

## **UC Davis**

### **UC Davis Previously Published Works**

#### **Title**

Cancer in California, 1988-2009

#### **Permalink**

<https://escholarship.org/uc/item/61x1c855>

#### **Authors**

Cook, Sarah N  
Giddings, B M  
Parikh-Patel, Arti  
et al.

#### **Publication Date**

2013-07-01



# CANCER

AN OVERVIEW OF CALIFORNIA'S

# IN

RECENT

# CALIFORNIA

CANCER INCIDENCE AND MORTALITY

# 1988-2009

STATISTICS





# CANCER

AN OVERVIEW OF CALIFORNIA'S

# IN

RECENT

# CALIFORNIA

CANCER INCIDENCE AND MORTALITY

# 1988-2009

STATISTICS





This publication was prepared by the Institute for Population Health Improvement, UC Davis Health System, for the Chronic Disease Surveillance and Research Branch, California Department of Public Health, pursuant to Grant Number 11-10828.

Chronic Disease Surveillance and Research Branch  
California Department of Public Health  
1631 Alhambra Boulevard, Suite 200  
Sacramento, CA 95816  
(916) 731-2500  
<http://www.cdph.ca.gov> or <http://www.ccrca.org>

**Questions about the report should be directed to:**

California Cancer Registry  
c/o Institute for Population Health Improvement  
MS 7205  
P.O. Box 997377  
Sacramento, CA 95849-7377

**Suggested Citation:**

Cook SN, Giddings BM, Parikh-Patel A, Kizer KW, Kwong SL, Bates JH, Snipes KP. **Cancer in California, 1988–2009.** Sacramento, CA: California Department of Public Health, California Cancer Registry, July 2013.

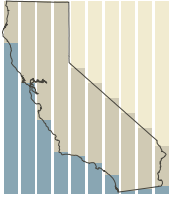
**Copyright information:**

All material in this report is in the public domain and may be reproduced or copied without permission; citation as to source, however, is appreciated.

This and other California Cancer Registry publications are available at:

<http://www.cdph.ca.gov>  
<http://www.ccrca.org>  
and  
<http://www.ucdmc.ucdavis.edu/iph/>

Layout and design by Glenn Wong, GW Graphic Works.



# Cancer in California, 1988–2009

## Contents

Overview: Cancer in California	1
Leading Cancer Sites by Sex	2
Leading Cancer Sites by Sex and Race/Ethnicity	6
Cancer Trends in California	9
Technical Notes	12

### Report Prepared by

**Sara N. Cook MPH, CHES**

*California Cancer Registry  
Institute for Population Health Improvement  
UC Davis Health System*

**Brenda M. Giddings MA**

*California Cancer Registry  
Institute for Population Health Improvement  
UC Davis Health System*

**Cyllene Morris DVM, PhD**

*Research Program Director  
California Cancer Registry  
Institute for Population Health Improvement  
UC Davis Health System*

**Arti Parikh-Patel PhD, MPH**

*Program Director  
California Cancer Registry  
Institute for Population Health Improvement  
UC Davis Health System*

**Kenneth W. Kizer MD, MPH**

*Director  
Institute for Population Health Improvement  
UC Davis Health System*

**Sandy L. Kwong MPH**

*Chronic Disease Surveillance and Research Branch  
California Department of Public Health*

**Janet H. Bates MD, MPH**

*Director  
California Cancer Registry  
Chronic Disease Surveillance and Research Branch  
California Department of Public Health*

**Kurt P. Snipes MS, PhD,**

*Chief  
Chronic Disease Surveillance and Research Branch  
California Department of Public Health*



**Edmund G. Brown, Jr.** Governor  
*State of California*

**Diana S. Dooley** Secretary  
*California Health and Human Services Agency*

**Ron Chapman** MD, MPH *Director and State Health Officer*  
*California Department of Public Health*



## **ACKNOWLEDGMENTS AND DISCLAIMER**

The collection of cancer incidence data used in this study was supported by the California Department of Public Health as part of the statewide cancer reporting program mandated by California Health and Safety Code Section 103885; the National Cancer Institute's Surveillance, Epidemiology and End Results Program under contract HHSN261201000140C awarded to the Cancer Prevention Institute of California, contract HHSN261201000035C awarded to the University of Southern California, and contract HHSN261201000034C awarded to the Public Health Institute; and the Centers for Disease Control and Prevention's National Program of Cancer Registries, under agreement U58DP003862-01 awarded to the California Department of Public Health. The ideas and opinions expressed herein are those of the author(s) and endorsement by the State of California, Department of Public Health, the National Cancer Institute, and the Centers for Disease Control and Prevention or their Contractors and Subcontractors is not intended nor should be inferred.

### **Inquiries regarding the content of this report should be directed to:**

California Cancer Registry  
c/o Institute for Population Health Improvement  
MS 7205  
P.O. Box 997377  
Sacramento, CA 95849-7377  
(916) 731-2500

*<http://www.cdph.ca.gov> or <http://www.ccrca.org>*



# CANCER IN CALIFORNIA

## California Cancer Rates: 2009 Update

### OVERVIEW

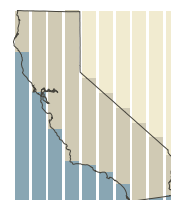
A total of 154,180 new cases of cancer were diagnosed among California residents in 2009. The overall age-adjusted cancer incidence (new cases) rate in California was 430.7 cases per 100,000 persons in 2009, compared to 463.0 in 1988 when statewide cancer reporting began, or 7.0 percent lower in 2009 than in 1988. Approximately 11,000 new cancer cases\* were prevented in California since 1988 due to this declining incidence rate.

The age-adjusted cancer incidence rate among California women dropped from 416.4 cases per 100,000 females in 1988, to 392.0 in 2009, a decline of 5.9 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 545.1 in 1989, to 628.5 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 488.4 in 2009, the lowest since 1988. The overall change between 1988 and 2009 was a decline of 10.4 percent.

Cancer of all types remained the second leading cause of death in California in 2009, accounting for 55,752 deaths. Encouragingly, however, the overall cancer mortality (death) rate has decreased by 22.9 percent since 1988, falling from 205.4 cancer-related deaths per 100,000 persons in 1988, to 158.3 in 2009—a drop of 26.4 percent for men and 20.8 percent for women. Approximately 16,000 deaths\* were prevented in California since 1988 due to this declining mortality rate.

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 2009, African-American men had the highest overall cancer incidence rate (581.9 cases per 100,000 males) and mortality rate (281.7 deaths per 100,000 males), followed by non-Hispanic white



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



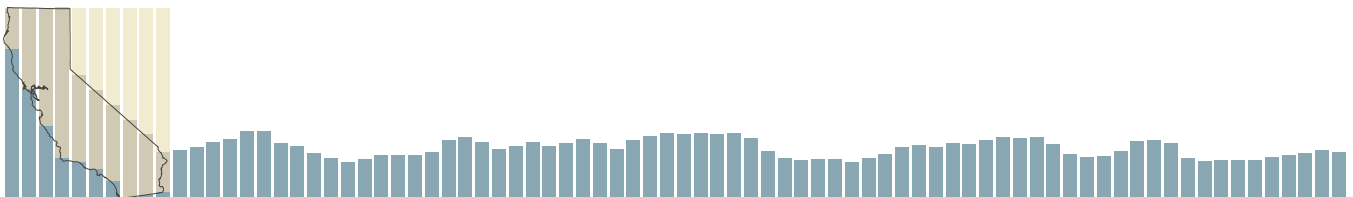
males (529.9 new cases and 202.9 deaths per 100,000 persons). Among women, non-Hispanic whites had the highest overall cancer incidence rate (436.3 cases per 100,000 females), while African-American women had the highest mortality rate (186.0 deaths per 100,000 females).

**LEADING  
CANCER SITES  
BY SEX**

Tables 1–4 and Figures 1 and 2 show the ten most common types of cancer incidence and mortality among Californians in 2009. These ten organ sites accounted for 79.0 percent of all new cancer diagnoses and 75.5 percent of cancer-related deaths. Breast cancer remained the most common cancer diagnosed among women, accounting for 31.4 percent of new cancers (23,747 cases) in 2009. 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 (21,731 cases) in California men in 2009.

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 (24.4 percent) and more than one of every five deaths for women (22.3 percent). A total of 17,568 Californians were diagnosed with cancer of the lung and bronchus in 2009, and 13,050 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 2009. Colorectal cancer accounted for 9.8 and 9.4 percent of newly diagnosed cancers in California men (7,704 new cases) and women (7,088 new cases), respectively, and 9.3 and 9.1 percent of cancer-related deaths in males (2,660 deaths) and females (2,473 deaths), respectively.



**Table 1. Ten Most-Common Types of Cancer Incidence among California Females, 2009\***

Rank	Cancer Site	Count	Rate <sup>†</sup>
1	Breast	23,747	123.4
2	Lung and Bronchus	8,543	44.4
3	Colorectal	7,088	36.1
4	Corpus and Uterus, Not Otherwise Specified	4,698	23.8
5	Thyroid	3,197	17.2
6	Non-Hodgkin Lymphoma	3,041	15.7
7	Melanoma	3,002	15.6
8	Ovary	2,364	12.2
9	Pancreas	1,939	9.9
10	Kidney and Renal Pelvis	1,874	9.8

<sup>†</sup> 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:**

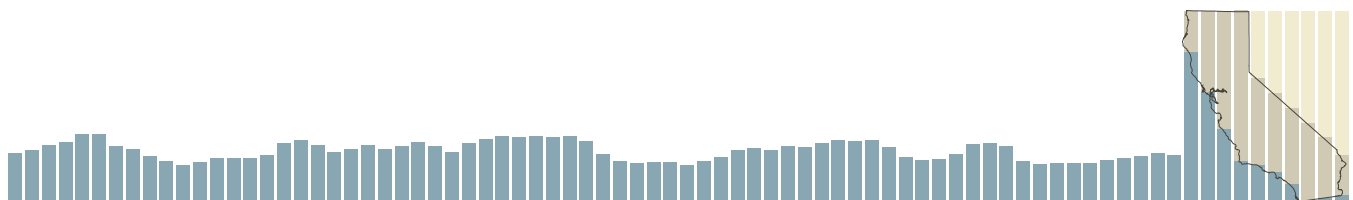
Breast cancer remained the most commonly diagnosed cancer in California...

**Table 2. Ten Most-Common Types of Cancer Mortality among California Females, 2009\***

Rank	Cancer Site	Count	Rate <sup>†</sup>
1	Lung and Bronchus	6,071	31.1
2	Breast	4,386	22.2
3	Colorectal	2,473	12.2
4	Pancreas	1,861	9.4
5	Ovary	1,564	7.9
6	Leukemia	1,033	5.2
7	Non-Hodgkin Lymphoma	937	4.6
8	Liver and Intrahepatic Bile Duct	862	4.4
9	Corpus and Uterus	789	4.0
10	Brain and Other Nervous System	679	3.5

<sup>†</sup> 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.



**AMONG MEN  
IN CALIFORNIA:**

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

**Table 3. Ten Most-Common Types of Cancer Incidence among California Males, 2009\***

Rank	Cancer Site	Count	Rate <sup>†</sup>
1	Prostate	21,731	132.5
2	Lung and Bronchus	9,025	59.8
3	Colorectal	7,704	48.5
4	Urinary Bladder	4,862	32.6
5	Melanoma	4,380	27.0
6	Non-Hodgkin Lymphoma	3,706	23.1
7	Kidney and Renal Pelvis	3,309	20.1
8	Oral Cavity and Pharynx	2,636	15.5
9	Leukemia	2,488	15.4
10	Liver and Intrahepatic Bile Duct	2,442	14.2

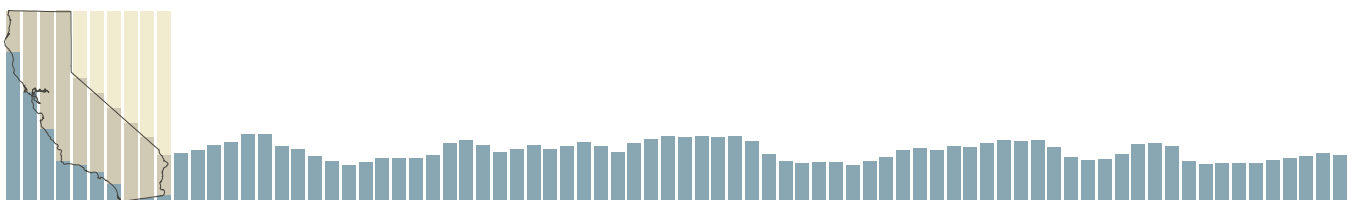
<sup>†</sup> Rates are per 100,000 and age-adjusted to the 2000 US Standard Population.  
<sup>\*</sup> Source: California Cancer Registry, California Department of Public Health.  
 Prepared by the California Department of Public Health, California Cancer Registry.

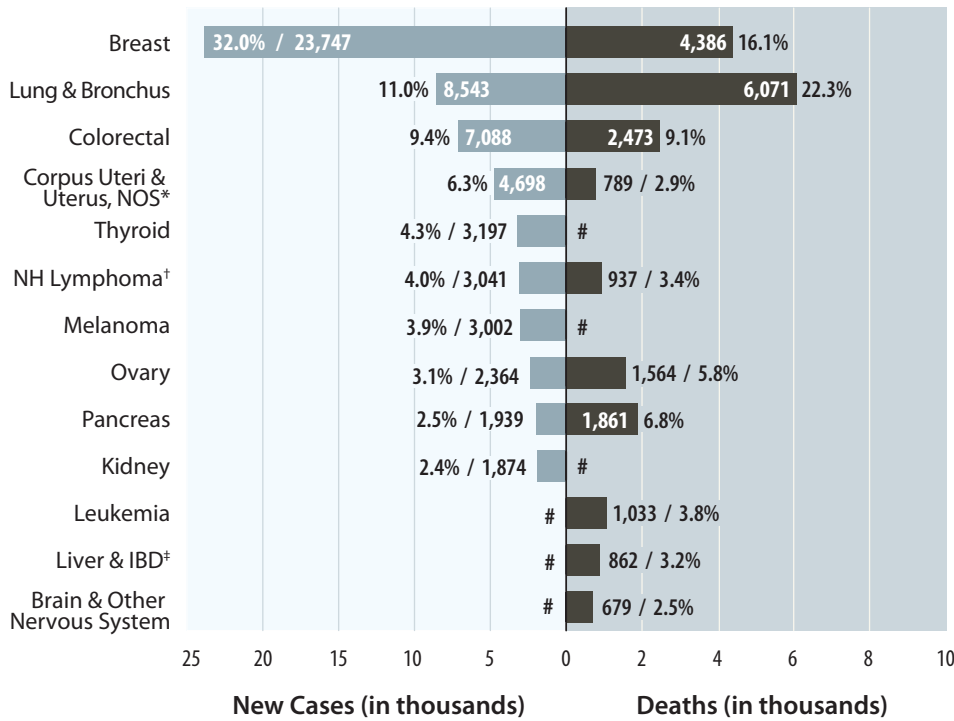
...while, again, cancer of the lung and bronchus was the leading cause of cancer-related death.

**Table 4. Ten Most-Common Types of Cancer Mortality among California Males, 2009\***

Rank	Cancer Site	Count	Rate <sup>†</sup>
1	Lung and Bronchus	6,979	46.9
2	Prostate	3,093	22.4
3	Colorectal	2,660	17.5
4	Pancreas	1,807	11.7
5	Liver and Intrahepatic Bile Duct	1,659	10.1
6	Leukemia	1,323	8.7
7	Non-Hodgkin Lymphoma	1,164	7.8
8	Urinary Bladder	936	6.6
9	Esophagus	953	6.1
10	Stomach	879	5.7

<sup>†</sup> Rates are per 100,000 and age-adjusted to the 2000 US Standard Population.  
<sup>\*</sup> Source: California Cancer Registry, California Department of Public Health.  
 Prepared by the California Department of Public Health, California Cancer Registry.





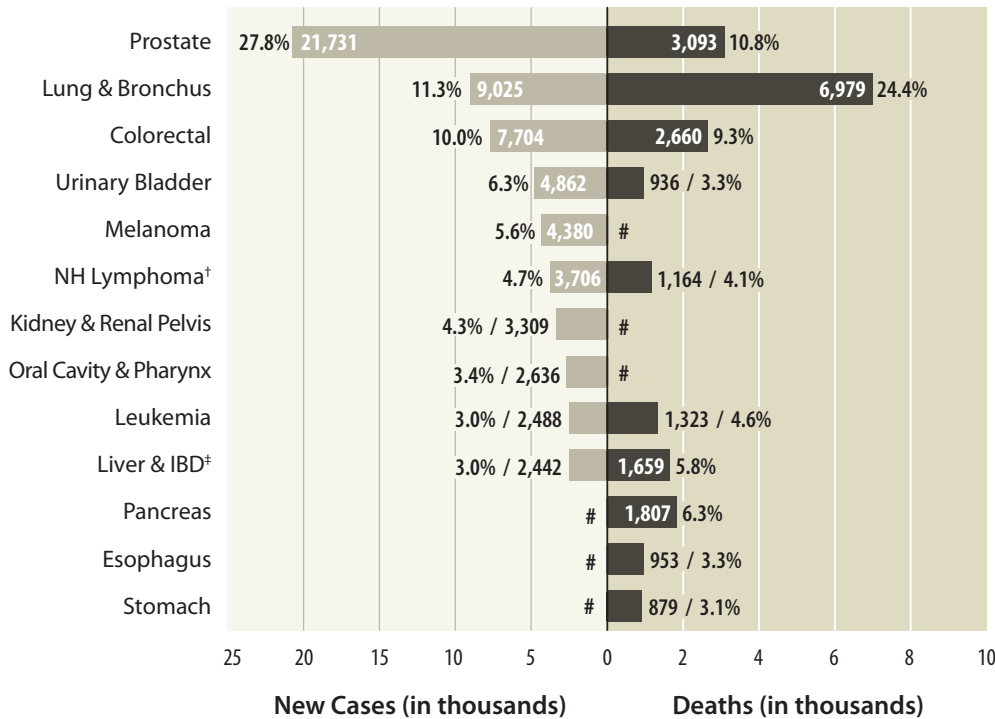
**Figure 1.**

Ten most-common types of cancer incidence (new cases), and the ten most common types of cancer mortality (deaths) among California females, 2009

\* NOS: not otherwise specified  
 † NH: Non-Hodgkin  
 ‡ IBD: Intrahepatic bile duct  
 # Not among the ten most common types

Excludes *in situ* cancers except bladder.

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



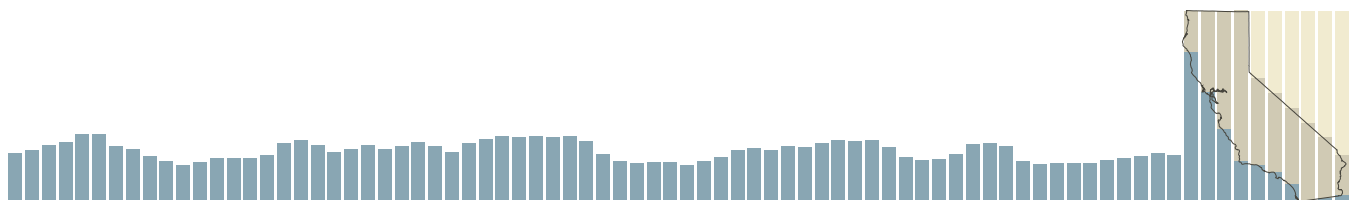
**Figure 2.**

Ten most-common types of cancer incidence (new cases), and the ten most common types of cancer mortality (deaths) among California males, 2009

† NH: Non-Hodgkin  
 ‡ IBD: Intrahepatic bile duct  
 # Not among the ten most common types

Excludes *in situ* cancers except bladder.

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

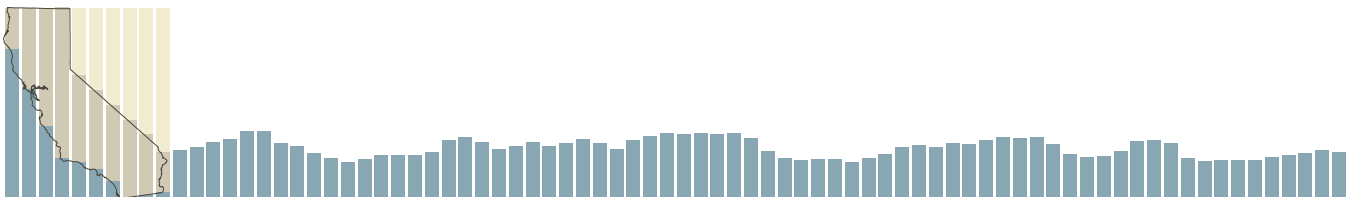


**LEADING  
CANCER SITES  
BY SEX  
AND  
RACE/ETHNICITY**

Tables 5 and 6 show the ten most commonly diagnosed cancers in California from 2005–2009 among males and females in 14 race/ethnicity groups: African American, American Indian/Alaska Native, Chinese, Filipino, Hawaiian, Hispanic, Japanese, Kampuchean, Korean, Laotian/Hmong, Pacific Islander, South Asian, 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 liver and intrahepatic bile duct (IBD) cancer was most common; 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; 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 fourteen 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 corpus and uterus cancer, not otherwise specified (NOS); Korean females, for whom the third most common was stomach cancer; Laotian/Hmong females, for whom the third most common was cervix uteri 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.** The ten most common newly diagnosed types of cancer among males by race/ethnicity, California, 2005–2009.

	RANK									
	1	2	3	4	5	6	7	8	9	10
Non-Hispanic White	Prostate 70,052	Lung & Bronchus 31,796	Colorectal 23,883	Melanoma 19,013	Urinary Bladder 18,995	Non-Hodgkin Lymphoma 11,583	Kidney & Renal Pelvis 9,389	Oral Cavity & Pharynx 8,949	Leukemia 7,520	Pancreas 6,360
African American	Prostate 9,684	Lung & Bronchus 3,573	Colorectal 2,738	Kidney & Renal Pelvis 1,117	Urinary Bladder 884	Non-Hodgkin Lymphoma 831	Liver & IBD* 825	Pancreas 699	Oral Cavity & Pharynx 685	Stomach 590
American Indian/ Alaska Native	Prostate 338	Lung & Bronchus 175	Colorectal 163	Liver & IBD* 112	Kidney & Renal Pelvis 92	Urinary Bladder 67	Oral Cavity & Pharynx 64	Non-Hodgkin Lymphoma 59	Leukemia 46	Melanoma 35
Chinese	Prostate 1,976	Lung & Bronchus 1,384	Colorectal 1,167	Liver & IBD* 713	Urinary Bladder 422	Non-Hodgkin Lymphoma 404	Stomach 403	Oral Cavity & Pharynx 370	Pancreas 259	Kidney & Renal Pelvis 237
Filipino	Prostate 2,313	Lung & Bronchus 1,235	Colorectal 1,013	Liver & IBD* 415	Non-Hodgkin Lymphoma 398	Kidney & Renal Pelvis 320	Leukemia 226	Urinary Bladder 223	Oral Cavity & Pharynx 213	Pancreas 191
Hawaiian	Prostate 75	Colorectal 33	Lung & Bronchus 30	Non-Hodgkin Lymphoma 15	Liver & IBD* 13	Urinary Bladder 12	Leukemia 9	Oral Cavity & Pharynx 8	Pancreas 7	Esophagus 6
Hispanic	Prostate 16,984	Colorectal 6,646	Lung & Bronchus 4,828	Non-Hodgkin Lymphoma 3,369	Kidney & Renal Pelvis 3,307	Liver & IBD* 2,931	Leukemia 2,601	Urinary Bladder 2,364	Stomach 2,073	Testis 1,806
Japanese	Prostate 723	Colorectal 572	Lung & Bronchus 409	Stomach 201	Urinary Bladder 201	Non-Hodgkin Lymphoma 154	Pancreas 133	Liver & IBD* 103	Kidney & Renal Pelvis 91	Oral Cavity & Pharynx 86
Kampuchean	Liver & IBD* 62	Colorectal 56	Lung & Bronchus 46	Prostate 30	Non-Hodgkin Lymphoma 23	Oral Cavity & Pharynx 21	Pancreas 11	Stomach 10	Leukemia 9	Brain & ONS** 8
Korean	Colorectal 462	Prostate 409	Stomach 365	Lung & Bronchus 342	Liver & IBD* 268	Urinary Bladder 173	Pancreas 101	Kidney & Renal Pelvis 101	Non-Hodgkin Lymphoma 97	Leukemia 54
Laotian/ Hmong	Lung & Bronchus 79	Liver & IBD* 56	Colorectal 47	Stomach 33	Oral Cavity & Pharynx 31	Prostate 21	Non-Hodgkin Lymphoma 21	Leukemia 13	Pancreas 12	Urinary Bladder 9 Kidney & Renal Pelvis 9
Pacific Islander†	Prostate 195	Lung & Bronchus 90	Colorectal 75	Liver & IBD* 38	Urinary Bladder 30	Oral Cavity & Pharynx 27	Non-Hodgkin Lymphoma 26	Kidney & Renal Pelvis 24	Stomach 23	Pancreas 19
South Asian	Prostate 526	Colorectal 167	Lung & Bronchus 123	Non-Hodgkin Lymphoma 113	Urinary Bladder 87	Leukemia 85	Kidney & Renal Pelvis 75	Oral Cavity & Pharynx 69	Liver & IBD* 53	Pancreas 49
Vietnamese	Lung & Bronchus 663	Liver & IBD* 625	Prostate 509	Colorectal 462	Stomach 182	Non-Hodgkin Lymphoma 175	Oral Cavity & Pharynx 150	Leukemia 103	Pancreas 96	Urinary Bladder 95

† 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

\*\* ONS: Other nervous system

‡ NOS: Not otherwise specified

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

**Table 6.** The ten most common newly diagnosed types of cancer among females by race/ethnicity, California, 2005–2009.

	RANK									
	1	2	3	4	5	6	7	8	9	10
Non-Hispanic White	Breast 74,867	Lung & Bronchus 31,208	Colorectal 22,854	Corpus & Uterus, NOS <sup>‡</sup> 13,684	Melanoma 12,397	Non-Hodgkin Lymphoma 9,333	Ovary 7,538	Thyroid 7,218	Pancreas 6,295	Urinary Bladder 5,765
African American	Breast 7,192	Lung & Bronchus 2,929	Colorectal 2,837	Corpus & Uterus, NOS <sup>‡</sup> 1,220	Pancreas 804	Non-Hodgkin Lymphoma 669	Kidney & Renal Pelvis 635	Ovary 591	Thyroid 563	Myeloma 519
American Indian/Alaska Native	Breast 411	Lung & Bronchus 184	Colorectal 142	Corpus & Uterus, NOS <sup>‡</sup> 118	Kidney & Renal Pelvis 70	Ovary 51	Thyroid 51	Non-Hodgkin Lymphoma 47	Pancreas 42	Leukemia 42
Chinese	Breast 2,741	Colorectal 1,233	Lung & Bronchus 989	Corpus & Uterus, NOS <sup>‡</sup> 491	Thyroid 431	Stomach 307	Non-Hodgkin Lymphoma 300	Liver & IBD* 293	Ovary 290	Pancreas 225
Filipino	Breast 3,691	Colorectal 1,046	Lung & Bronchus 885	Corpus & Uterus, NOS <sup>‡</sup> 814	Thyroid 750	Non-Hodgkin Lymphoma 407	Ovary 375	Pancreas 273	Cervix Uteri 250	Leukemia 218
Hawaiian	Breast 91	Colorectal 28	Corpus & Uterus, NOS <sup>‡</sup> 26	Lung & Bronchus 25	Non-Hodgkin Lymphoma 10	Oral Cavity & Pharynx 9	Stomach 8	Pancreas 8	Ovary 8	Thyroid 7
Hispanic	Breast 18,747	Colorectal 5,397	Lung & Bronchus 3,911	Corpus & Uterus, NOS <sup>‡</sup> 3,900	Thyroid 3,707	Cervix Uteri 2,846	Non-Hodgkin Lymphoma 2,837	Ovary 2,357	Kidney & Renal Pelvis 2,166	Leukemia 2,029
Japanese	Breast 1,244	Colorectal 608	Lung & Bronchus 471	Corpus & Uterus, NOS <sup>‡</sup> 230	Stomach 180	Pancreas 176	Non-Hodgkin Lymphoma 153	Liver & IBD* 127	Ovary 108	Thyroid 91
Kampuchean	Breast 68	Colorectal 59	Lung & Bronchus 35	Liver & IBD* 29	Cervix Uteri 27	Thyroid 17	Ovary 15	Non-Hodgkin Lymphoma 15	Corpus & Uterus, NOS <sup>‡</sup> 12	Stomach 11 Pancreas 11
Korean	Breast 798	Colorectal 413	Stomach 275	Lung & Bronchus 242	Thyroid 161	Liver & IBD* 122	Pancreas 102	Cervix Uteri 94	Corpus & Uterus, NOS <sup>‡</sup> 91	Ovary 89
Laotian/Hmong	Breast 51	Colorectal 40	Cervix Uteri 35	Lung & Bronchus 33	Liver & IBD* 30	Thyroid 18	Ovary 16	Stomach 16	Corpus & Uterus, NOS <sup>‡</sup> 15	Non-Hodgkin Lymphoma 14
Pacific Islander <sup>†</sup>	Breast 281	Corpus & Uterus, NOS <sup>‡</sup> 118	Lung & Bronchus 71	Colorectal 65	Thyroid 45	Ovary 40	Cervix Uteri 38	Non-Hodgkin Lymphoma 24	Stomach 21	Leukemia 18
South Asian	Breast 707	Colorectal 130	Corpus & Uterus, NOS <sup>‡</sup> 124	Thyroid 115	Ovary 81	Non-Hodgkin Lymphoma 72	Lung & Bronchus 60	Leukemia 56	Cervix Uteri 46	Oral Cavity & Pharynx 43
Vietnamese	Breast 926	Colorectal 398	Lung & Bronchus 356	Thyroid 241	Liver & IBD* 205	Corpus & Uterus, NOS <sup>‡</sup> 147	Stomach 143	Cervix Uteri 139	Ovary 126	Non-Hodgkin Lymphoma 126

<sup>†</sup> Pacific Islanders include the following: Micronesian, NOS<sup>‡</sup>; Chamorroan; Guamanian, NOS<sup>‡</sup>; Polynesian, NOS<sup>‡</sup>; Tahitian; Samoan; Tongan; Melanesian, NOS<sup>‡</sup>; Fiji Islander; New Guinean; and Pacific Islander, NOS<sup>‡</sup>

\* IBD: Intrahepatic bile duct

<sup>‡</sup> NOS: Not otherwise specified

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

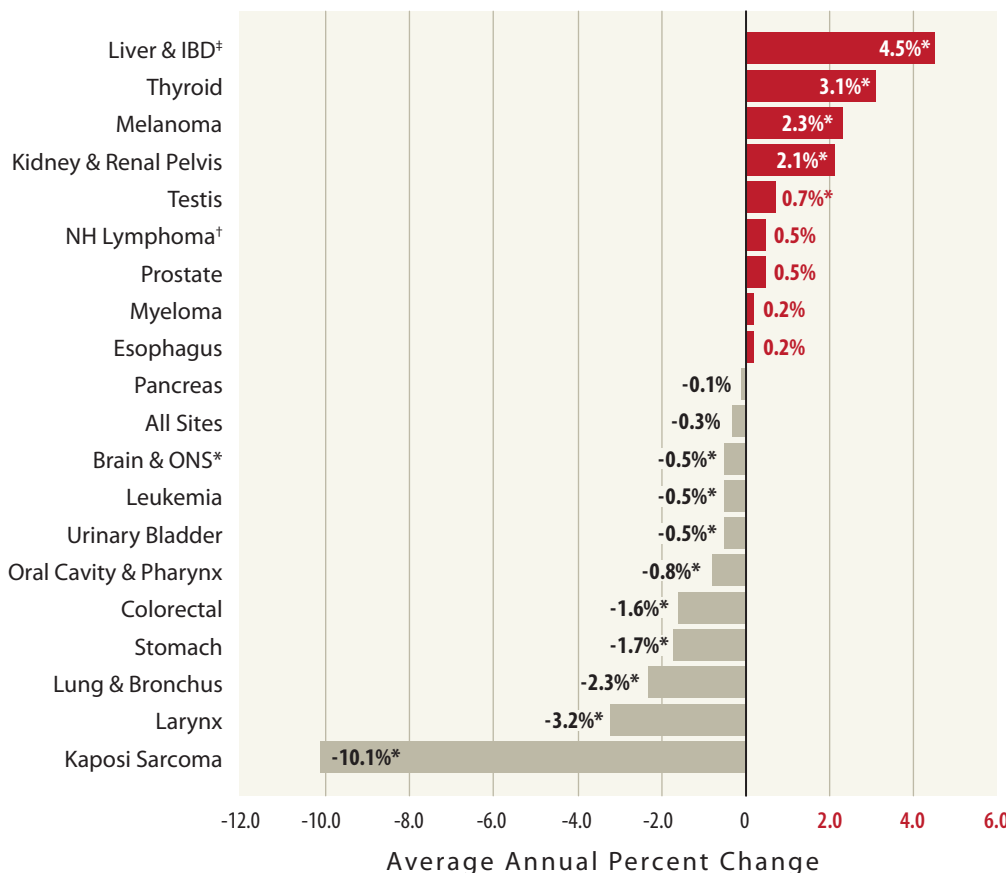
Figures 3–6 depict the trends in cancer incidence and mortality rates for the most common cancers by sex (for all races combined) over the 22-year period 1988 to 2009. A bar to the right of zero (*i.e.*, a positive percentage) means that the rate, on average, is increasing, while a bar to the left (*i.e.*, 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 1988. This is mostly due to lower rates of smoking and the decline of smoking-related cancers (e.g., cancers of the lung and bronchus, oral cavity and pharynx, larynx, stomach, cervix uteri, and urinary bladder).

For males, nine common cancers showed statistically significant declines in incidence rates since 1988; these include: cancer of the brain and nervous system, urinary bladder, oral cavity and pharynx, colorectal, stomach, lung and bronchus, larynx, leukemia, and Kaposi sarcoma. The incidence rates for five common cancers increased significantly for men since 1988: liver and IBD, thyroid, melanoma, kidney and renal pelvis, and testis.

**CANCER TRENDS IN CALIFORNIA**

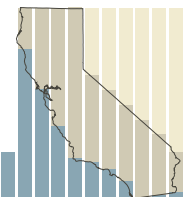
**MALES: Cancer Incidence Trends**



**Figure 3.** Average annual percent change (AAPC) in age-adjusted cancer INCIDENCE rates for males, California, 1988–2009

\* 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.

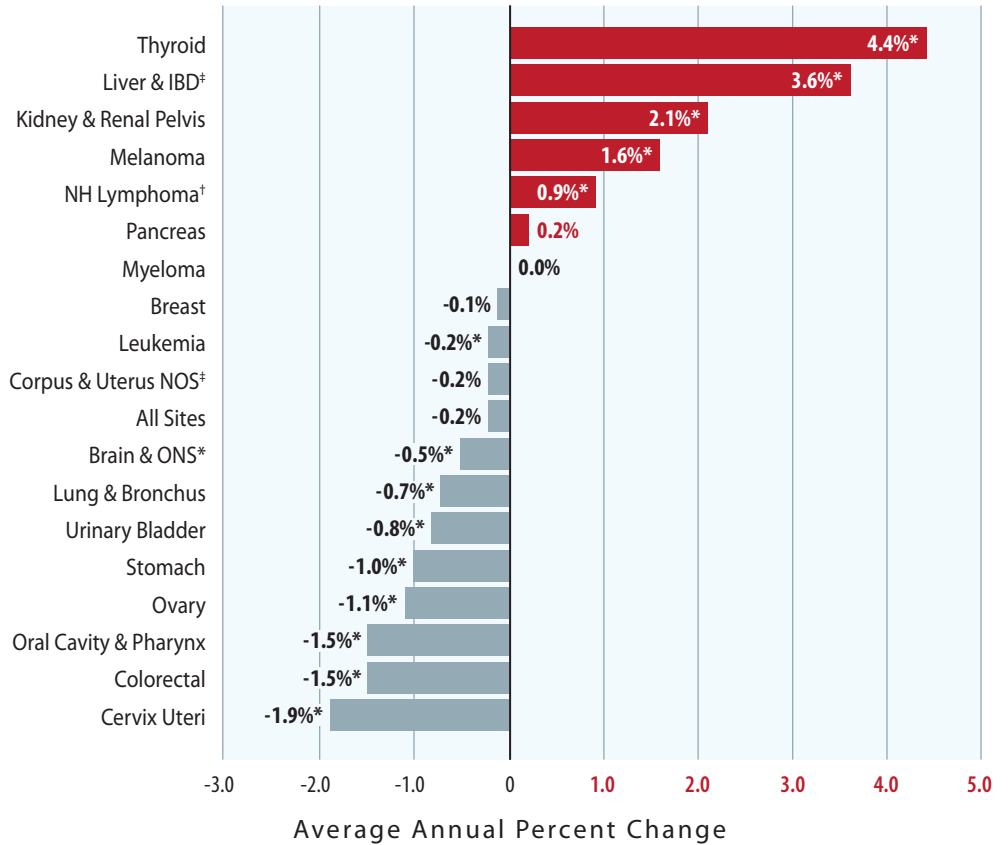




**FEMALES:**  
**Cancer Incidence**  
**Trends**

For females, nine common cancers showed statistically significant declines in incidence rates since 1988; these include (similar to males): cancer of the brain and nervous system, lung and bronchus, urinary bladder, stomach, oral cavity and pharynx, colorectal, and leukemia; additionally, statistically significant declines also occurred for ovary and cervix uteri cancers. The incidence rates for five common cancers increased significantly for women since 1988: thyroid, liver and IBD, kidney and renal pelvis, melanoma, and non-Hodgkin lymphoma.

**Figure 4.**  
Average annual percent change (AAPC) in age-adjusted cancer INCIDENCE rates for females, California, 1988–2009



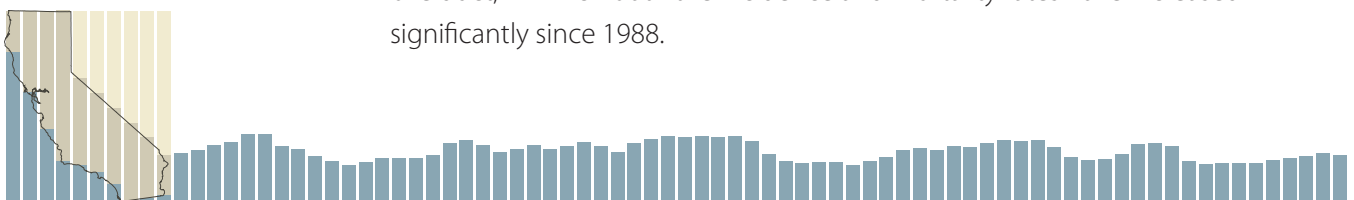
\* AAPC is significantly different from zero at p<0.05  
Rates are per 100,000 and age-adjusted to the 2000 U.S. Standard Population.

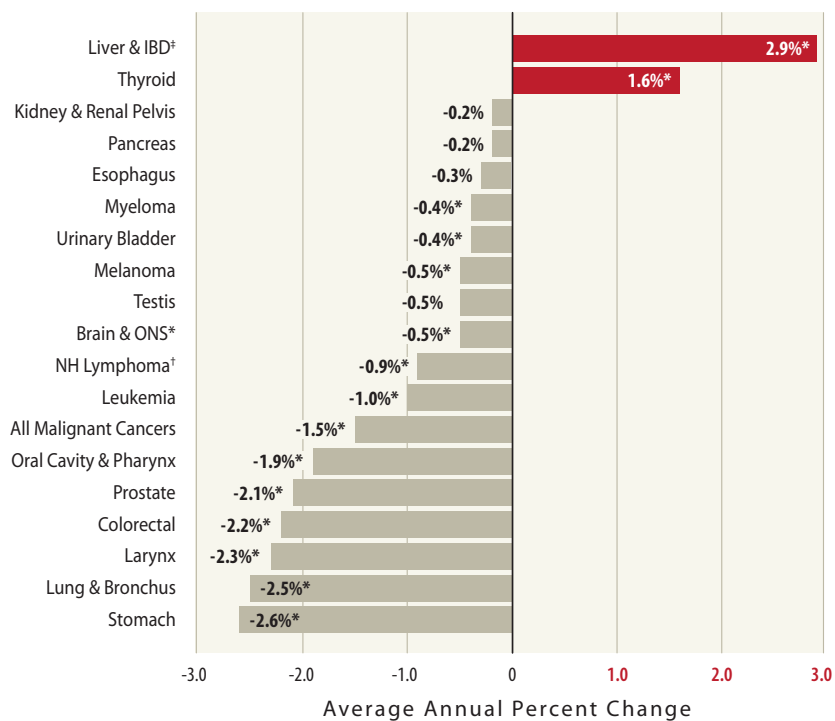
Source: California Cancer Registry, California Department of Public Health. Prepared by the California Department of Public Health, California Cancer Registry.

**MORTALITY:**  
**Trends**

Mortality rates for most cancers in both genders also decreased since 1988, and significantly so for a 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).

Two notable exceptions to the decreasing cancer mortality rates among both genders are cancers of the thyroid gland and the liver and intrahepatic bile duct, in which both the incidence and mortality rates have increased significantly since 1988.



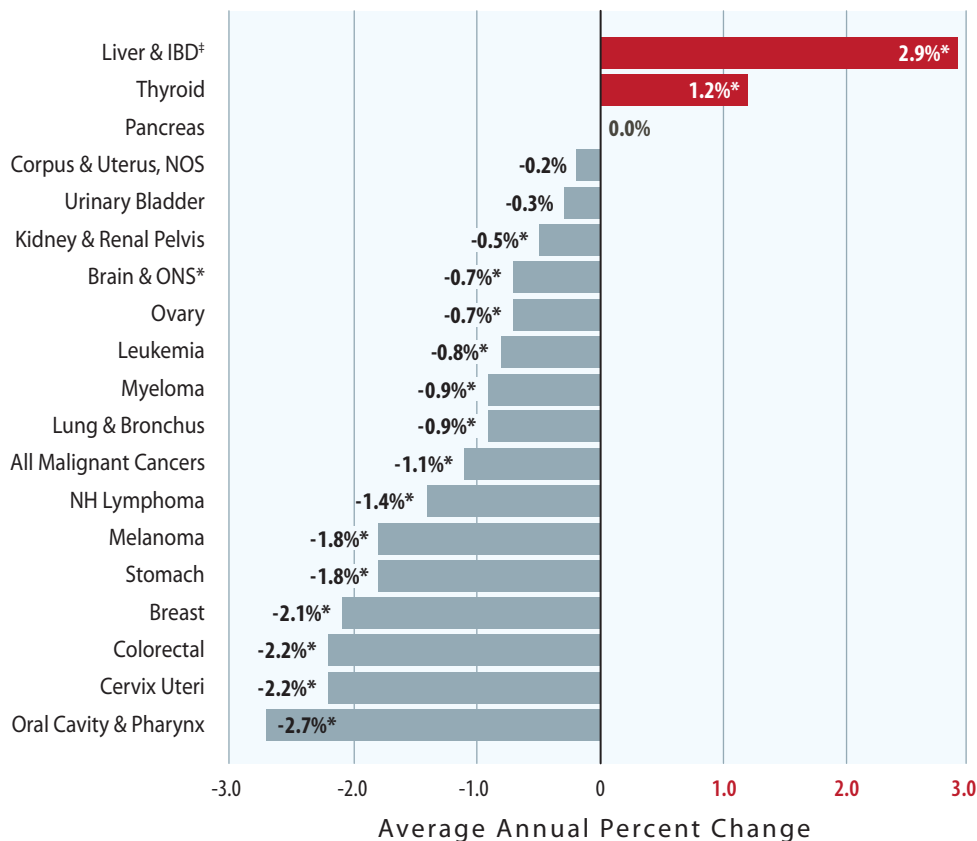


**Figure 5.**

Average annual percent change (AAPC) in age-adjusted cancer MORTALITY rates for males, California, 1988–2009

\* 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.

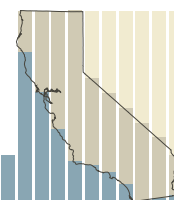


**Figure 6.**

Average annual percent change (AAPC) in age-adjusted cancer MORTALITY rates for females, California, 1988–2009

\* 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.



## Technical Notes

### 1. Incidence (New Cases)

This report includes cases diagnosed between January 1, 1988 and December 31, 2009, and reported to the California Cancer Registry (CCR) as of January 2012. A **case** is defined as a primary cancer; tumors that result from the spread, or metastasis, of cancer to another organ 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 operated by the California Cancer Registry at the Institute for Population Health Improvement, UC Davis Health System, for the 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, and thereafter, 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 were calculated as the number of new cases (incidence) or deaths (mortality) in specific age groups per 100,000 persons each year, and were age-adjusted to the 2000 United States standard population. Age-adjusted rates are weighted averages of age-specific rates, where the weights represent the age distribution of a standard population. Such adjustment eliminates differences in rates due to changes in the age of a population over time, or due to differences in age distribution between population groups. Rates in this report were calculated 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  $\alpha = 0.05$ . That is, the trend in cancer rates was considered statistically significant 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.





For additional cancer data  
from the  
California Cancer Registry (CCR),  
please visit our website:  
**[www.ccrca.org](http://www.ccrca.org)**

**UCDAVIS**  
**INSTITUTE FOR POPULATION  
HEALTH IMPROVEMENT**

