Title
Cancer in California, 1988-2009

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et al.

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AN OVERVIEW OF CALIFORNIA’S IN RECENT CALIFORNIA CANCER INCIDENCE AND MORTALITY 1988-2009 STATISTICS
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IN
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1988-2009
STATISTICS
Chronic Disease Surveillance and Research Branch
California Department of Public Health
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http://www.cdph.ca.gov or http://www.ccrcal.org

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Cancer in California, 1988–2009

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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
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).

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.
AMONG WOMEN IN CALIFORNIA:

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

...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 Females, 2009*

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

† 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 Females, 2009*

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

† 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 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*

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

† 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, 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*

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

† 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.
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.
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.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Non-Hispanic White</th>
<th>African American</th>
<th>American Indian/Alaska Native</th>
<th>Chinese</th>
<th>Filipino</th>
<th>Hawaiian</th>
<th>Hispanic</th>
<th>Japanese</th>
<th>Kampuchean</th>
<th>Korean</th>
<th>Laotian/Hmong</th>
<th>Pacific Islander*</th>
<th>South Asian</th>
<th>Vietnamese</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Prostate 70,052</td>
<td>Lung &amp; Bronchus 31,796</td>
<td>Colorectal 23,883</td>
<td>Lung &amp; Bronchus 1,384</td>
<td>Lung &amp; Bronchus 1,235</td>
<td>Prostate 75</td>
<td>Prostate 16,984</td>
<td>Prostate 723</td>
<td>Liver &amp; IBD* 62</td>
<td>Colorectal 462</td>
<td>Lung &amp; Bronchus 79</td>
<td>Prostate 195</td>
<td>Prostate 526</td>
<td>Lung &amp; Bronchus 663</td>
</tr>
<tr>
<td>2</td>
<td>Lung &amp; Bronchus 31,796</td>
<td>Colorectal 23,883</td>
<td>Lung &amp; Bronchus 3,573</td>
<td>Colorectal 1,167</td>
<td>Colorectal 1,013</td>
<td>Colorectal 33</td>
<td>Colorectal 6,464</td>
<td>Colorectal 572</td>
<td>Colorectal 56</td>
<td>Prostate 409</td>
<td>Lung &amp; Bronchus 56</td>
<td>Lung &amp; Bronchus 90</td>
<td>Colorectal 167</td>
<td>Lung &amp; Bronchus 625</td>
</tr>
<tr>
<td>3</td>
<td>Colorectal 23,883</td>
<td>Lung &amp; Bronchus 2,738</td>
<td>Kidney &amp; Renal Pelvis 1,117</td>
<td>Liver &amp; IBD* 713</td>
<td>Liver &amp; IBD* 415</td>
<td>Lung &amp; Bronchus 30</td>
<td>Lung &amp; Bronchus 4,828</td>
<td>Lung &amp; Bronchus 409</td>
<td>Liver &amp; IBD*</td>
<td>Stomach 365</td>
<td>Stomach 33</td>
<td>Colorectal 47</td>
<td>Colorectal 167</td>
<td></td>
</tr>
</tbody>
</table>

† Pacific Islanders include the following: Micronesian, NOS; Chamorroan; 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.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Non-Hispanic White</th>
<th>African American</th>
<th>American Indian/Alaska Native</th>
<th>Chinese</th>
<th>Filipino</th>
<th>Hawaiian</th>
<th>Hispanic</th>
<th>Japanese</th>
<th>Kampucheane</th>
<th>Korean</th>
<th>Laotian/Hmong</th>
<th>Pacific Islander</th>
<th>South Asian</th>
<th>Vietnamese</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Breast 74,867</td>
<td>Lung &amp; Bronchus 31,208</td>
<td>Colorectal 22,854</td>
<td>Breast 2,741</td>
<td>Colorectal 1,233</td>
<td>Non-Hodgkin Lymphoma 300</td>
<td>Thyroid 8</td>
<td>Thyroid 2,166</td>
<td>Thyroid 9</td>
<td>Breast 798</td>
<td>Breast 51</td>
<td>Breast 281</td>
<td>Breast 707</td>
<td>Breast 926</td>
</tr>
<tr>
<td>3</td>
<td>Colorectal 22,854</td>
<td>Corpus &amp; Uterus, NOS* 13,684</td>
<td>Melanoma 12,397</td>
<td>Corpus &amp; Uterus, NOS* 491</td>
<td>Corpus &amp; Uterus, NOS* 118</td>
<td>Kidney &amp; Renal Pelvis 70</td>
<td>Stomach 307</td>
<td>Ovary 15</td>
<td>Thyroid 17</td>
<td>Stomach 275</td>
<td>Stomach 35</td>
<td>Stomach 33</td>
<td>Stomach 65</td>
<td>Stomach 45</td>
</tr>
<tr>
<td>5</td>
<td>Melanoma 12,397</td>
<td>Non-Hodgkin Lymphoma 9,333</td>
<td>Ovary 51</td>
<td>Thyroid 51</td>
<td>Oral Cavity &amp; Pharynx 9</td>
<td>Thyroid 17</td>
<td>Stomach 180</td>
<td>Stomach 180</td>
<td>Stomach 180</td>
<td>Pancreas 176</td>
<td>Pancreas 176</td>
<td>Pancreas 176</td>
<td>Pancreas 176</td>
<td>Pancreas 176</td>
</tr>
<tr>
<td>8</td>
<td>Thyroid 7,218</td>
<td>Ovary 391</td>
<td>Thyroid 563</td>
<td>Pancreas 42</td>
<td>Uterus, NOS 205</td>
<td>Uterus, NOS 147</td>
<td>Pancreas 129</td>
<td>Pancreas 129</td>
<td>Pancreas 129</td>
<td>Oral Cavity &amp; Pharynx 9</td>
<td>Oral Cavity &amp; Pharynx 9</td>
<td>Oral Cavity &amp; Pharynx 9</td>
<td>Oral Cavity &amp; Pharynx 9</td>
<td>Oral Cavity &amp; Pharynx 9</td>
</tr>
<tr>
<td>9</td>
<td>Pancreas 6,295</td>
<td>Pancreas 42</td>
<td>Myeloma 519</td>
<td>Lymphoma 519</td>
<td>Lymphoma 517</td>
<td>Lymphoma 517</td>
<td>Lymphoma 517</td>
<td>Lymphoma 517</td>
<td>Lymphoma 517</td>
<td>Lymphoma 517</td>
<td>Lymphoma 517</td>
<td>Lymphoma 517</td>
<td>Lymphoma 517</td>
<td>Lymphoma 517</td>
</tr>
</tbody>
</table>

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

‡ 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.
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.

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.
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