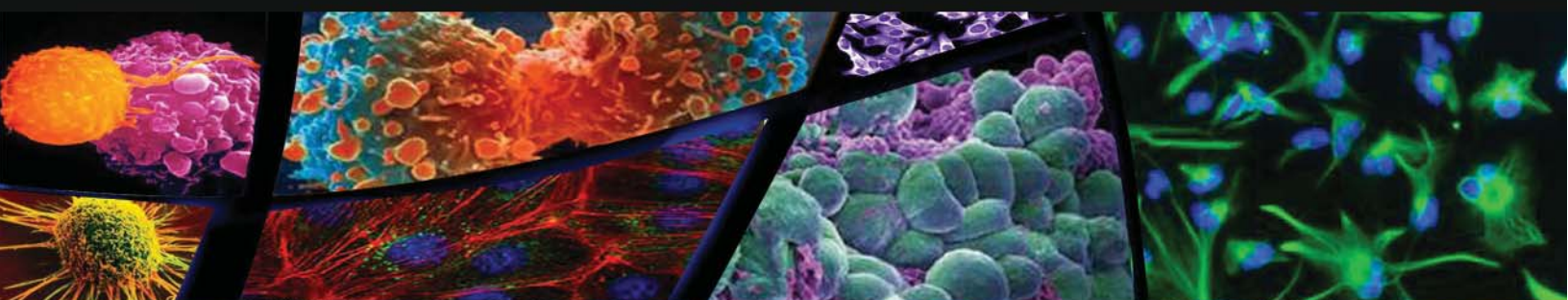


Cancer in California: 1988-2010





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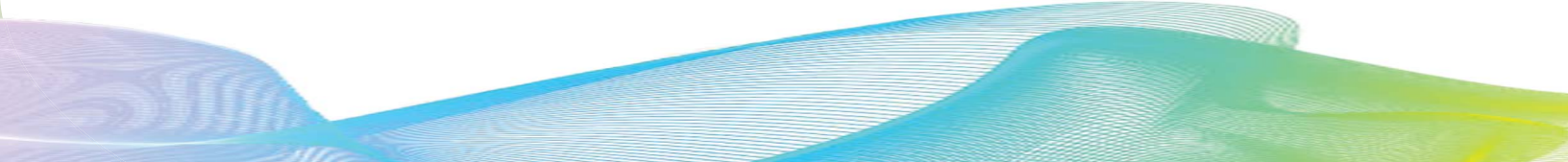
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Overview

CALIFORNIA CANCER RATES IN 2010

A total of 155,258 new cases of cancer were diagnosed among California residents in 2010. The overall age-adjusted cancer incidence (new cases) rate in California was 420.3 cases per 100,000 persons in 2010, compared to 463.1 in 1988 when statewide cancer reporting began, or 9.2 percent lower in 2010 than in 1988. This means that there were nearly 16,000 fewer new cancer cases in California in 2010 than there would have been if the incidence rate had remained the same as in 1988.¹

The age-adjusted cancer incidence rate among California women dropped from 416.5 cases per 100,000 females in 1988, to 382.6 in 2010, a decline of 8.1 percent.

The age-adjusted cancer incidence rate among men is complicated by changes in prostate screening procedures. The age-adjusted incidence rate of cancer among men increased from 545.2 in 1989, to 628.6 in 1992 (due in part to the introduction and widespread use of the prostate specific antigen (PSA) test in the late 1980s), and then decreased in subsequent years to 473.5 in 2010, the lowest since 1988. The overall change between 1988 and 2010 was a decline of 13.1 percent.

The overall cancer mortality (death) rate has decreased by 24.6 percent since 1988

Cancer of all types remained the second leading cause of death in California in 2010, accounting for 56,124 deaths. Encouragingly, the overall cancer mortality (death) rate has decreased by 24.6 percent since 1988, falling from 205.4 cancer-related deaths per 100,000 persons in 1988, to 154.8 in 2010 - a drop of 29.0 percent for men and 22.1 percent for women. This means that there were approximately 18,000 fewer deaths from cancer in 2010 than there would have been if the mortality rate had stayed the same as in 1988.

While cancer-related mortality rates have declined for all four major racial/ethnic groups in the state since 1988, the risk of being diagnosed with, or dying from cancer continues to vary by race/ethnicity. In 2010, African-American men had the highest overall cancer incidence rate (542.4 cases per 100,000 males) and mortality rate (244.5 deaths per 100,000 males), followed by non-Hispanic white males (514.2 new cases and 194.6 deaths per 100,000 persons). Non-Hispanic white women had the highest overall cancer incidence rate (431.2 cases per 100,000 females), while African-American women had the highest mortality rate (179.8 deaths per 100,000 females).

1. This calculation assumes the population age distribution in California has remained constant since 1988.



Leading Cancer Sites - By Sex

Tables 1-4 show the ten most common types of cancer incidence and mortality among Californians in 2010. These ten organ sites accounted for 78.7 percent of all new cancer diagnoses and 76.4 percent of cancer-related deaths. Breast cancer remained the most common cancer diagnosed among women, accounting for 30.8 percent of new cancers (23,453 cases) in 2010. Prostate cancer was the second overall most commonly diagnosed cancer and the most common newly diagnosed cancer among men, accounting for 27.7 percent of new cancers (21,907 cases) in California men in 2010.

For both males and females, cancer of the lung and bronchus was the second most commonly diagnosed cancer and the leading cause of cancer-related deaths, accounting for nearly one of every four deaths for men (23.6 percent) and more than one of every five deaths for women (22.3 percent). A total of 16,911 Californians were diagnosed with cancer of the lung and bronchus in 2010, and 12,880 died from the disease.

Colorectal cancer was the third most commonly diagnosed cancer and the third leading cause of cancer-related deaths among both men and women in 2010. Colorectal cancer accounted for 9.5 and 9.2 percent of newly diagnosed cancers in California men (7,490 new cases) and women (6,994 new cases), respectively, and 9.2 and 9.1 percent of cancer-related deaths in males (2,654 deaths) and females (2,480 deaths), respectively.



Breast cancer remained the most common cancer diagnosed among women



Among Men in California

Prostate cancer was the most commonly diagnosed cancer among men in California in 2010...

... while cancer of the lung and bronchus was the leading cause of cancer-related death.

TABLE 1

Ten Most Common Types of Cancer Incidence Among California Males, 2010

Rank	Cancer Site	Count	Rate
1	Prostate	21,907	127.7
2	Lung and Bronchus	8,718	55.1
3	Colorectal	7,490	45.2
4	Urinary Bladder	5,123	33.0
5	Melanoma	4,540	27.3
6	Non-Hodgkin Lymphoma	3,780	22.6
7	Kidney and Renal Pelvis	3,317	19.3
8	Leukemia	2,559	15.4
9	Oral Cavity and Pharynx	2,652	14.9
10	Liver and Intrahepatic Bile Duct	2,576	14.4

Rates are per 100,000 and age-adjusted to the 2000 US Standard Population.

Source: California Cancer Registry, California Department of Public Health

Prepared by the California Department of Public Health, California Cancer Registry

TABLE 2

Ten Most Common Types of Cancer Mortality Among California Males, 2010

Rank	Cancer Site	Count	Rate
1	Lung and Bronchus	6,781	43.5
2	Prostate	3,049	21.0
3	Colorectal	2,654	16.8
4	Pancreas	1,865	11.7
5	Liver and Intrahepatic Bile Duct	1,846	10.7
6	Leukemia	1,344	8.6
7	Non-Hodgkin Lymphoma	1,123	7.2
8	Urinary Bladder	1,011	6.8
9	Esophagus	972	5.9
10	Stomach	917	5.8

Rates are per 100,000 and age-adjusted to the 2000 US Standard Population.

Source: California Cancer Registry, California Department of Public Health

Prepared by the California Department of Public Health, California Cancer Registry



TABLE 3

Ten Most Common Types of Cancer Incidence Among California Female, 2010

Rank	Cancer Site	Count	Rate
1	Breast	23,453	118.0
2	Lung and Bronchus	8,193	41.5
3	Colorectal	6,994	34.7
4	Corpus and Uterus, NOS*	4,869	23.9
5	Thyroid	3,477	18.2
6	Non-Hodgkin Lymphoma	3,101	15.6
7	Melanoma	3,017	15.3
8	Ovary	2,328	11.7
9	Pancreas	2,127	10.5
10	Leukemia	1,939	9.8

* Not Otherwise Specified
 Rates are per 100,000 and age-adjusted to the 2000 US Standard Population.
 Source: California Cancer Registry, California Department of Public Health
 Prepared by the California Department of Public Health, California Cancer Registry

Among Women in California
 Breast cancer remained the most common cancer diagnosed among women in California in 2010...


TABLE 4

Ten Most Common Types of Cancer Mortality Among California Female, 2010

Rank	Cancer Site	Count	Rate
1	Lung and Bronchus	6,099	30.7
2	Breast	4,225	20.6
3	Colorectal	2,480	12.0
4	Pancreas	1,931	9.5
5	Ovary	1,542	7.7
6	Leukemia	1,012	5.0
7	Non-Hodgkin Lymphoma	965	4.8
8	Corpus and Uterus, NOS*	889	4.4
9	Liver and Intrahepatic Bile Duct	837	4.2
10	Stomach	680	3.4
10	Brain and Other Nervous System	683	3.4

* Not Otherwise Specified
 Rates are per 100,000 and age-adjusted to the 2000 US Standard Population.
 Source: California Cancer Registry, California Department of Public Health
 Prepared by the California Department of Public Health, California Cancer Registry

... while cancer of the lung and bronchus was the leading cause of cancer-related death.



Prostate cancer was the most common newly diagnosed cancer in most of the race/ethnic groups for men.

Breast cancer was the most commonly diagnosed cancer among each of the fifteen race/ethnicity groups for women.

Leading Cancer Sites – by Sex and Race/Ethnicity

Tables 5 and 6 show the ten most commonly diagnosed cancers in California from 2006-2010 among males and females in 15 race/ethnicity groups: African-American, American Indian/Alaska Native, Chinese, Filipino, Hawaiian, Hispanic, Japanese, Kampuchean, Korean, Laotian/Hmong, Pacific Islander, South Asian, Thai, Vietnamese and non-Hispanic white.

Prostate cancer was the most common newly diagnosed cancer in most of the race/ethnic groups for men, with lung and bronchus and colorectal cancers ranking second or third. Exceptions included: Kampuchean males, for whom colorectal cancer was the most common cancer, followed by liver and intrahepatic bile duct (IBD) and lung and bronchus cancers; Korean males, for whom colorectal cancer was most common, followed by prostate and stomach cancers; Laotian/Hmong males, for whom lung and bronchus cancer was most common, followed by liver and IBD and colorectal cancers; Thai males, for whom liver and IBD cancer was the third most common; and Vietnamese males, for whom lung and bronchus cancer was most common, followed by liver and IBD and prostate cancers.

Breast cancer was the most commonly diagnosed cancer among each of the fifteen race/ethnicity groups for women, with lung and bronchus cancer and colorectal cancer ranking second or third for most of the race/ethnicity groups. Exceptions included: Hawaiian females, for whom the third most common was a tie between colorectal cancer and corpus and uterus cancer, not otherwise specified (NOS); Hispanic females, for whom the third most common was corpus and uterus cancer, NOS; Korean females, for whom the third most common was stomach cancer; Pacific Islander females, for whom the second most common was corpus and uterus cancer, NOS; and South Asian females, for whom the third most common was corpus and uterus cancer, NOS.

TABLE 5

Ten Most Common Newly Diagnosed Types of Cancer among Males by Race/Ethnicity - California, 2006-2010

Male										
Rank										
	1	2	3	4	5	6	7	8	9	10
African American	Prostate (10,060)	Lung and Bronchus (3,528)	Colorectal (2,754)	Kidney and Renal Pelvis (1,145)	Urinary Bladder (912)	Liver and IBD* (887)	Non-Hodgkin Lymphoma (843)	Pancreas (750)	Oral Cavity and Pharynx (695)	Myeloma (613)
American Indian/ Alaska Native	Prostate (371)	Lung and Bronchus (179)	Colorectal (165)	Liver and IBD* (121)	Kidney and Renal Pelvis (97)	Urinary Bladder (72)	Oral Cavity and Pharynx (68)	Non-Hodgkin Lymphoma (63)	Leukemia (54)	Testis (38)
Chinese	Prostate (2,004)	Lung and Bronchus (1,395)	Colorectal (1,206)	Liver and IBD* (726)	Urinary Bladder (436)	Non-Hodgkin Lymphoma (424)	Stomach (409)	Oral Cavity and Pharynx (378)	Pancreas (252)	Kidney and Renal Pelvis (247)
Filipino	Prostate (2,370)	Lung and Bronchus (1,281)	Colorectal (1,044)	Liver and IBD* (427)	Non-Hodgkin Lymphoma (414)	Kidney and Renal Pelvis (351)	Urinary Bladder (234)	Leukemia (224)	Oral Cavity and Pharynx (222)	Pancreas (203)
Hawaiian	Prostate (83)	Colorectal (39)	Lung and Bronchus (38)	Non-Hodgkin Lymphoma (17)	Urinary Bladder (12)	Oral Cavity and Pharynx (10)	Leukemia (9)	Liver and IBD* (8)	Pancreas (8)	Kidney and Renal Pelvis (8)
Hispanic	Prostate (17,517)	Colorectal (6,833)	Lung and Bronchus (4,828)	Non-Hodgkin Lymphoma (3,558)	Kidney and Renal Pelvis (3,502)	Liver and IBD* (3,203)	Leukemia (2,714)	Urinary Bladder (2,448)	Stomach (2,174)	Testis (1,907)
Japanese	Prostate (706)	Colorectal (540)	Lung and Bronchus (397)	Urinary Bladder (207)	Stomach (189)	Non-Hodgkin Lymphoma (150)	Pancreas (139)	Liver and IBD* (104)	Kidney and Renal Pelvis (99)	Oral Cavity and Pharynx (87)
Kampuchean	Colorectal (69)	Liver and IBD* (57)	Lung and Bronchus (44)	Prostate (31)	Oral Cavity and Pharynx (21)	Non-Hodgkin Lymphoma (21)	Pancreas (10)	Stomach (9)	Brain and Other Nervous System (9)	Leukemia (8)
Korean	Colorectal (452)	Prostate (424)	Stomach (358)	Lung and Bronchus (343)	Liver and IBD* (254)	Urinary Bladder (174)	Pancreas (110)	Kidney and Renal Pelvis (104)	Non-Hodgkin Lymphoma (96)	Leukemia (60)
Laotian/ Hmong	Lung and Bronchus (91)	Liver and IBD* (71)	Colorectal (53)	Stomach (32)	Oral Cavity and Pharynx (31)	Prostate (30)	Non-Hodgkin Lymphoma (30)	Pancreas (14)	Leukemia (13)	Thyroid (9)
Pacific Islander ²	Prostate (191)	Lung and Bronchus (102)	Colorectal (64)	Liver and IBD* (45)	Oral Cavity and Pharynx (33)	Urinary Bladder (31)	Kidney and Renal Pelvis (28)	Leukemia (28)	Stomach (27)	Non-Hodgkin Lymphoma (27)
South Asian	Prostate (559)	Colorectal (178)	Lung and Bronchus (142)	Non-Hodgkin Lymphoma (117)	Urinary Bladder (99)	Kidney and Renal Pelvis (92)	Leukemia (90)	Oral Cavity and Pharynx (81)	Liver and IBD* (55)	Brain and ONS** (54)
Thai	Prostate (58)	Colorectal (29)	Liver and IBD* (22)	Lung and Bronchus (22)	Non-Hodgkin Lymphoma (15)	Urinary Bladder (14)	Stomach (9)	Oral Cavity and Pharynx (8)	Kidney and Renal Pelvis (7)	Leukemia (5)
Vietnamese	Lung and Bronchus (704)	Liver and IBD* (663)	Prostate (585)	Colorectal (554)	Stomach (191)	Non-Hodgkin Lymphoma (188)	Oral Cavity and Pharynx (164)	Leukemia (128)	Urinary Bladder (109)	Pancreas (105)
Non-Hispanic White	Prostate (70,755)	Lung and Bronchus (31,561)	Colorectal (23,686)	Melanoma of the Skin (19,307)	Urinary Bladder (19,251)	Non-Hodgkin Lymphoma (11,738)	Kidney and Renal Pelvis (9,708)	Oral Cavity and Pharynx (9,154)	Leukemia (7,842)	Pancreas (6,491)

2. Pacific Islanders include the following: Micronesian, NOS, Chamorran, Guamanian, NOS, Polynesian, NOS, Tahitian, Samoan, Tongan, Melanesian, NOS, Fiji Islander, New Guinean, and Pacific Islander, NOS
 *IBD: Intrahepatic Bile Duct **NOS: Not Otherwise Specified

Cancer in California, 1988-2010

TABLE 6

Ten Most Common Newly Diagnosed Types of Cancer among Females by Race/Ethnicity - California, 2006-2010

Female										
Rank										
	1	2	3	4	5	6	7	8	9	10
African American	Breast (7,309)	Lung and Bronchus (2,961)	Colorectal (2,843)	Corpus and Uterus, NOS** (1,324)	Pancreas (795)	Kidney and Renal Pelvis (672)	Non-Hodgkin Lymphoma (660)	Thyroid (603)	Ovary (589)	Myeloma (540)
American Indian/ Alaska Native	Breast (451)	Lung and Bronchus (187)	Colorectal (155)	Corpus and Uterus, NOS** (124)	Kidney and Renal Pelvis (73)	Ovary (56)	Non-Hodgkin Lymphoma (56)	Thyroid (52)	Pancreas (45)	
									Cervix (45)	
									Leukemia (45)	
Chinese	Breast (2,850)	Colorectal (1,217)	Lung and Bronchus (1,017)	Corpus and Uterus, NOS** (542)	Thyroid (461)	Non-Hodgkin Lymphoma (338)	Stomach (306)	Ovary (301)	Liver and IBD* (283)	Pancreas (252)
Filipino	Breast (3,852)	Colorectal (1,060)	Lung and Bronchus (935)	Corpus and Uterus, NOS** (873)	Thyroid (810)	Non-Hodgkin Lymphoma (438)	Ovary (370)	Pancreas (294)	Cervix (248)	Leukemia (229)
Hawaiian	Breast (104)	Lung and Bronchus (29)	Colorectal (28)	Corpus and Uterus, NOS** (28)	Thyroid (14)	Non-Hodgkin Lymphoma (11)	Ovary (10)	Leukemia (9)	Oral Cavity and Pharynx (8)	Kidney and Renal Pelvis (7)
Hispanic	Breast (19,429)	Colorectal (5,676)	Corpus and Uterus, NOS** (4,122)	Lung and Bronchus (4,110)	Thyroid (4,018)	Non-Hodgkin Lymphoma (2,990)	Cervix (2,806)	Ovary (2,459)	Kidney and Renal Pelvis (2,318)	Leukemia (2,162)
Japanese	Breast (1,287)	Colorectal (575)	Lung and Bronchus (447)	Corpus and Uterus, NOS** (227)	Pancreas (183)	Stomach (176)	Non-Hodgkin Lymphoma (161)	Liver and IBD* (119)	Ovary (97)	Thyroid (87)
Kampuchean	Breast (66)	Colorectal (58)	Lung and Bronchus (43)	Liver and IBD* (33)	Cervix (24)	Thyroid (18)	Stomach (16)	Ovary (16)	Corpus and Uterus, NOS** (12)	Non-Hodgkin Lymphoma (12)
Korean	Breast (834)	Colorectal (419)	Stomach (263)	Lung and Bronchus (245)	Thyroid (188)	Liver and IBD* (120)	Corpus and Uterus, NOS** (104)	Pancreas (99)	Cervix (94)	Ovary (91)
Laotian/ Hmong	Breast (64)	Colorectal (45)	Lung and Bronchus (35)	Liver and IBD* (33)	Cervix (32)	Corpus and Uterus, NOS** (23)	Thyroid (23)	Stomach (16)	Oral Cavity and Pharynx (15)	Non-Hodgkin Lymphoma (14)
Pacific Islander ³	Breast (307)	Corpus and Uterus, NOS** (130)	Lung and Bronchus (70)	Colorectal (64)	Thyroid (50)	Ovary (42)	Cervix (36)	Non-Hodgkin Lymphoma (25)	Stomach (24)	Leukemia (23)
South Asian	Breast (769)	Colorectal (145)	Corpus and Uterus, NOS** (133)	Thyroid (128)	Ovary (88)	Non-Hodgkin Lymphoma (76)	Lung and Bronchus (70)	Leukemia (65)	Oral Cavity and Pharynx (50)	Cervix (49)
Thai	Breast (136)	Colorectal (41)	Lung and Bronchus (30)	Corpus and Uterus, NOS** (24)	Thyroid (23)	Ovary (20)	Non-Hodgkin Lymphoma (20)	Cervix (19)	Pancreas (10)	Liver and IBD* (9)
Vietnamese	Breast (1,026)	Colorectal (433)	Lung and Bronchus (357)	Thyroid (266)	Liver and IBD* (208)	Corpus and Uterus, NOS** (161)	Cervix (149)	Stomach (138)	Ovary (134)	Non-Hodgkin Lymphoma (124)
Non-Hispanic White	Breast (75,095)	Lung and Bronchus (30,919)	Colorectal (22,417)	Corpus and Uterus, NOS** (14,046)	Melanoma of the Skin (12,451)	Non-Hodgkin Lymphoma (9,403)	Thyroid (7,745)	Ovary (7,423)	Pancreas (6,325)	Urinary Bladder (5,813)

3. Pacific Islanders include the following: Micronesian, NOS, Chamorro, Guamanian, NOS, Polynesian, NOS, Tahitian, Samoan, Tongan, Melanesian, NOS, Fiji Islander, New Guinean, and Pacific Islander, NOS

*IBD: Intrahepatic Bile Duct **NOS: Not Otherwise Specified

Cancer Incidence and Mortality Short-Term Trends (2000-2009) in California

Figures 1-4 depict the trends in cancer incidence and mortality rates for the most common cancers by sex (for all races combined) over the 10-year period 2000 to 2009. A bar to the right of zero (i.e., a positive percentage) means that the rate, on average, is increasing, while a bar to the left (i.e., a negative percentage) means that the rate is decreasing. An asterisk indicates that the change is statistically significant (that it has less than a five percent of occurring by chance alone).

Although cancer remains a major cause of illness and death in California, the incidence rate for all types of cancer combined and for most of the common types of cancer declined among both men and women since 2000. This is due, in part, to lower rates of smoking and the decline of smoking-related cancers (e.g., cancers of the lung and bronchus, larynx, stomach, cervix uteri, and urinary bladder).

For males, six common cancers showed statistically significant declines in incidence rates since 2000; these include: cancer of the urinary bladder, stomach, colorectal, prostate, lung and bronchus and larynx.

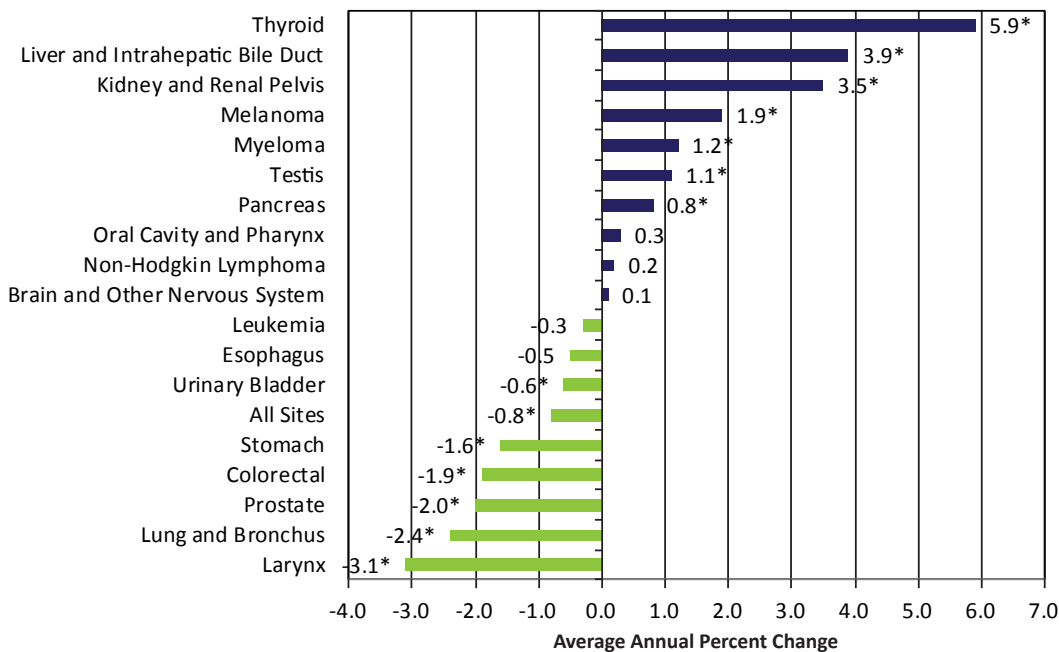
The incidence rates for seven common cancers increased significantly since 2000 for males: thyroid, liver and IBD, kidney and renal pelvis, melanoma, myeloma, testis and pancreas.



Males: Cancer Incidence Trends
...six cancers showed declines and seven common cancers increased since 2000 in California.

Figure 1: Male Incidence

Average Annual Percent Change (AAPC) in Age-Adjusted Cancer Incidence Rates 2000-2009



*- 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.

Source: California Cancer Registry, California Department of Public Health

Prepared by the California Department of Public Health, California Cancer Registry

Cancer in California, 1988-2010

Females: Cancer Incidence Trends

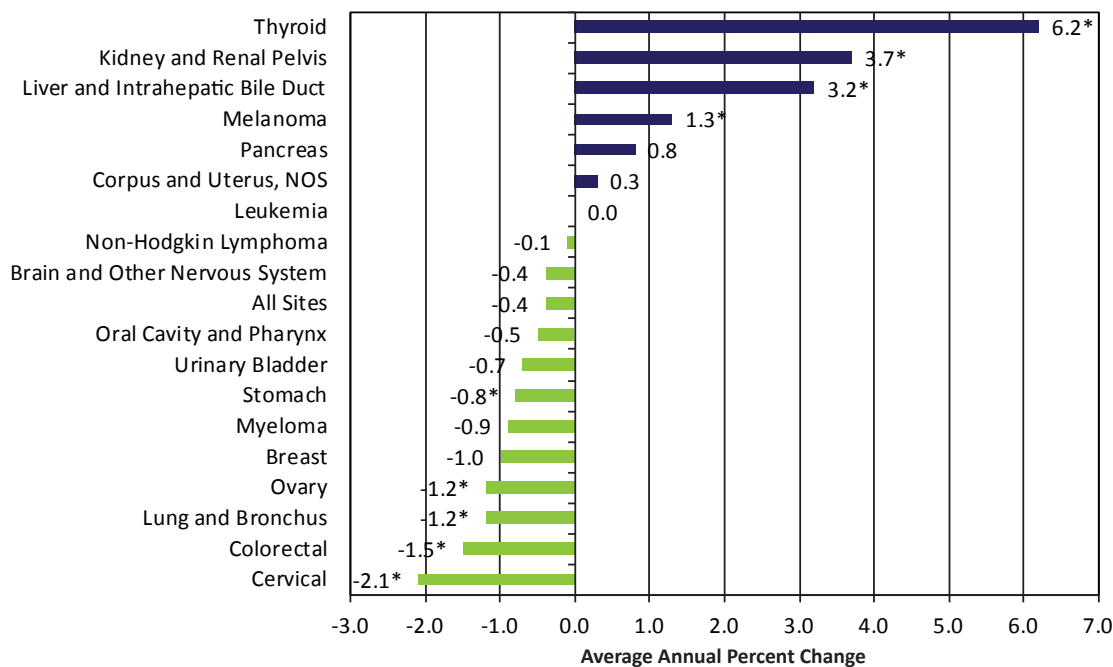
...five cancers showed declines and four common cancers increased since 2000 in California.

For females, five common cancers showed statistically significant declines in incidence rates since 2000; these include (similar to males): cancer of the stomach, lung and bronchus, and colorectal; additionally, statistically significant declines also occurred for ovary and cervical cancers.

The incidence rates for four common cancers increased significantly since 2000 for females: thyroid, kidney and renal pelvis, liver and IBD, and melanoma.

Figure 2: Female Incidence

Average Annual Percent Change (AAPC) in Age-Adjusted Cancer Incidence Rates 2000-2009



*- 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.

Source: California Cancer Registry, California Department of Public Health

Prepared by the California Department of Public Health, California Cancer Registry

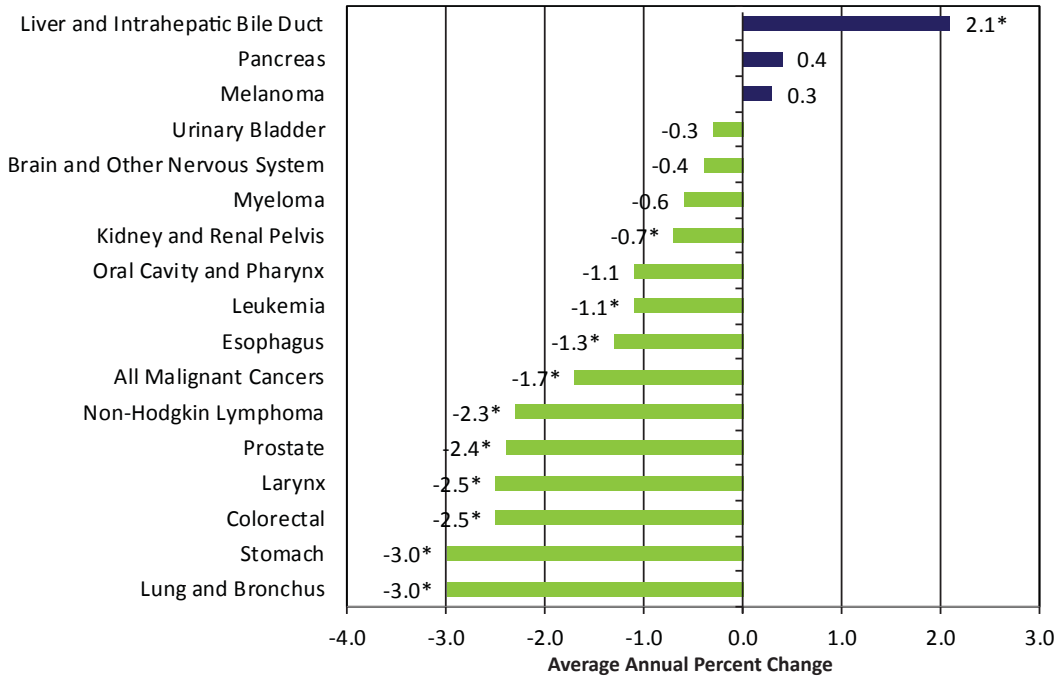
Mortality rates for most cancers in both genders also decreased since 2000, and significantly so for the majority. Much of this decline is due to significant decreases in smoking-related cancers such as lung and bronchus, oral cavity and pharynx, larynx, stomach, cervix uteri, and urinary bladder (decline is only statistically significant in males).

One notable exception to the decreasing cancer mortality rates among both genders is cancer of the liver and IBD, in which both the incidence and mortality rates have increased significantly since 2000.



Mortality Trends:
 ...Among both genders cancer of the liver and IBD, has increased significantly since 2000.

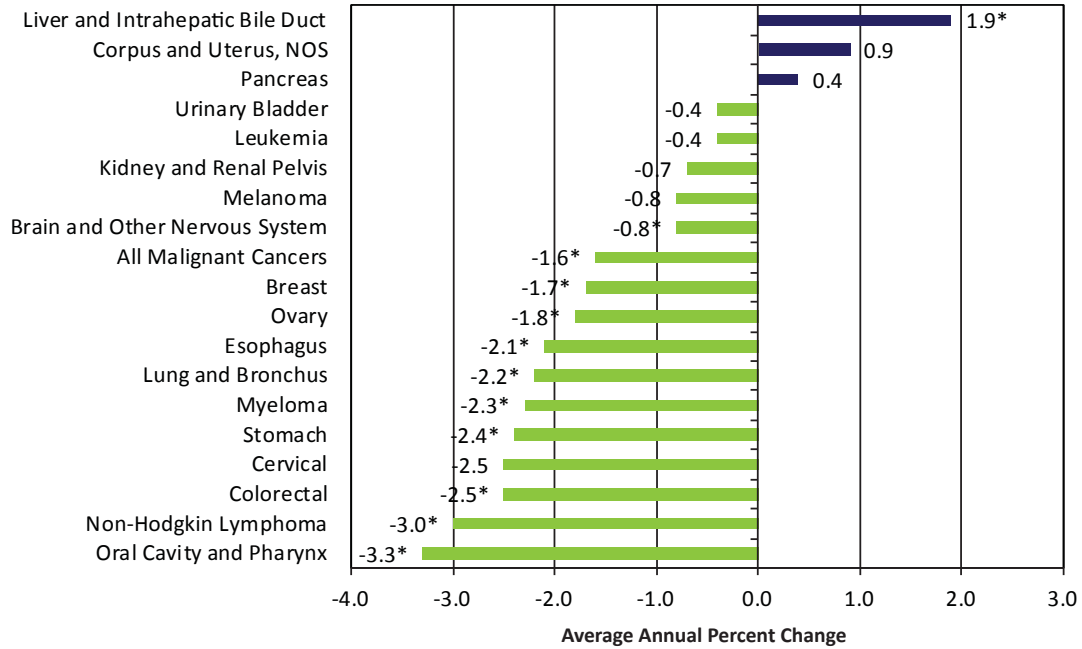
Figure 3: Male Mortality
 Average Annual Percent Change (AAPC) in Age-Adjusted Cancer Mortality Rates 2000-2009



*. 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.
 Source: California Cancer Registry, California Department of Public Health
 Prepared by the California Department of Public Health, California Cancer Registry

Cancer in California, 1988-2010

Figure 4: Female Mortality
Average Annual Percent Change (AAPC) in Age-Adjusted Cancer Mortality Rates 2000-2009



*- 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.
 Source: California Cancer Registry, California Department of Public Health
 Prepared by the California Department of Public Health, California Cancer Registry

Five-Year Relative Survival By Stage at Diagnosis

Cancer survival is typically expressed as a rate, or percentage of all the 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 five years after diagnosis, after adjustment 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 that the cancer has spread when diagnosed. The following terms are used to describe the different stages at diagnosis in this report:

- Localized:** The tumor has broken through the first layer of cells (the basement membrane), but is still confined to the organ in which it is growing.
- 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 presents data on five-year relative survival for the most common types of cancer incidence and mortality for Californians diagnosed between 2001 and 2010. Five-year relative survival is broken out for each cancer site by stage at diagnosis as well as for all stages combined. 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



Over the past several decades in California, five-year relative survival has improved for many types of cancer.

...percentages listed in Table 7 represent the probability that an individual will not die from a given cancer during the five-years after diagnosis.

TABLE 7

Five Year Relative Survival by Stage at Diagnosis in Californians Diagnosed 2001-2010⁴

Cancer Type	All Stages	Localized	Regional	Distant
Breast (Female)	92.0%	100.0%	85.9%	26.5%
Brain and ONS	33.4%	36.5%	21.1%	34.9%
Cervix Uteri	71.2%	93.3%	59.4%	19.1%
Colorectal	68.2%	93.8%	72.5%	12.7%
Corpus and Uterus, NOS	84.1%	97.2%	69.0%	17.0%
Esophagus	16.7%	34.5%	19.9%	3.1%
Kidney and Renal Pelvis	71.5%	92.0%	63.3%	11.9%
Leukemia	53.8%	N/A – All leukemias are staged as distant disease; thus survival cannot be calculated for other stages.		53.8%
Liver and IBD	18.1%	29.3%	10.8%	3.9%
Lung and Bronchus	16.9%	56.2%	27.1%	3.9%
Melanoma	91.9%	99.0%	62.5%	16.2%
Non-Hodgkin Lymphoma	67.9%	82.1%	71.3%	59.4%
Oral Cavity and Pharynx	65.1%	85.1%	60.9%	36.3%
Ovary	47.6%	92.6%	76.3%	29.4%
Pancreas	6.4%	24.1%	8.8%	2.5%
Prostate	100.0%	100.0%	100.0%	29.4%
Stomach	28.0%	64.8%	29.9%	4.0%
Testis	94.5%	98.7%	94.9%	72.0%
Thyroid	97.4%	99.9%	97.5%	58.6%
Urinary Bladder	60.6%	73.2%	35.9%	6.3%

4. Follow-up is through December 2010. Cancers that were unstaged at time of diagnosis are excluded.
 Source: California Cancer Registry, California Department of Public Health
 Prepared by the California Department of Public Health, California Cancer Registry

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

Approximately 2,000 children and adolescents were diagnosed with cancer in California each year between 2006 and 2010. These cases represent just over one percent of all new cancers diagnosed among California's residents during this time period. Although incidence rates for childhood and adolescent cancers have increased since 1988, progress in the treatment of these cancers has resulted in improved five-year relative survival. Overall, children and adolescents diagnosed with cancer in California between 2001 and 2010 had a five-year relative survival of nearly 80 percent.

Incidence and Number of Cases (2006-2010)

Childhood and adolescent cancers are categorized differently than adult cancers; they are categorized according to the International Classification of Childhood Cancer (ICCC). The classification of childhood cancer is based on the form and structure of the tumor (commonly referred to as tumor morphology) and primary site, with an emphasis on morphology. Adult cancers are also based on morphology and primary site but the emphasis is on primary site (e.g., breast, lung etc.). The ICCC is broken down into the following twelve site groups⁵:

- I. Leukemias, myeloproliferative diseases, and myelodysplastic diseases
- II. Lymphomas and reticuloendothelial neoplasms
- III. CNS (central nervous system) 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

Leukemias were the most commonly diagnosed cancer group among children (ages 0-14) between 2006 and 2010 (see Figure 5). They represented 35 percent of the total cancers diagnosed among children. Brain and central nervous system cancers were the second most diagnosed cancer group, constituting 22 percent of all childhood cancers in California. For additional data about childhood cancer incidence rates and case counts (2006-2010) for each cancer group, see Table 8. 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.



Children and adolescents diagnosed with cancer in California between 2001 and 2010 had a five-year relative survival of nearly 80 percent.

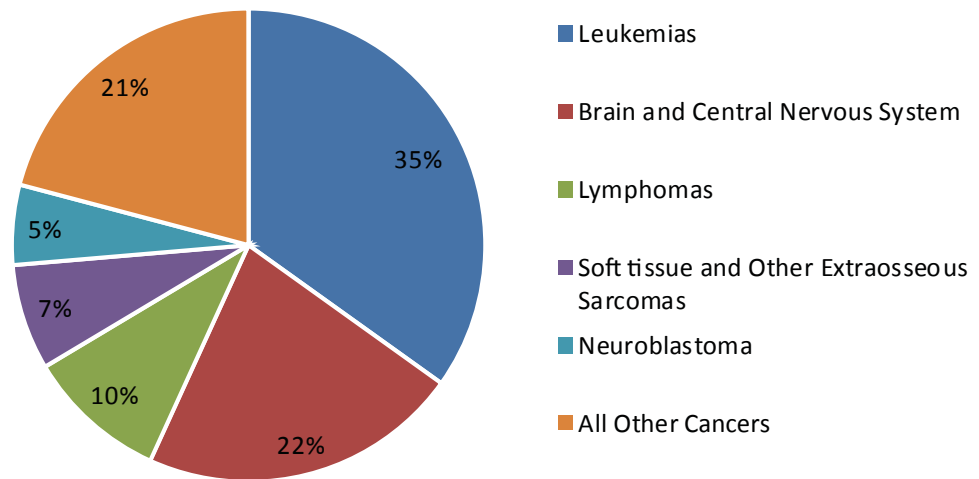
5. For additional information about the ICCC variable definitions, please see the following link: <http://seer.cancer.gov/iccc/iccc-who2008.html>



Leukemias were the most commonly diagnosed cancer among children (ages 0-14) between 2006 and 2010.

Figure 5: Ages 0-14 by Cancer Types

Distribution of Cancer Types among Children Ages 0-14 Years in California, 2006-2010
(including myelodysplastic syndromes and benign brain/CNS tumors)



Source: California Cancer Registry, California Department of Public Health
Prepared by the California Department of Public Health, California Cancer Registry

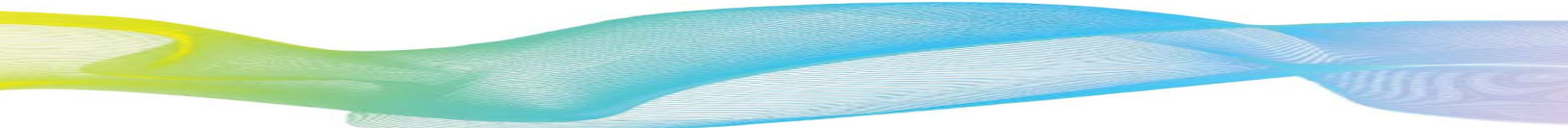
TABLE 8

Childhood Cancer (0-14 years) Average Incidence Rates and Counts in California, 2006-2010
(including myelodysplastic syndromes and benign brain/CNS tumors)

Male and Female	Rate	Count
All cancers combined (excluding benign brain/CNS tumors)	163.9	6,301
All cancers combined (including benign brain/CNS tumors)	173.8	6,681
Leukemias, myeloproliferative & myelodysplastic diseases	60.6	2,331
Lymphomas and reticuloendothelial neoplasms	16.8	642
CNS and misc intracranial and intraspinal neoplasms	38.3	1,465
Neuroblastoma and other peripheral nervous cell tumors	9.4	366
Retinoblastoma	4.3	168
Renal tumors	7.8	302
Hepatic tumors	3.1	123
Malignant bone tumors	7.3	277
Soft tissue and other extrasosseous sarcomas	12.6	482
Germ cell & trophoblastic tumors & neoplasms of gonads	6.7	260
Other malignant epithelial neoplasms and melanomas	6.4	245
Other and unspecified malignant neoplasms	0.5	20

Rates are per 1,000,000 and age-adjusted to the 2000 US Std Population (19 age groups - Census P25-1130) standard.

Source: California Cancer Registry, California Department of Public Health
Prepared by the California Department of Public Health, California Cancer Registry



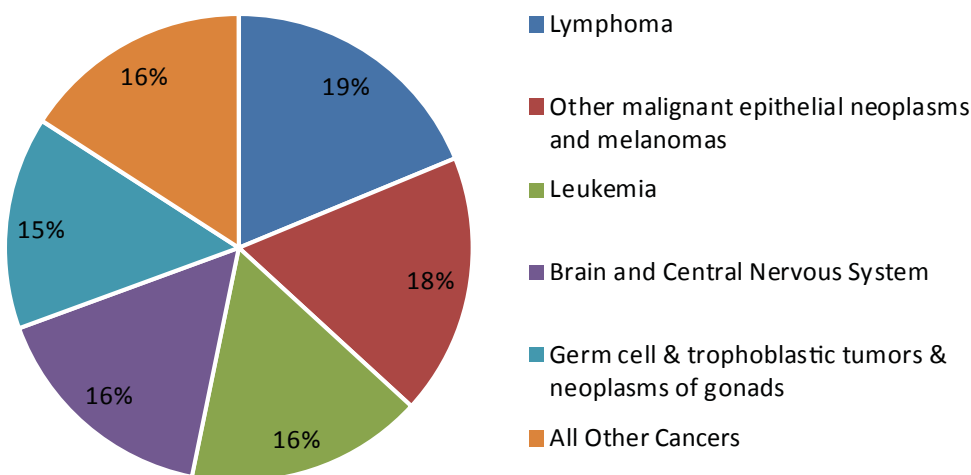
The distribution of cancer types is different for adolescents (ages 15-19) than for children. For adolescents, the most commonly diagnosed types of cancer between 2006 and 2010 were lymphomas, representing 19 percent of all adolescent cancer diagnoses (see Figure 6). The second most common types of cancer were other malignant epithelial neoplasms and melanomas, equating to 18 percent of adolescent cancer diagnoses. Adolescent cancer incidence rates and case counts (2006-2010) for each cancer are included in Table 9. Again, childhood and adolescent cancer incidence rates are presented as rates per 1,000,000 persons, while adult cancer incidence rates are per 100,000 persons.



For ages 15-19 the most commonly diagnosed types of cancer between 2006 and 2010 were lymphomas.

Figure 6: Ages 15-19 by Cancer Types

Distribution of Cancer Types among Adolescents Ages 15-19 Years in California, 2006-2010
(including myelodysplastic syndromes and benign brain/CNS tumors)



Source: California Cancer Registry, California Department of Public Health
Prepared by the California Department of Public Health, California Cancer Registry

TABLE 9

Adolescent Cancer (15-19 years) Average Incidence Rates and Counts in California, 2006-2010
(including myelodysplastic syndromes and benign brain/CNS tumors)

Male and Female	Rate	Count
All cancers combined (excluding benign brain/CNS tumors)	210.5	2,950
All cancers combined (including benign brain/CNS tumors)	235.8	3,305
Leukemias, myeloproliferative & myelodysplastic diseases	38.7	542
Lymphomas and reticuloendothelial neoplasms	44.2	620
CNS and misc intracranial and intraspinal neoplasms	38.2	535
Neuroblastoma and other peripheral nervous cell tumors	0.8	11
Retinoblastoma	0	0
Renal tumors	1.9	27
Hepatic tumors	1.4	20
Malignant bone tumors	12.9	181
Soft tissue and other extraosseous sarcomas	19.8	278
Germ cell & trophoblastic tumors & neoplasms of gonads	34.7	486
Other malignant epithelial neoplasms and melanomas	42.6	597
Other and unspecified malignant neoplasms	0.6	8

Rates are per 1,000,000 and age-adjusted to the 2000 US Std Population (19 age groups - Census P25-1130) standard.

Source: California Cancer Registry, California Department of Public Health

Prepared by the California Department of Public Health, California Cancer Registry

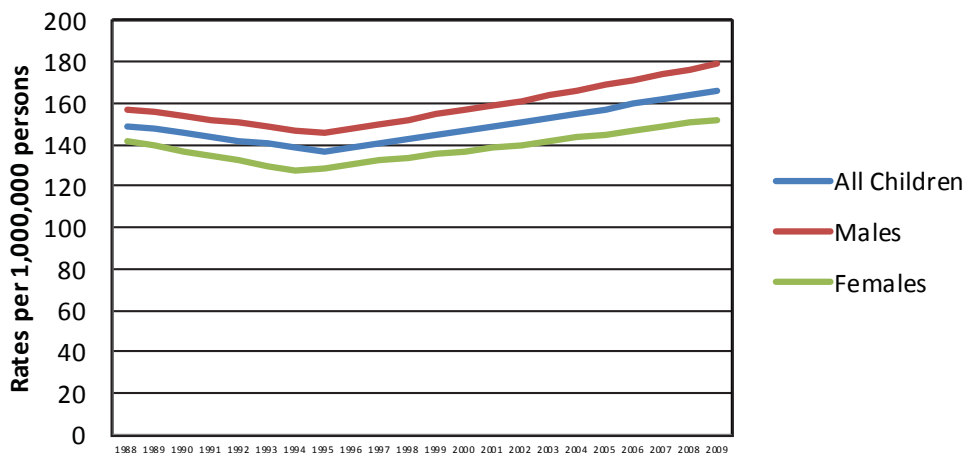
Cancer incidence trend for all children in California (ages 0-14) decreased from 1988 to 1995, and then increased through 2009.

Incidence Trends by Gender, Cancer Type and Age Group (1988-2009)

Overall, incidence rates for childhood and adolescent cancers have increased since 1988. The cancer incidence trend for all children in California (ages 0-14) decreased from 1988 to 1995, and then increased at a statistically significant rate through 2009 (see Figure 7 and Table 10). The incidence rates for male children followed a similar pattern while the incidence rates for female children decreased significantly from 1988 to 1994 and then began increasing at a statistically significant rate from 1994 through 2009.

Figure 7: Incidence Trends by Gender Ages 0-14

Age-Adjusted Cancer Incidence Trends Among Children Ages 0-14 in California by Gender, 1988-2009
(excluding myelodysplastic syndromes and benign brain/CNS tumors)



Source: California Cancer Registry, California Department of Public Health
Prepared by the California Department of Public Health, California Cancer Registry

TABLE 10

Age-Adjusted Cancer Incidence Trends Among Children Ages 0-14 in California by Gender, 1988-2009
(excluding myelodysplastic syndromes and benign brain/CNS tumors)

	Period	APC
All Children	1988-1995	-1.2
	1995-2009	1.4*
Male	1988-1995	-1.1
	1995-2009	1.5*
Female	1988-1994	-1.8*
	1994-2009	1.2*

APC=Average Annual Percent Change

*Means the APC is Statistically Significantly Different (p< 0.05).

Source: California Cancer Registry, California Department of Public Health

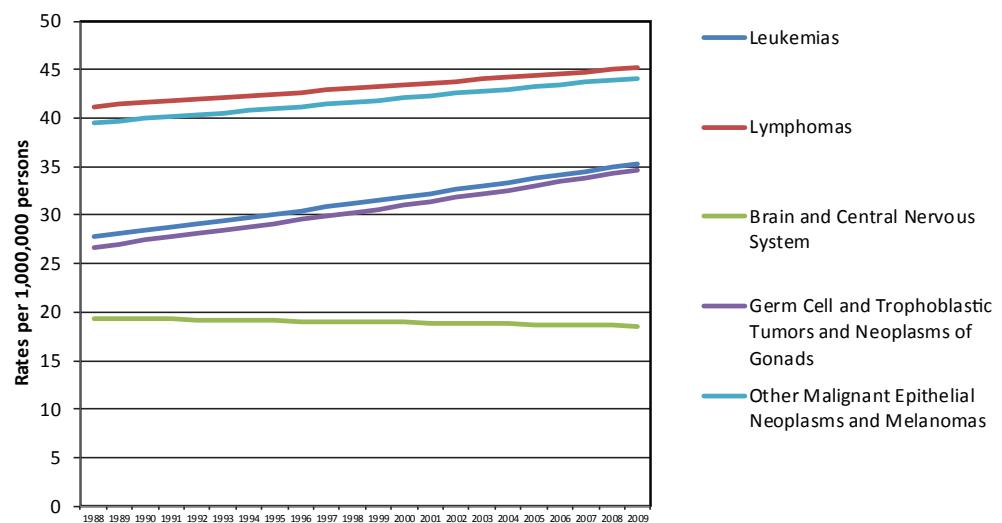
Prepared by the California Department of Public Health, California Cancer Registry

Cancer in California, 1988-2010

The cancer incidence trends for the most commonly diagnosed cancer types in children show that while incidence rates for lymphomas, brain and central nervous system, and neuroblastoma remained relatively stable from 1988-2009, incidence rates for leukemias, the most commonly diagnosed cancer type among children, increased at a statistically significant rate. It is also notable that incidence rates for soft tissue and other extraosseous sarcomas increased at a statistically significant rate during this same period, although overall incidence rates for these cancer types are much lower than for leukemias. (See Figure 8 and Table 11).

Figure 8: Incidence Trends by Cancer Type Ages 0-14

Age-Adjusted Cancer Incidence Trends Among Children Ages 0-14 in California by Cancer Type, 1988-2009 (excluding myelodysplastic syndromes and benign brain/CNS tumors)



Source: California Cancer Registry, California Department of Public Health
Prepared by the California Department of Public Health, California Cancer Registry

TABLE 11

Age-Adjusted Cancer Incidence Trends for the Most Commonly Diagnosed Cancer Types among Children Ages 0-14 in California, 1988-2009

(excluding myelodysplastic syndromes and benign brain/CNS tumors)

Cancer Types	Period	APC
Leukemias, myeloproliferative & myelodysplastic diseases	1988-2009	1.1*
Lymphomas and reticuloendothelial neoplasms	1988-2009	0.2
CNS (Central Nervous System) and misc intracranial and intraspinal neoplasms	1988-2009	0.4
Neuroblastoma and other peripheral nervous cell tumors	1988-2009	0.3
Soft tissue and other extraosseous sarcomas	1988-2009	0.9*

APC=Average Annual Percent Change

*Means the APC is Statistically Significantly Different ($p < 0.05$).

Source: California Cancer Registry, California Department of Public Health

Prepared by the California Department of Public Health, California Cancer Registry

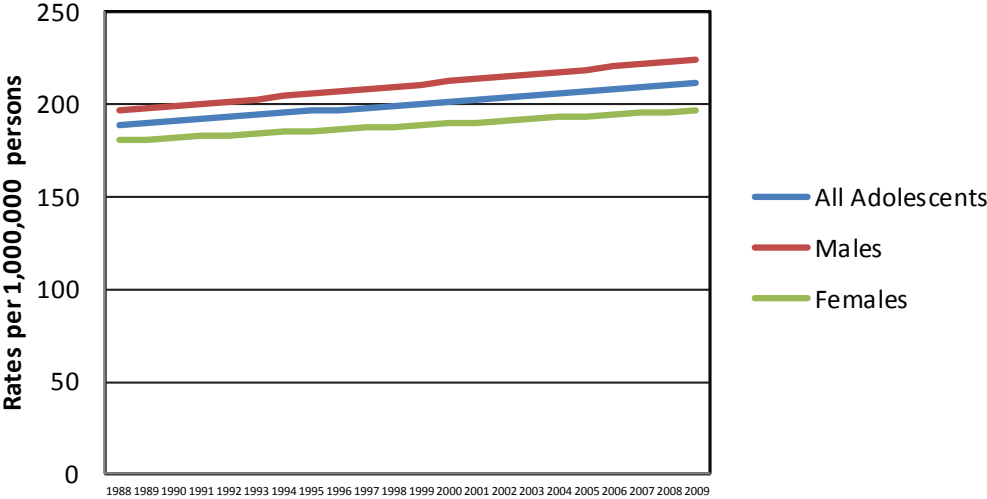
From 1988 through 2009, the cancer incidence rates for all adolescents in California (ages 15-19) increased slightly, at a statistically significant rate. (See Figure 9 and Table 12). The incidence rates for male and female adolescents followed a similar pattern, although the increase was not statistically significant for females.



Figure 9: Incidence Trends by Gender Ages 15-19

Incidence rates for all adolescents in California ages 15-19 increased slightly.

Age-Adjusted Cancer Incidence Trends Among Adolescents Ages 15-19 in California by Gender, 1988-2009
(excluding myelodysplastic syndromes and benign brain/CNS tumors)



Source: California Cancer Registry, California Department of Public Health
Prepared by the California Department of Public Health, California Cancer Registry

TABLE 12

Age-Adjusted Cancer Incidence Trends Among Adolescents Ages 15-19 in California by Gender, 1988-2009
(excluding myelodysplastic syndromes and benign brain/CNS tumors)

	Period	APC
All Adolescents	1988-2009	0.5*
Male	1988-2009	0.6*
Female	1988-2009	0.4

APC= Average Annual Percent Change
*Means the APC is Statistically Significantly Different (p< 0.05).
Source: California Cancer Registry, California Department of Public Health
Prepared by the California Department of Public Health, California Cancer Registry

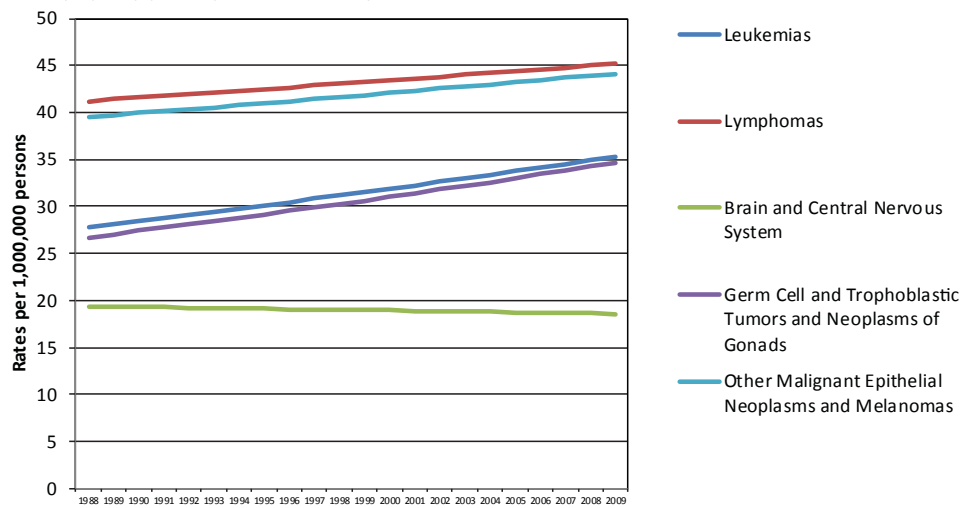
Cancer in California, 1988-2010

The cancer incidence trends for the most commonly diagnosed cancer types in adolescents show that incidence rates for leukemias and germ cell and trophoblastic tumors and neoplasms of gonads have increased at a statistically significant rate from 1988-2009. Incidence rates for lymphomas, brain and central nervous system cancers, and other malignant epithelial neoplasms and melanomas remained relatively stable among adolescents during this time period. (See Figure 10 and Table 13).

Figure 10: Incidence Trends by Cancer Types Ages 15-19

Age-Adjusted Cancer Incidence Trends for the Most Commonly Diagnosed Cancer Types among Adolescents Ages 15-19 in California, 1988-2009

(excluding myelodysplastic syndromes and benign brain/CNS tumors)



Source: California Cancer Registry, California Department of Public Health
Prepared by the California Department of Public Health, California Cancer Registry

TABLE 13

Age-Adjusted Cancer Incidence Trends for the Most Commonly Diagnosed Cancer Types among Adolescents Ages 15-19 in California, 1988-2009
(excluding myelodysplastic syndromes and benign brain/CNS tumors)

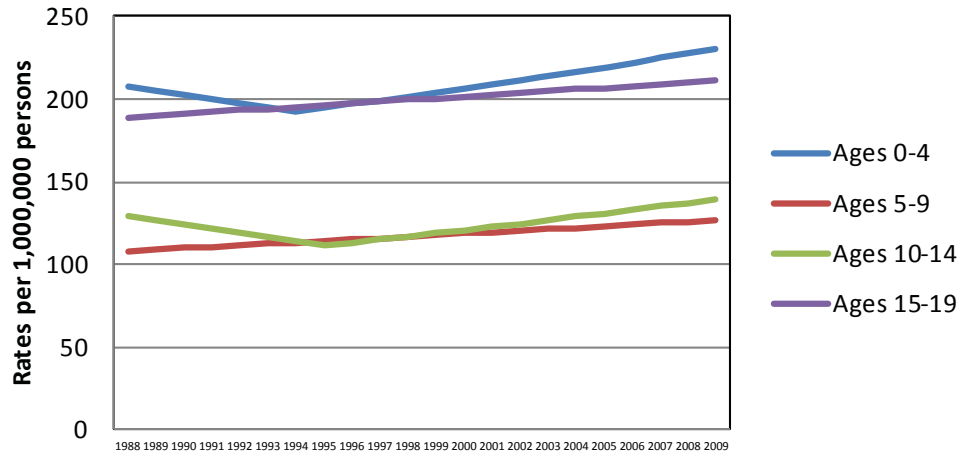
Cancer Types	Period	APC
Leukemias, myeloproliferative & myelodysplastic diseases	1988-2009	1.1*
Lymphomas and reticuloendothelial neoplasms	1988-2009	0.4
CNS (Central Nervous System) and misc intracranial and intraspinal neoplasms	1988-2009	-0.2
Germ Cell and Trophoblastic Tumors and Neoplasms of Gonads	1988-2009	1.2*
Other Malignant Epithelial Neoplasms and Melanomas	1988-2009	0.5

APC=Average Annual Percent Change
 *Means the APC is Statistically Significantly Different ($p < 0.05$).
 Source: California Cancer Registry, California Department of Public Health
 Prepared by the California Department of Public Health, California Cancer Registry

Figure 11 and Table 14 show the cancer incidence trends for children and adolescents in California, separated into five-year age groups (ages 0-4, 5-9, 10-14 and 15-19). Incidence rates among children ages 0-4 and ages 10-14 decreased from 1988 until the mid-1990's and then increased at a statistically significant rate through 2009. Children ages 5-9 and adolescents ages 15-19 experienced slight, but statistically significant increases in incidence rates throughout the time period of 1988 to 2009.

Figure 11: Incidence Trends Ages 0-19

Age-Adjusted Cancer Incidence Trends Among Children and Adolescents in California by Age Group, 1988-2009
(excluding myelodysplastic syndromes and benign brain/CNS tumors)



Source: California Cancer Registry, California Department of Public Health
Prepared by the California Department of Public Health, California Cancer Registry

TABLE 14

Age-Adjusted Cancer Incidence Trends Among Children and Adolescents in California by Age Group, 1988-2009
(excluding myelodysplastic syndromes and benign brain/CNS tumors)

	Period	APC
Ages 0-4	1988-1994	-1.3
	1994-2009	1.2*
Ages 5-9	1988-2009	0.8*
Ages 10-14	1988-1995	-2.1*
	1995-2009	1.6*
Ages 15-19	1988-2009	0.5*

APC= Average Annual Percent Change

*Means the APC is Statistically Significantly Different (p< 0.05).

Source: California Cancer Registry, California Department of Public Health

Prepared by the California Department of Public Health, California Cancer Registry

Five-Year Relative Survival (2001-2010) by ICCC Group

Progress in the treatment of childhood and adolescent cancers has resulted in improved five-year relative survival. The five-year relative survival for children and adolescents diagnosed between 2001 and 2010 for all cancers combined (excluding benign brain/CNS tumors) is 79.6 percent (See Table 15). When including benign brain/CNS tumors, the five-year relative survival remains the same for adolescents but changes just slightly for children to 79.7 percent. See Table 15 below for five-year relative survival rates for each of the major ICCC groups broken down by gender.



Progress in the treatment of childhood and adolescent cancers has resulted in improved five-year relative survival.

TABLE 15

Five-Year Relative Survival (Percent), in CA, 2001-2010

By International Classification of Childhood Cancer (ICCC) Groups and Sex and Age Including myelodysplastic syndromes and benign brain/CNS tumors⁶

Cancer Type	Ages 0-14			Ages 15-19		
	Total	Male	Female	Total	Male	Female
All Cancers Combined (Excluding benign brain/CNS tumors)	79.6	79.9	79.4	79.6	76.3	83.6
All Cancers Combined (Including benign brain/CNS tumors)	79.7	79.9	79.4	79.6	76.3	83.6
Leukemias (including myelodysplastic syndromes)	81.8	81.4	82.3	63.0	63.5	62.2
Lymphomas and Reticuloendothelial Neoplasms	90.1	90.9	88.7	89.3	87.4	91.4
CNS and Misc. Intracranial and Intraspinial Neoplasms (includes benign brain/CNS tumors)	68.7	69.6	67.7	76.8	74.2	80.6
Neuroblastoma and Other Peripheral Nervous Cell Tumors	74.2	75.2	73.1	-	-	-
Retinoblastoma	97.1	94.6	100.0	-	-	-
Renal Tumors	88.1	91.2	84.9	82.9	-	-
Hepatic Tumors	73.2	73.1	73.5	33.0	-	-
Malignant Bone Tumors	70.2	68.3	72.5	60.6	58.6	64.0
Soft Tissue and Other Extrasosseous Sarcomas	71.4	71.3	71.4	68.3	65.0	71.8
Germ Cell & Trophoblastic Tumors & Neoplasms of Gonads	89.8	90.6	89.0	88.7	87.4	91.9
Other Malignant Epithelial Neoplasms and Melanomas	91.6	91.9	91.5	90.4	82.6	94.2

- Statistics could not be calculated due to fewer than 25 cases during the time period.

⁶ Follow-up is through December 2010.

Source: California Cancer Registry, California Department of Public Health

Prepared by the California Department of Public Health, California Cancer Registry



TECHNICAL NOTES

1. **Incidence (New Cases)**

This report includes cases of cancer diagnosed between January 1, 1988 and December 31, 2010, and reported to California Cancer Registry (CCR) as of February 2013. A “case” is defined as a primary cancer; tumors that result from the spread, or metastasis, of cancer to another organ from a primary cancer are not counted as new cases. Only invasive cancers (those that have infiltrated the tissue of the organ of origin) are included in this report. 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). Standards for data abstracting, collection, and reporting are specified by the CCR. Only cases diagnosed in California residents are included in this report: persons who were treated for cancer in California but who were residents of another state or country are not included.

2. **Mortality (Deaths)**

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 by 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.

3. **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 (incidence) 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 age distribution between population groups. Rates in this report were calculated



TECHNICAL NOTES

using the Surveillance Research Program, National Cancer Institute SEER*Stat software version 6.2.3 (<http://srab.cancer.gov/seerstat>).

Annual Percent Change (APC): The estimated annual percent change (APC) represents the average percent increase or decrease in cancer rates per year over a specified period of time. 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 variable:

$$\ln(r) = m(\text{year}) + b.$$

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 $\alpha = 0.05$. This means that the trend in cancer rates was considered significantly different if there was less than a five percent chance that the difference was the result of random variation.

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 SEER JoinPoint regression software version 3.0 (<http://srab.cancer.gov/joinpoint>) was used for all trend analyses in this report.

Average Annual Percent Change (AAPC): Average Annual Percent Change (AAPC) is a summary measure of a trend over a pre-specified fixed interval. It allows us to use 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 APC's from the joinpoint model, with the weights equal to the length of the APC interval.



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*For additional cancer data from the
California Cancer Registry (CCR),
please refer to our website at
<http://www.cdph.ca.gov>, or
<http://www.ccrca.org>*

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