases, and myelodysplastic diseases
- II. Lymphomas and reticuloendothelial neoplasms
- III. Central nervous system (CNS) and miscellaneous intracranial and intraspinal neoplasms
- IV. Neuroblastoma and other peripheral nervous cell tumors
- V. Retinoblastoma



- VI. Renal tumors
- VII. Hepatic tumors
- VIII. Malignant bone tumors
- IX. Soft tissue and other extraosseous sarcomas
- X. Germ cell tumors, trophoblastic tumors, and neoplasms of gonads
- XI. Other malignant epithelial neoplasms and malignant melanomas
- XII. Other and unspecified malignant neoplasms

Between 2012 and 2016, leukemia was the most commonly diagnosed cancer among California children (ages 0-14 years) and accounted for 34 percent of all cancers diagnosed in this age group (Figure 3, page 24). CNS tumors were the second most commonly diagnosed cancer and accounted for 24 percent of all childhood cancers. For additional information on childhood cancer incidence rates and case counts, see Table 10 (page 24).

For adolescents (ages 15-19 years), the most commonly diagnosed cancers between 2012 and 2016 were cancers classified as other malignant epithelial neoplasms and malignant melanomas, which accounted for 20 percent of all adolescent cancers (Figure 4, page 25). CNS tumors were the second most frequently diagnosed cancers among adolescents and accounted for 19 percent of all cancers diagnosed in this age group. For additional data regarding adolescent cancer incidence rates and case counts, see Table 11 (page 25).

*Of note, childhood and adolescent cancer incidence rates are presented as rates per 1,000,000 persons, while adult cancer incidence rates (as presented earlier in this report) are per 100,000 persons.*

## **Childhood Cancer Incidence Trends by Sex and Cancer Type (2006-2015)**

Overall, the age-adjusted incidence rate of childhood cancer (ages 0 to 14 years) slightly increased from 159.0 per 1,000,000 in 2006 to 167.1 per 1,000,000 in 2015 (Figure 5, page 26). The trends in the age-adjusted incidence rates were similar when examined by sex. For males and females, there was a slight increase in the age-adjusted incidence rates from 2006 to 2015, but these changes were not statistically significant. Incidence trends for the most commonly diagnosed types of childhood cancer are presented in Figure 6 (page 26). The incidence rates of leukemia, lymphoma, CNS tumors, neuroblastoma, and cancer of the soft tissue did not change significantly during this time period.

## **Adolescent Incidence Trends by Sex and Cancer Type (2006-2015)**

From 2006 to 2015, the age-adjusted cancer incidence rate for adolescents (ages 15-19 years) increased significantly by 1.2 percent per year (Figure 7, page 27). The age-adjusted cancer incidence rate for male adolescents was higher than that of female adolescents and the trend in the age-adjusted incidence rate among males increased significantly. The trend in the age-adjusted cancer incidence rate among female adolescents also appeared to increase non-significantly during the time period.

Incidence trends for the most commonly diagnosed types of adolescent cancer are presented in Figure 8 (page 27). From 2006 to 2015, the incidence of lymphoma, leukemia, germ cell tumors, other malignant epithelial neoplasms (including melanoma), and CNS tumors all slightly increased but these increases were not statistically significant.

## **Childhood and Adolescent Incidence Trends by Age Group (2006-2015)**

Figure 9 (page 28) and Table 12 (page 28) display the cancer incidence trends for children and adolescents, separated into five-year age groups (ages 0-4, 5-9, 10-14, and 15-19 years). From 2006 to 2015, cancer incidence among children ages 0-4 years and 5-9 years did not change significantly. For children ages 10-14 years, cancer incidence appeared to decrease from 2006 to 2012 and then significantly increased by 8.3 percent per year from 2012 to 2015. For adolescents ages 15-19 years, incidence significantly increased by 1.8 percent per year from 2006 to 2015.

## **Five-Year Relative Survival by ICCC Group (2007-2016)**

There has been improvement in the five-year relative survival rates for childhood and adolescent cancers, in part due to progress in cancer treatments. The five-year relative survival in California, from 2007 to 2016, for all cancers combined (excluding benign brain/CNS tumors) was 82.4 percent for children and 83.8 percent for adolescents (Table 13, page 29). When benign brain/CNS tumors were included, the five-year relative survival was 82.3 for children and 83.8 for adolescents. See Table 13 (page 29) for the five-year relative survival for each of the major ICCC groups by sex and age group.

## Tables and Graphs

**Table 1: Most Common Types of Cancer Incidence and Prevalence Among California Males, 2016**

Rank	Cancer Site	New Cases	Incidence Rate	Existing Cases
1	Prostate	17,975	86.0	275,731
2	Lung and Bronchus	8,088	42.5	19,284
3	Colon and Rectum	7,469	37.7	63,747
4	Melanoma of the Skin	5,844	30.0	54,203
5	Urinary Bladder	5,206	28.0	44,406
6	Non-Hodgkin Lymphoma	4,161	21.4	33,914
7	Kidney and Renal Pelvis	3,925	19.6	28,625
8	Oral Cavity and Pharynx	3,072	14.9	23,113
9	Leukemia	2,853	14.9	21,557
10	Liver and Intrahepatic Bile Duct	2,816	13.3	7,368

Rates are per 100,000 and age-adjusted to the 2000 U.S. Standard Population.  
 Source: California Cancer Registry, California Department of Public Health

**Table 2: Most Common Types of Cancer Mortality Among California Males, 2016**

Rank	Cancer Site	Count	Rate
1	Lung and Bronchus	6,081	32.7
2	Prostate	3,606	20.5
3	Colon and Rectum	2,697	14.2
4	Pancreas	2,244	11.7
5	Liver and Intrahepatic Bile Duct	2,274	11.2
6	Leukemia	1,368	7.5
7	Urinary Bladder	1,233	7.0
8	Non-Hodgkin Lymphoma	1,177	6.4
9	Brain and Other Nervous System	1,059	5.4
10	Esophagus	1,035	5.3

Rates are per 100,000 and age-adjusted to the 2000 U.S. Standard Population.  
 Source: California Cancer Registry, California Department of Public Health

**Table 3: Most Common Types of Cancer Incidence and Prevalence Among California Females, 2016**

Rank	Cancer Site	New Cases	Incidence Rate	Existing Cases
1	Breast	26,581	118.7	332,329
2	Lung and Bronchus	8,159	35.1	26,404
3	Colon and Rectum	6,964	30.6	62,786
4	Corpus and Uterus, NOS	6,184	26.6	63,870
5	Thyroid	3,892	18.8	52,262
6	Melanoma of the Skin	3,772	16.8	47,521
7	Non-Hodgkin Lymphoma	3,367	14.7	30,366
8	Ovary	2,400	10.7	20,673
9	Pancreas	2,372	10.2	3,707
10	Kidney and Renal Pelvis	2,204	9.7	18,307

Rates are per 100,000 and age-adjusted to the 2000 U.S. Standard Population.  
 Source: California Cancer Registry, California Department of Public Health

**Table 4: Most Common Types of Cancer Mortality Among California Females, 2016**

Rank	Cancer Site	Count	Rate
1	Lung and Bronchus	5,664	24.2
2	Breast	4,311	18.5
3	Colon and Rectum	2,516	10.6
4	Pancreas	2,180	9.1
5	Ovary	1,649	7.1
6	Corpus and Uterus, NOS	1,249	5.3
7	Liver and Intrahepatic Bile Duct	1,173	5.0
8	Leukemia	1,025	4.4
9	Non-Hodgkin Lymphoma	931	4.0
10	Brain and Other Nervous System	828	3.7

Rates are per 100,000 and age-adjusted to the 2000 U.S. Standard Population.  
 Source: California Cancer Registry, California Department of Public Health

**Table 5: Ten Most Commonly Diagnosed Types of Cancer by Race/Ethnicity Among California Males, 2012-2016**

Rank	1	2	3	4	5	6	7	8	9	10
<b>African American</b>	Prostate (8,115)	Lung and Bronchus (3,075)	Colon and Rectum (2,445)	Kidney and Renal Pelvis (1,277)	Liver and IBD* (1,043)	Urinary Bladder (996)	Non-Hodgkin Lymphoma (920)	Pancreas (814)	Myeloma (787)	Leukemia (694)
<b>American Indian</b>	Prostate (370)	Lung and Bronchus (242)	Colon and Rectum (202)	Liver and IBD* (178)	Kidney and Renal Pelvis (128)	Urinary Bladder (108)	Non-Hodgkin Lymphoma (98)	Oral Cavity and Pharynx (80)	Pancreas (77)	Melanoma of the Skin (67)
<b>Chinese</b>	Prostate (1,917)	Lung and Bronchus (1,830)	Colon and Rectum (1,589)	Liver and IBD* (753)	Non-Hodgkin Lymphoma (637)	Urinary Bladder (603)	Oral Cavity and Pharynx (495)	Stomach (495)	Kidney and Renal Pelvis (424)	Pancreas (407)
<b>Filipino</b>	Prostate (2,089)	Lung and Bronchus (1,491)	Colon and Rectum (1,131)	Non-Hodgkin Lymphoma (538)	Liver and IBD* (517)	Kidney and Renal Pelvis (466)	Urinary Bladder (346)	Leukemia (303)	Pancreas (298)	Thyroid (276)
<b>Hawaiian</b>	Prostate (111)	Colon and Rectum (72)	Lung and Bronchus (71)	Non-Hodgkin Lymphoma (28)	Liver and IBD* (25)	Stomach (24)	Kidney and Renal Pelvis (23)	Oral Cavity and Pharynx (21)	Urinary Bladder (21)	Myeloma (20)
<b>Hispanic</b>	Prostate (16,569)	Colon and Rectum (8,241)	Lung and Bronchus (5,011)	Kidney and Renal Pelvis (4,938)	Non-Hodgkin Lymphoma (4,343)	Liver and IBD* (4,324)	Leukemia (3,337)	Urinary Bladder (2,918)	Stomach (2,534)	Testis (2,365)
<b>Japanese</b>	Prostate (612)	Colon and Rectum (462)	Lung and Bronchus (366)	Non-Hodgkin Lymphoma (219)	Urinary Bladder (194)	Stomach (192)	Pancreas (144)	Kidney and Renal Pelvis (133)	Oral Cavity and Pharynx (95)	Liver and IBD* (88)
<b>Kampuchean</b>	Colon and Rectum (85)	Lung and Bronchus (77)	Liver and IBD* (74)	Prostate (28)	Non-Hodgkin Lymphoma (20)	Oral Cavity and Pharynx (17)	Pancreas (14)	Leukemia (14)	Urinary Bladder (12)	Kidney and Renal Pelvis (12)
<b>Korean</b>	Colon and Rectum (555)	Lung and Bronchus (513)	Prostate (431)	Stomach (382)	Liver and IBD* (275)	Urinary Bladder (228)	Pancreas (153)	Kidney and Renal Pelvis (148)	Non-Hodgkin Lymphoma (135)	Thyroid (100)
<b>Laotian/Hmong</b>	Lung and Bronchus (97)	Liver and IBD* (85)	Colon and Rectum (81)	Oral Cavity and Pharynx (32)	Non-Hodgkin Lymphoma (29)	Pancreas (25)	Leukemia (25)	Stomach (24)	Prostate (23)	Brain and Other Nervous System (11)
<b>Pacific Islander<sup>^</sup></b>	Prostate (200)	Lung and Bronchus (125)	Colon and Rectum (95)	Liver and IBD* (54)	Kidney and Renal Pelvis (43)	Oral Cavity and Pharynx (41)	Urinary Bladder (39)	Stomach (35)	Non-Hodgkin Lymphoma (32)	Thyroid (23)
<b>South Asian<sup>†</sup></b>	Prostate (735)	Colon and Rectum (329)	Lung and Bronchus (256)	Non-Hodgkin Lymphoma (241)	Urinary Bladder (214)	Leukemia (191)	Oral Cavity and Pharynx (174)	Kidney and Renal Pelvis (148)	Liver and IBD* (124)	Thyroid (106)
<b>Thai</b>	Prostate (57)	Colon and Rectum (54)	Liver and IBD* (36)	Lung and Bronchus (35)	Non-Hodgkin Lymphoma (24)	Stomach (14)	Oral Cavity and Pharynx (13)	Urinary Bladder (11)	Kidney and Renal Pelvis (10)	Pancreas (9)
<b>Vietnamese</b>	Lung and Bronchus (953)	Liver and IBD* (756)	Colon and Rectum (683)	Prostate (600)	Non-Hodgkin Lymphoma (275)	Oral Cavity and Pharynx (231)	Stomach (211)	Urinary Bladder (177)	Kidney and Renal Pelvis (155)	Pancreas (147)
<b>Non-Hispanic White</b>	Prostate (52,431)	Lung and Bronchus (26,442)	Melanoma of the Skin (23,698)	Colon and Rectum (20,304)	Urinary Bladder (18,978)	Non-Hodgkin Lymphoma (12,282)	Kidney and Renal Pelvis (10,347)	Oral Cavity and Pharynx (10,258)	Leukemia (8,612)	Pancreas (7,286)

<sup>^</sup> Pacific Islander includes: Micronesian, Chamorran, Guamanian, Polynesian, Tahitian, Samoan, Tongan, Melanesian, Fiji Islander, New Guinean, and Pacific Islander not specified

<sup>†</sup> South Asian Includes: Asian Indian and Pakistani

\* IBD: Intrahepatic Bile Duct

Source: California Cancer Registry, California Department of Public Health



**Table 6: Ten Most Commonly Diagnosed Types of Cancer by Race/Ethnicity Among California Females, 2012-2016**

Rank	1	2	3	4	5	6	7	8	9	10
<b>African American</b>	Breast (8,282)	Lung and Bronchus (3,035)	Colon and Rectum (2,534)	Uterus (1,839)	Pancreas (869)	Non-Hodgkin Lymphoma (806)	Kidney and Renal Pelvis (804)	Thyroid (688)	Myeloma (660)	Ovary (628)
<b>American Indian</b>	Breast (698)	Lung and Bronchus (283)	Colon and Rectum (220)	Uterus (202)	Thyroid (109)	Kidney and Renal Pelvis (101)	Non-Hodgkin Lymphoma (71)	Liver and IBD* (70)	Cervix Uteri (69)	Ovary (63)
<b>Chinese</b>	Breast (4,339)	Lung and Bronchus (1,582)	Colon and Rectum (1,320)	Uterus (831)	Thyroid (759)	Non-Hodgkin Lymphoma (496)	Stomach (420)	Pancreas (416)	Ovary (399)	Liver and IBD* (338)
<b>Filipino</b>	Breast (5,576)	Uterus (1,318)	Lung and Bronchus (1,109)	Colon and Rectum (1,107)	Thyroid (1,081)	Non-Hodgkin Lymphoma (533)	Ovary (448)	Pancreas (414)	Cervix Uteri (314)	Kidney and Renal Pelvis (284)
<b>Hawaiian</b>	Breast (256)	Uterus (88)	Colon and Rectum (74)	Lung and Bronchus (53)	Thyroid (33)	Ovary (25)	Non-Hodgkin Lymphoma (20)	Leukemia (18)	Pancreas (17)	Kidney and Renal Pelvis (17)
<b>Hispanic</b>	Breast (25,649)	Colon and Rectum (7,215)	Uterus (6,608)	Thyroid (6,061)	Lung and Bronchus (4,825)	Non-Hodgkin Lymphoma (3,963)	Kidney and Renal Pelvis (3,316)	Ovary (3,031)	Cervix Uteri (2,719)	Leukemia (2,579)
<b>Japanese</b>	Breast (1,533)	Colon and Rectum (559)	Lung and Bronchus (497)	Uterus (235)	Non-Hodgkin Lymphoma (225)	Pancreas (210)	Stomach (153)	Thyroid (128)	Ovary (123)	Urinary Bladder (104)
<b>Kampuchean</b>	Breast (125)	Colon and Rectum (75)	Lung and Bronchus (50)	Liver and IBD* (42)	Thyroid (28)	Uterus (22)	Cervix Uteri (20)	Ovary (19)	Stomach (15)	Non-Hodgkin Lymphoma (15)
<b>Korean</b>	Breast (1,142)	Colon and Rectum (494)	Thyroid (316)	Lung and Bronchus (307)	Stomach (246)	Uterus (179)	Pancreas (172)	Ovary (155)	Liver and IBD* (147)	Non-Hodgkin Lymphoma (131)
<b>Laotian/Hmong</b>	Breast (90)	Colon and Rectum (76)	Lung and Bronchus (54)	Uterus (37)	Thyroid (31)	Cervix Uteri (29)	Pancreas (27)	Liver and IBD* (22)	Leukemia (22)	Oral Cavity and Pharynx (21)
<b>Pacific Islander<sup>^</sup></b>	Breast (428)	Uterus (254)	Lung and Bronchus (110)	Colon and Rectum (94)	Thyroid (71)	Cervix Uteri (50)	Ovary (43)	Non-Hodgkin Lymphoma (41)	Stomach (35)	Pancreas (33)
<b>South Asian<sup>±</sup></b>	Breast (1,472)	Thyroid (307)	Uterus (275)	Colon and Rectum (190)	Non-Hodgkin Lymphoma (174)	Ovary (164)	Lung and Bronchus (156)	Leukemia (112)	Oral Cavity and Pharynx (83)	Pancreas (75)
<b>Thai</b>	Breast (209)	Colon and Rectum (65)	Lung and Bronchus (60)	Uterus (41)	Thyroid (41)	Liver and IBD* (22)	Non-Hodgkin Lymphoma (21)	Ovary (17)	Cervix Uteri (16)	Pancreas (13)
<b>Vietnamese</b>	Breast (1,446)	Lung and Bronchus (595)	Colon and Rectum (553)	Thyroid (334)	Uterus (291)	Liver and IBD* (226)	Non-Hodgkin Lymphoma (199)	Ovary (182)	Stomach (161)	Cervix Uteri (134)
<b>Non-Hispanic White</b>	Breast (76,563)	Lung and Bronchus (28,810)	Colon and Rectum (19,264)	Uterus (15,723)	Melanoma of the Skin (14,650)	Non-Hodgkin Lymphoma (9,314)	Thyroid (9,054)	Ovary (6,921)	Pancreas (6,588)	Leukemia (5,716)

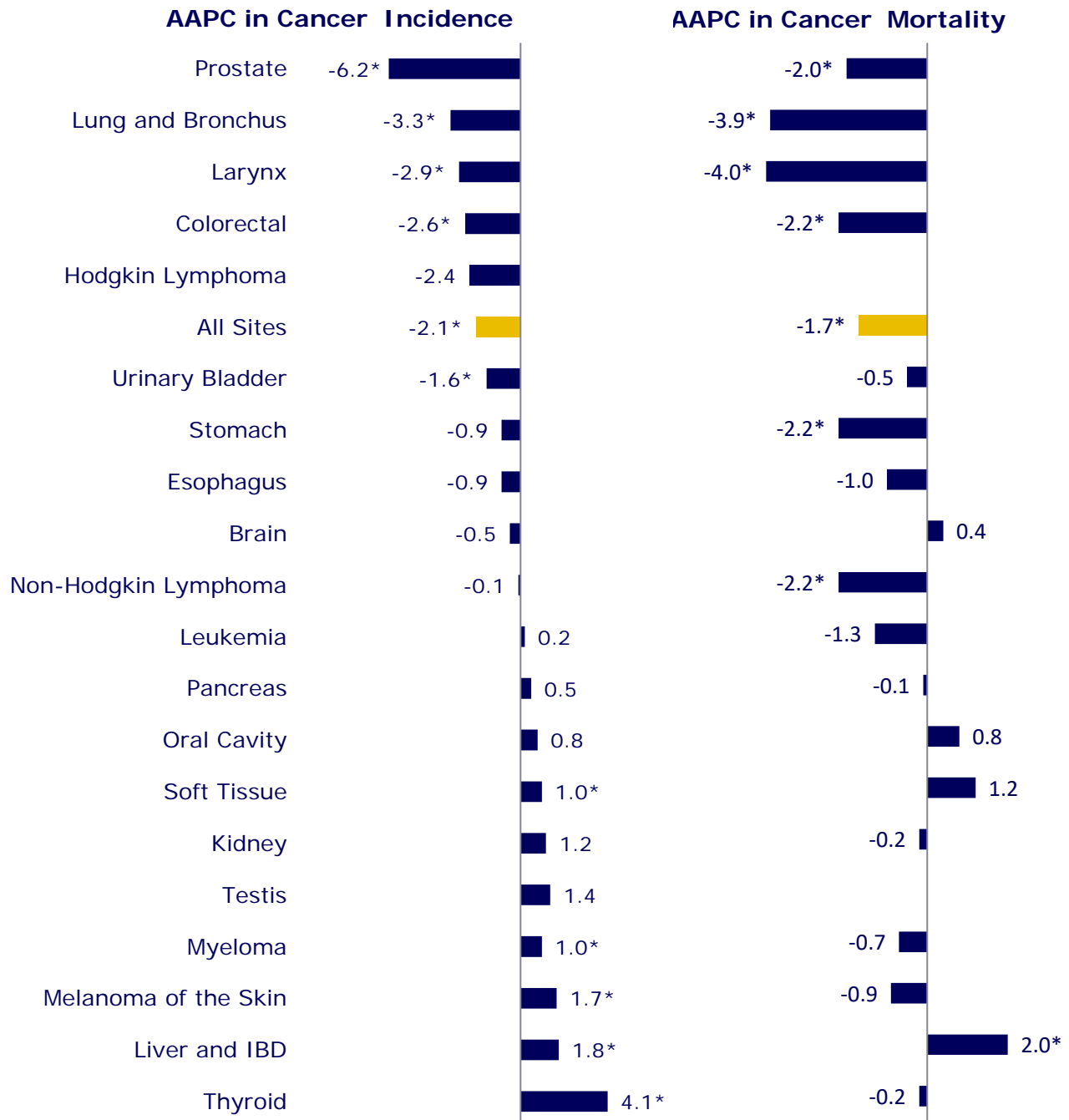
<sup>^</sup> Pacific Islander includes: Micronesian, Chamorran, Guamanian, Polynesian, Tahitian, Samoan, Tongan, Melanesian, Fiji Islander, New Guinean, and Pacific Islander not specified

<sup>±</sup> South Asian Includes: Asian Indian and Pakistani

\* IBD: Intrahepatic Bile Duct

Source: California Cancer Registry, California Department of Public Health

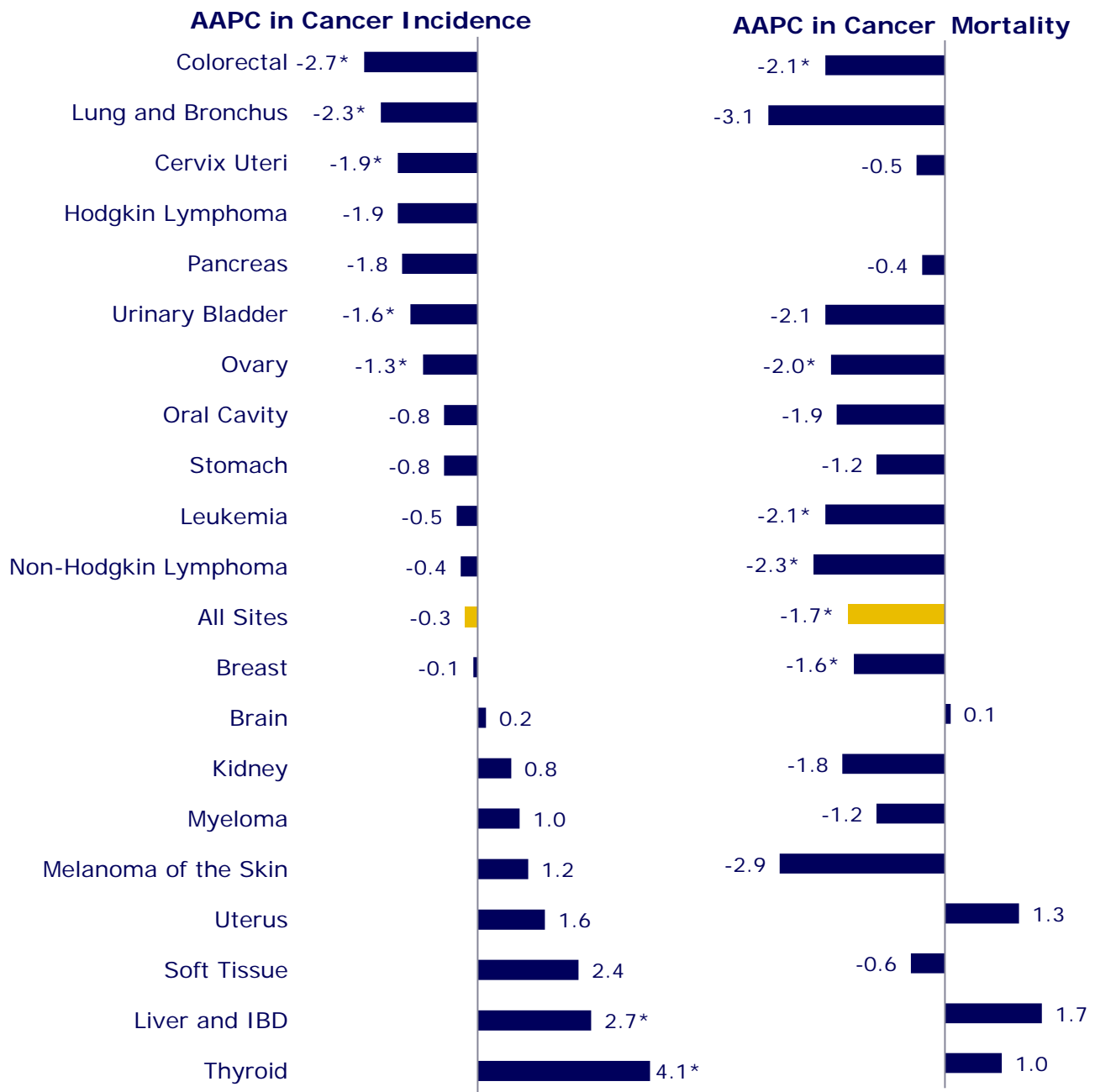
**Figure 1: Average Annual Percent Change (AAPC) in Cancer Incidence and Mortality Trends Among California Males, 2006-2015**



\*AAPC is significantly different from zero at  $p < 0.05$ . Rates are per 100,000 and age-adjusted to the 2000 U.S. Standard Population. For Hodgkin lymphoma and testicular cancer mortality, the AAPC could not be calculated due to small counts.

Source: California Cancer Registry, California Department of Public Health

**Figure 2: Average Annual Percent Change (AAPC) in Cancer Incidence and Mortality Trends Among California Females, 2006-2015**



\*AAPC is significantly different from zero at  $p < 0.05$ . Rates are per 100,000 and age-adjusted to the 2000 U.S. Standard Population. For Hodgkin lymphoma mortality, the AAPC could not be calculated due to small counts.

Source: California Cancer Registry, California Department of Public Health

**Table 7: Five-Year Relative Survival (Percentage) by Stage at Diagnosis, California, 2007-2016**

Cancer Site	All Stages	Localized	Regional	Distant
Breast (Female)	90.4	98.3	85.4	28.9
Prostate	97.3	100	99.8	29.4
Lung and Bronchus	19.1	57.0	30.1	5.1
Colon and Rectum	65.8	89.8	70.5	14.1
Melanoma	89.9	96.8	63.1	20.5
Non-Hodgkin Lymphoma	70.2	82.8	73.8	62.5
Urinary Bladder	58.2	69.7	39.5	6.2
Kidney and Renal Pelvis	74.0	91.6	67.3	12.1
Uterus	81.7	94.7	68.6	17.6
Leukemia	59.1	N/A: All leukemias are staged as distant disease; thus survival cannot be calculated for other stages		59.1
Thyroid	97.4	99.9	97.7	55.7
Pancreas	9.0	34.2	11.6	2.8
Oral Cavity and Pharynx	66.9	83.6	66.7	39.7
Liver and Intrahepatic Bile Duct	21.0	32.9	12.0	3.0
Stomach	30.9	67.4	31.1	5.2
Ovary	49.6	91.0	75.2	30.6
Brain and Other Nervous System	32.6	35.3	22.0 <sup>^</sup>	
Cervix Uteri	67.1	91.6	56.7	17.7
Esophagus	18.4	39.7	23.0	4.6
Testis	94.0	98.6	95.2	69.9
Follow-up is through December 31, 2016. Cancers that were unstaged at time of diagnosis were excluded. <sup>^</sup> For brain and other nervous system tumors, regional and distant stages were combined. <i>Source: California Cancer Registry, California Department of Public Health</i>				

**Table 8: Percent of Cancer Diagnosed at Early\* Stage by County Among California Males, 2012-2016**

County	Colon and Rectum		Prostate	
	Count	Percent	Count	Percent
California	14,184	38.3%	62,879	69.9%
Alameda	574	38.2%	2,940	76.1%
Contra Costa	459	39.3%	2,507	76.3%
Fresno	287	36.1%	1,257	70.0%
Kern	274	37.6%	1,116	65.9%
Los Angeles	3,500	36.8%	13,255	61.4%
Orange	1,230	42.4%	5,242	72.5%
Riverside	932	40.7%	4,362	75.1%
Sacramento	575	39.0%	2,213	71.7%
San Bernardino	774	38.8%	3,195	69.6%
San Diego	1,110	37.9%	5,407	71.0%
San Francisco	400	42.2%	1,493	75.8%
San Joaquin	259	40.3%	1,039	72.8%
San Mateo	295	40.5%	1,525	77.0%
Santa Clara	669	39.3%	3,227	78.8%
Ventura	312	37.8%	1,408	66.3%

\*Early stage includes in situ and localized stages - Data not shown if fewer than 16 cases were reported.  
 Source: California Cancer Registry, California Department of Public Health

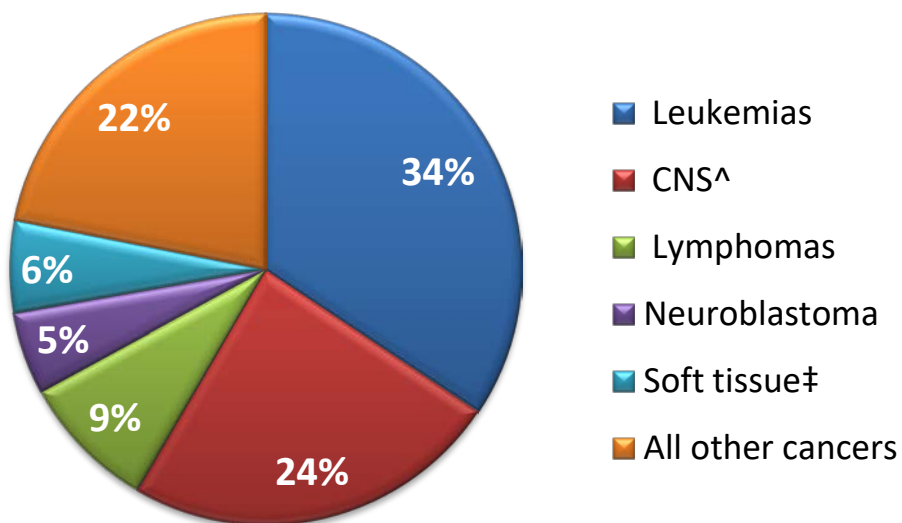


**Table 9: Percent of Cancer Diagnosed at Early\* Stage by County Among California Females, 2012-2016**

County	Colon and Rectum		Breast		Cervix Uteri	
	Count	Percent	Count	Percent	Count	Percent
California	13,283	38.5%	83,638	64.2%	3,173	43.6%
Alameda	566	40.4%	3,670	65.9%	133	49.1%
Contra Costa	468	40.3%	2,917	66.1%	87	47.0%
Fresno	284	37.9%	1,726	64.7%	73	40.3%
Kern	254	42.8%	1,341	61.8%	72	38.9%
Los Angeles	3,312	36.9%	19,968	62.2%	866	42.0%
Orange	1,118	41.7%	7,297	65.6%	241	44.7%
Riverside	786	38.5%	4,442	62.6%	189	39.9%
Sacramento	508	34.8%	3,597	65.7%	128	39.4%
San Bernardino	712	40.8%	3,512	60.0%	185	41.1%
San Diego	1,085	38.9%	7,098	63.2%	241	43.8%
San Francisco	363	42.6%	2,006	67.5%	87	53.4%
San Joaquin	237	38.2%	1,343	61.4%	46	34.3%
San Mateo	279	41.6%	2,295	71.2%	53	48.6%
Santa Clara	582	38.9%	4,157	66.0%	132	53.4%
Ventura	282	38.2%	2,115	66.4%	82	52.6%

\*Early stage includes in situ and localized stages - Data not shown if fewer than 16 cases were reported.  
Source: California Cancer Registry, California Department of Public Health

**Figure 3: Distribution of Cancer Types Among Children Ages 0-14 Years in California, 2012-2016\***



\*Includes myelodysplastic syndromes and benign brain/CNS tumors.

<sup>^</sup>Includes miscellaneous intracranial and intraspinal neoplasms.

<sup>‡</sup>Includes other extraosseous sarcomas.

Source: California Cancer Registry, California Department of Public Health

**Table 10: Childhood Cancer (0-14 years) Average Incidence Rates and Counts in California, 2012-2016\***

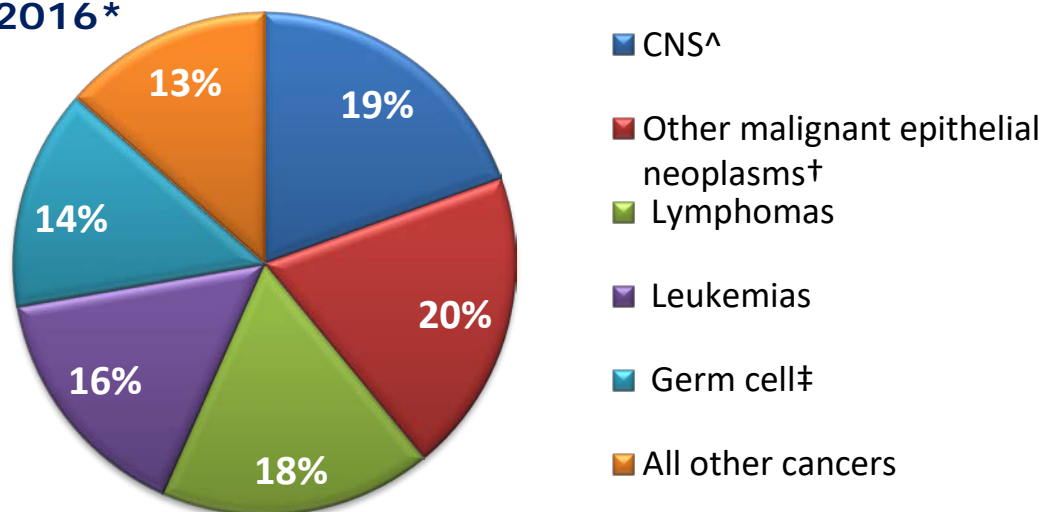
Cancer Type	Rate	Count
All cancers combined (including benign brain/CNS tumors)	179.5	6,819
All cancers combined (excluding benign brain/CNS tumors)	164.6	6,256
Leukemias, myeloproliferative & myelodysplastic diseases	61.4	2,344
CNS and miscellaneous intracranial and intraspinal neoplasms	43.2	1,637
Lymphomas and reticuloendothelial neoplasms	15.7	590
Soft tissue and other extraosseous sarcomas	10.5	398
Neuroblastoma and other peripheral nervous cell tumors	9.2	356
Other malignant epithelial neoplasms and melanomas	9.7	361
Renal tumors	8.0	306
Malignant bone tumors	7.3	273
Germ cell & trophoblastic tumors & neoplasms of gonads	6.3	237
Retinoblastoma	4.4	170
Hepatic tumors	3.2	123
Other and unspecified malignant neoplasms	0.6	24

\*Includes myelodysplastic syndromes and benign brain/CNS tumors.

Rates are per 1,000,000 and age-adjusted to the 2000 U.S. Standard Population.

Source: California Cancer Registry, California Department of Public Health

**Figure 4: Distribution of Cancer Types Among Adolescents Ages 15-19 Years in California, 2012-2016\***



\*Includes myelodysplastic syndromes and benign brain/CNS tumors.

<sup>^</sup>Includes miscellaneous intracranial and intraspinal neoplasms.

<sup>†</sup>Includes melanomas.

<sup>‡</sup>Includes trophoblastic tumors and neoplasms of gonads.

Source: California Cancer Registry, California Department of Public Health

**Table 11: Adolescent Cancer (15-19 years) Average Incidence Rates and Counts in California, Both Sexes, 2012-2016\***

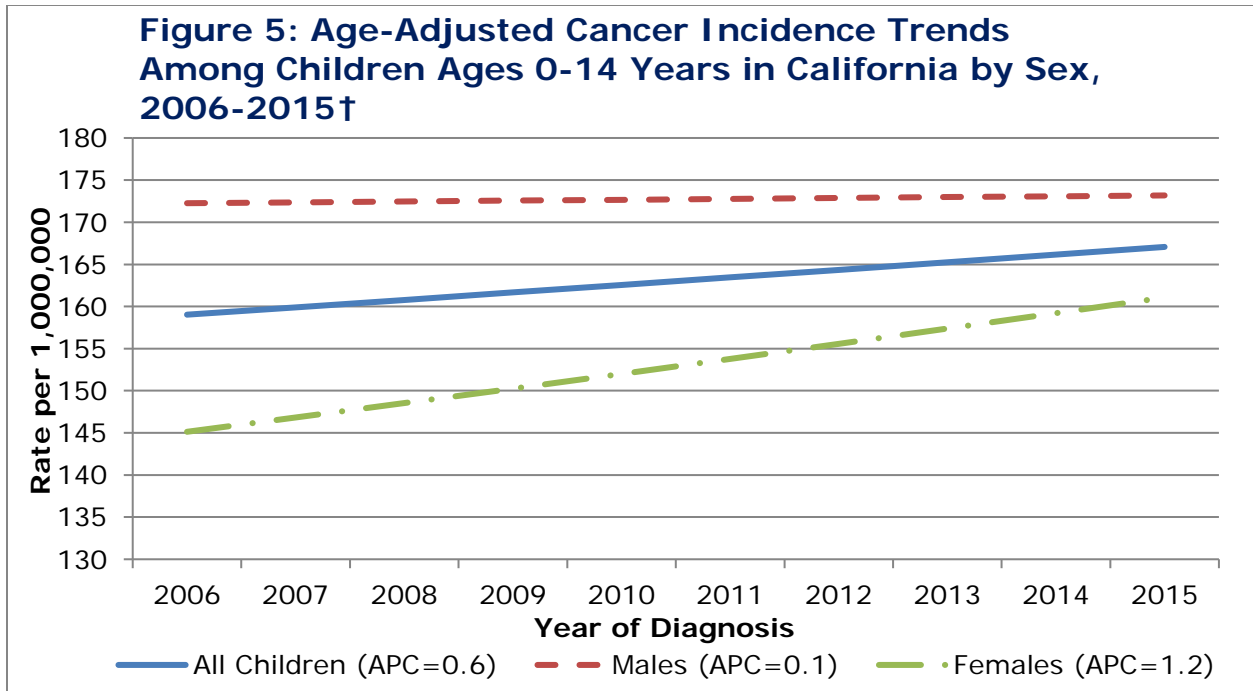
Cancer Type	Rate	Count
All cancers combined (including benign brain/CNS tumors)	266.6	3,508
All cancers combined (excluding benign brain/CNS tumors)	230.8	3,037
CNS and miscellaneous intracranial and intraspinal neoplasms	52.0	684
Other malignant epithelial neoplasms and melanomas	52.1	686
Lymphomas and reticuloendothelial neoplasms	46.9	617
Leukemias, myeloproliferative & myelodysplastic diseases	41.7	548
Germ cell & trophoblastic tumors & neoplasms of gonads	37.9	499
Soft tissue and other extraosseous sarcomas	17.2	226
Malignant bone tumors	14.7	193
Renal tumors	1.5	20
Hepatic tumors	1.2	16
Other and unspecified malignant neoplasms~	-	-
Neuroblastoma and other peripheral nervous cell tumors~	-	-
Retinoblastoma~	-	-

\*Includes myelodysplastic syndromes and benign brain/CNS tumors.

~Data not shown if fewer than 16 cases were reported.

Rates are per 1,000,000 and age-adjusted to the 2000 U.S. Standard Population.

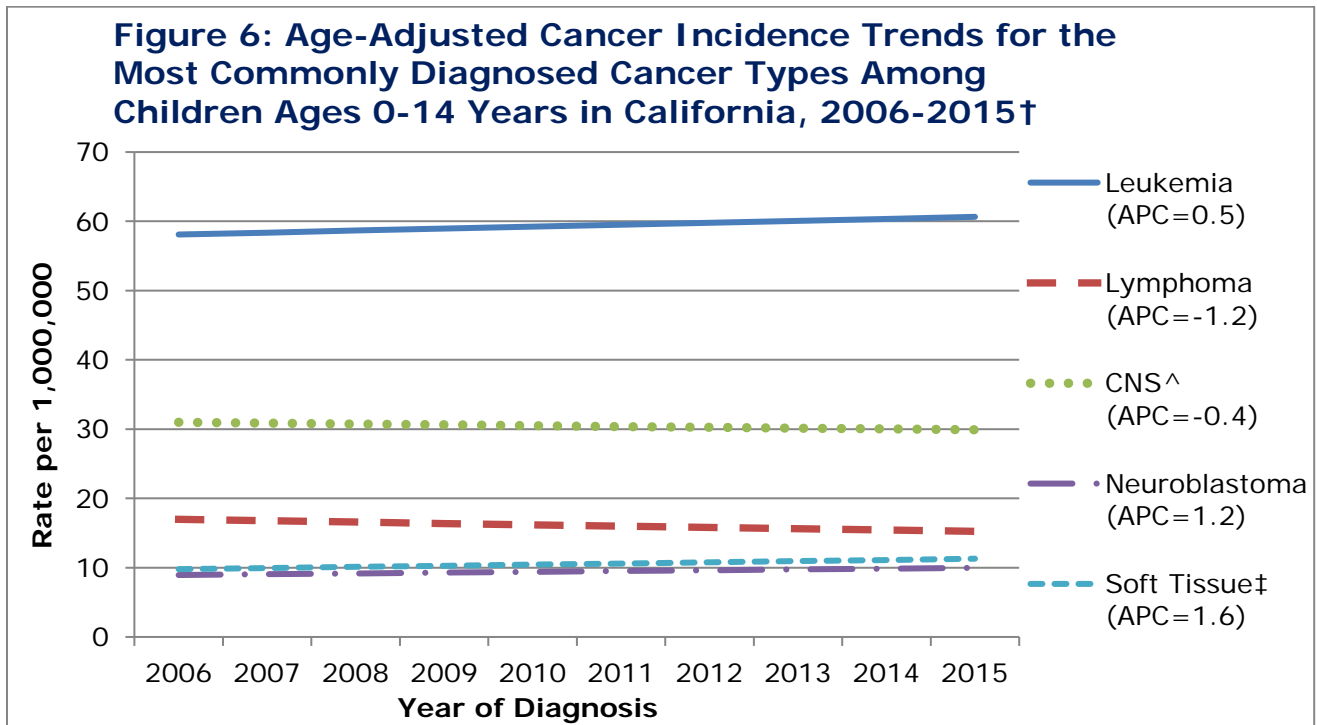
Source: California Cancer Registry, California Department of Public Health



† Excludes myelodysplastic syndromes and benign brain/CNS tumors.

\* The annual percent change (APC) is significantly different from zero at  $p < 0.05$ .

Source: California Cancer Registry, California Department of Public Health



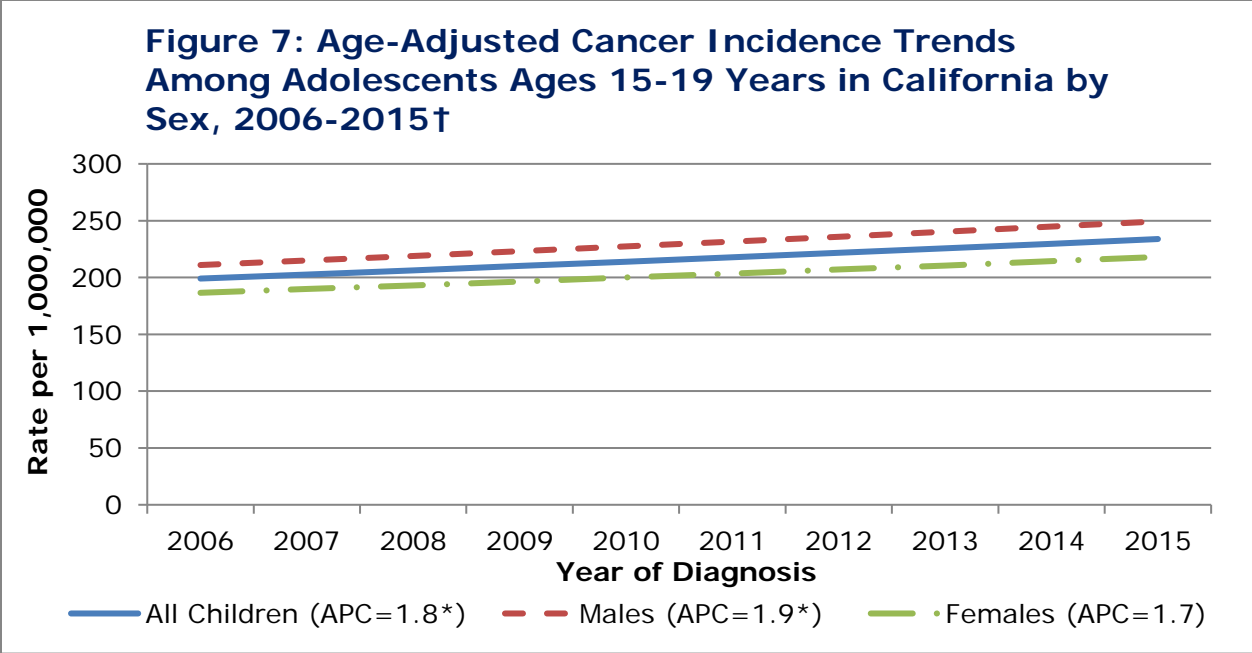
† Excludes myelodysplastic syndromes and benign brain/CNS tumors.

\* The annual percent change (APC) is significantly different from zero at  $p < 0.05$ .

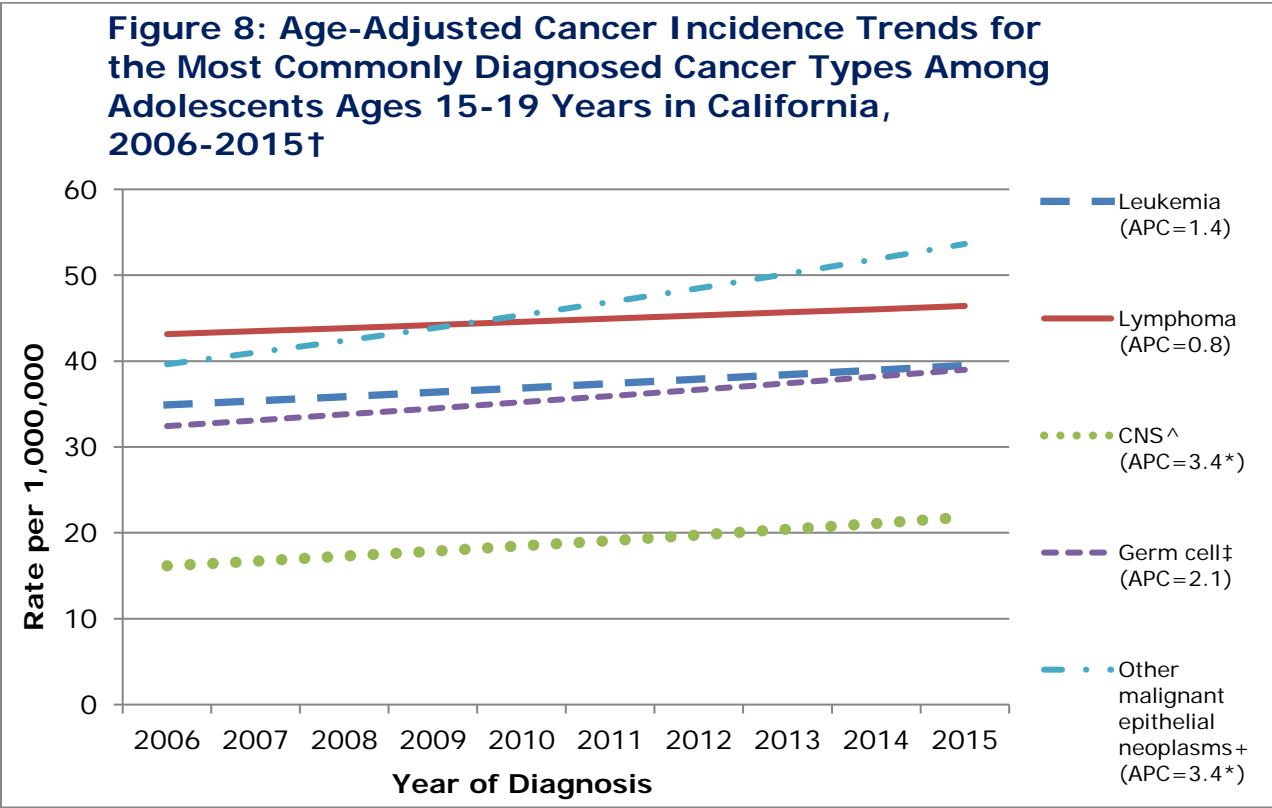
^ Includes miscellaneous intracranial and intraspinal neoplasms.

‡ Includes other extraosseous sarcomas.

Source: California Cancer Registry, California Department of Public Health



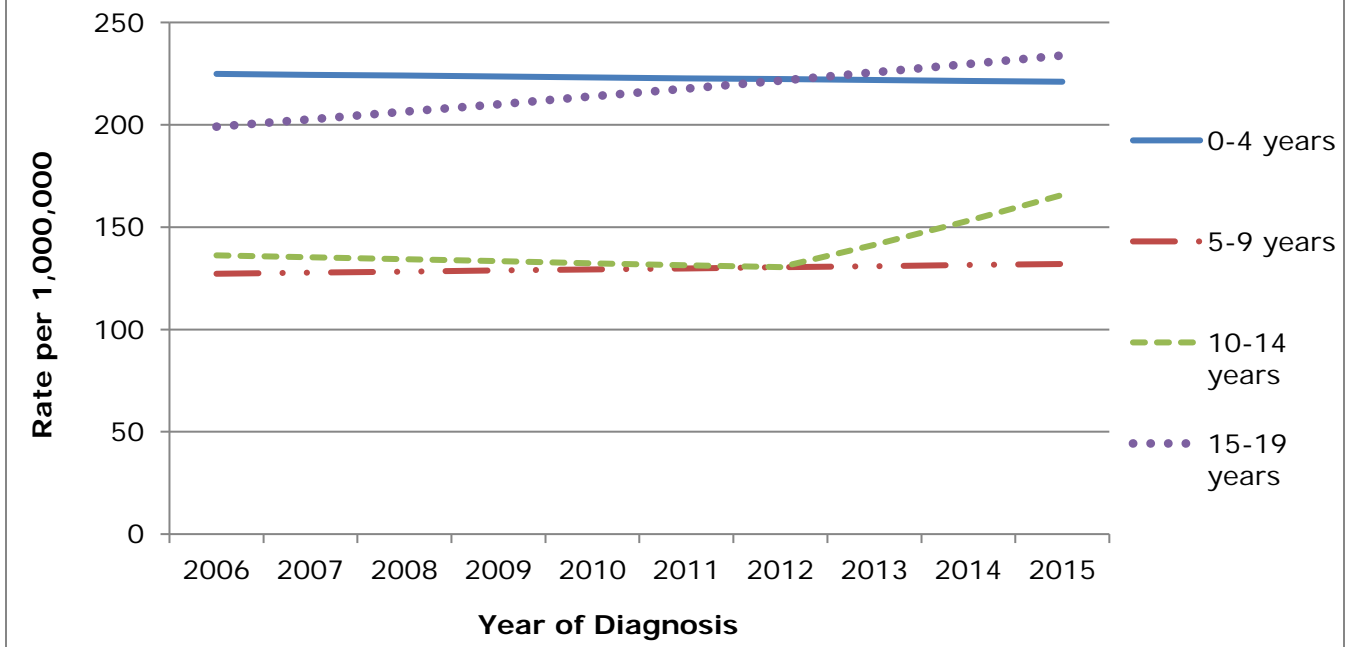
† Excludes myelodysplastic syndromes and benign brain/CNS tumors.  
 \* The annual percent change (APC) is significantly different from zero at  $p < 0.05$ .  
 Source: California Cancer Registry, California Department of Public Health



† Excludes myelodysplastic syndromes and benign brain/CNS tumors.  
 \* The annual percent change (APC) is significantly different from zero at  $p < 0.05$ .  
 ^ Includes miscellaneous intracranial and intraspinal neoplasms.  
 ‡ Includes trophoblastic tumors and neoplasms of gonads.  
 Source: California Cancer Registry, California Department of Public Health



**Figure 9: Age-Adjusted Cancer Incidence Trends Among Children and Adolescents in California by Age Group, 2006-2015†**



† Excludes myelodysplastic syndromes and benign brain/CNS tumors.

Source: California Cancer Registry, California Department of Public Health

**Table 12: Age-Adjusted Cancer Incidence Trends Among Children and Adolescents in California by Age Group, 2006-2015†**

Age Group	Time Period	Annual Percent Change (APC)
0-4 years	2006-2015	- 0.2
5-9 years	2006-2015	0.4
10-14 years	2006-2012	- 0.7
	2012-2015	8.3*
15-19 years	2006-2015	1.8*

† Excludes myelodysplastic syndromes and benign brain/CNS tumors.

\*APC is significantly different from zero at  $p < 0.05$ .

Source: California Cancer Registry, California Department of Public Health

**Table 13: Five-Year Relative Survival (Percentage) by International Classification of Childhood Cancer (ICCC) Groups, Age, and Sex in California, 2007-2016**

Cancer Type (ICCC Group)	Ages 0-14 years			Ages 15-19 years		
	Total	Male	Female	Total	Male	Female
All cancers combined (excluding benign brain/CNS Tumors)	82.4	82.1	82.7	83.8	81.3	86.8
All cancers combined (including benign brain/CNS Tumors)	82.3	82.1	82.7	83.8	81.3	86.7
Leukemias (including myelodysplastic syndromes)	85.6	84.9	86.4	72.6	72.7	72.4
Lymphomas and reticuloendothelial neoplasms	93.8	94.5	92.4	94.0	92.9	95.4
CNS and other intracranial and intraspinal neoplasm (includes benign brain/CNS tumors)	69.4	69.7	69.1	73.6	72.6	72.0
Neuroblastoma and other peripheral nervous cell tumors	78.8	75.7	82.0	-	-	-
Retinoblastoma	97.1	94.9	99.4	-	-	-
Renal tumors	88.5	83.7	92.6	64.4	-	-
Hepatic tumors	78.3	77.6	79.8	55.7	-	-
Malignant bone tumors	72.6	74.4	70.4	68.1	66.3	71.4
Soft tissue and other extraosseous sarcomas	71.8	75.1	67.8	67.8	59.4	76.2
Germ cell, trophoblastic tumors, neoplasms of gonads	92.4	94.1	91.0	92.8	92.9	92.4
Other malignant epithelial neoplasms and melanomas	90.1	87.7	91.5	92.0	85.2	94.7

Follow-up is through December 2016.  
Five-year relative survival was not calculated when there were less than 25 cases.  
Source: California Cancer Registry, California Department of Public Health

## Technical Notes

Incidence: This report includes cases of cancer diagnosed between January 1, 1988 and December 31, 2016, and reported to the California Cancer Registry (CCR) as of December 3, 2018. 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 the CCR, Chronic Disease Surveillance and Research Branch of the California Department of Public Health (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 the 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. As the reporting of 2016 diagnoses was only 95 percent complete at the time this report was produced, incidence trends did not include cases diagnosed in 2016.

Mortality: Computerized files containing information on cancer-related deaths were obtained from the CDPH, Center for Health Statistics. Beginning in 1999, cause of death was coded according to the International Classification of Disease, 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.

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 since January 1, 1988. These existing cases include individuals that no longer have evidence of cancer or those undergoing treatment that still have evidence of disease.

### Statistical Methods:

Calculation of Age-Adjusted Rates: Rates for adults 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. Incidence rates for children and adolescents were calculated as the number of new cases in specific age groups per 1,000,000 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. 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  $\alpha = 0.05$ . Rates in this report were calculated using the Surveillance Research Program, National Cancer Institute, SEER\*Stat software version 8.3.2 or higher (<https://seer.cancer.gov/seerstat>).

Annual Percent Change: The estimated annual percent change (APC) represents the average percent increase or decrease in cancer rates per year over a specified time period. It is calculated by first fitting a linear regression to the natural logarithm of the annual age-adjusted rates ( $r$ ), using calendar year as the predictor value:  $\ln(r) = m(\text{year}) + b$ . From the slope of the regression line, the APC is calculated as  $\text{APC} = 100(e^m - 1)$ . Testing the hypothesis that the APC is equal to zero is equivalent to testing the hypothesis that the slope of the line in the regression is equal to zero. Statistical significance was set at  $\alpha = 0.05$ .

Joinpoint Analysis of Trends: 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. At each segment, trends in rates are measured using the estimated APC, which assumes that rates change by a constant percentage each year. The Statistical Research and Applications Branch, National Cancer Institute, Joinpoint Regression Software version 4.3.1 or higher was used for all trend analyses in this report (<https://surveillance.cancer.gov/joinpoint>).

Average Annual Percent Change: The Average Annual Percent Change (AAPC) is a summary measure of a trend over a pre-specified fixed interval. It allows the use of a single number to describe the average APCs (Annual Percent Changes) 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.