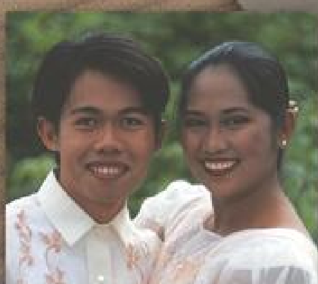
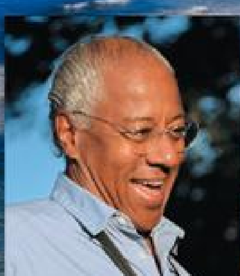
Cancer Incidence and Mortality in California



TRENDS BY RACE/ETHNICITY 1988 - 2001



CCR
CALIFORNIA CANCER REGISTRY

Cancer Incidence and Mortality in California

TRENDS BY RACE/ETHNICITY 1988-2001

Myles Cockburn, PhD
and
Dennis Deapen, DrPH

2004

Produced by:
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USC/Norris Comprehensive Cancer Center
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Suggested citation:
Cockburn M, Deapen D (eds).
Cancer Incidence and Mortality in California: Trends by Race/Ethnicity, 1988-2001.
Los Angeles Cancer Surveillance Program, University of Southern California, 2004.

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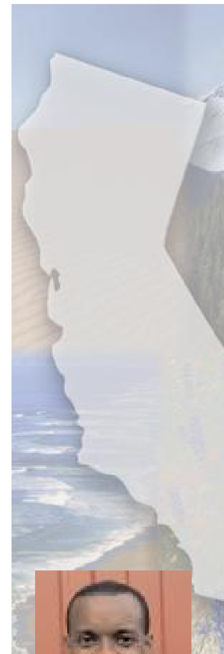

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EXECUTIVE SUMMARY

California has a statewide system for recording the occurrence of new cancer cases (cancer incidence) and noting which deaths among the population are due to cancer (cancer mortality). This resource is used by researchers throughout the State from many different agencies and research facilities to generate new hypotheses regarding cancer causes, to monitor trends and patterns of cancer incidence, and to identify population subgroups at high risk of cancer. Monitoring rates of cancer can provide a "report card" on how well cancer prevention programs are working. Government officials and policymakers use trends in cancer rates to determine funding for treatment and related social services.

The State of California has an ethnically diverse population that is changing rapidly in composition over time: Asian populations, both immigrants and second or later generation Asian Americans are increasing; the white population is declining slowly as birth rates decline and the population slowly ages; the Latino population is also rapidly growing, due to both immigration and an increase in the California-born Latino population. The substantial differences among rates of most cancers between men and women and various race/ethnic groups in California provide clues for a better understanding of cancer.

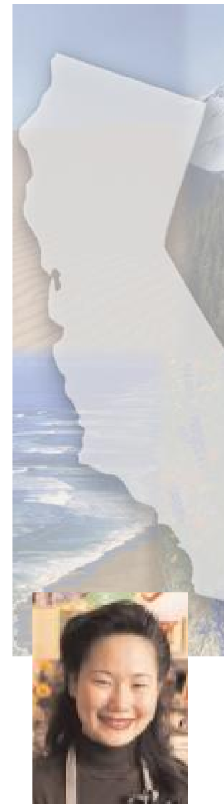
Important features of cancer incidence and mortality trends in California between 1988 and 2001 include:

- Cancer incidence varied greatly by race/ethnicity. For nineteen cancer sites one race/ethnic group had at least three times greater incidence than another race/ethnic group. For thirteen cancer sites one racial/ethnic group had at least three times greater cancer mortality than another.

- For all cancers combined, black men had the highest rate of cancer incidence followed in order by non-Latino white, Japanese, Filipino, Korean, Latino, Chinese and South Asian men. Among women, non-Latino whites had the highest overall rates of cancer, followed in order by blacks, Japanese, Vietnamese, Filipino, Chinese, Latina whites, Korean and South Asian women.

- For all cancers combined, there were at least threefold differences in the highest rates of cancer mortality (among blacks) and lowest (among South Asians).

- Prostate cancer was the most common cancer among males of all racial/ethnic groups except Koreans, for whom stomach cancer was most common, and Vietnamese, among whom lung cancer was most common.



- Rates of prostate cancer incidence declined among most racial ethnic groups after increasing until 1990. These trends reflect the impact of screening using the prostate-specific antigen test (PSA) which first caused a large increase in incidence, followed by a decline due to the removal of cases already discovered by PSA.

- Prostate cancer mortality declined slightly in the past 14 years in all racial/ethnic groups, but there remains a tenfold difference in rates between blacks (highest) and Asian groups (lowest).

- Breast cancer was the most common cancer among females of all racial/ethnic groups, accounting for roughly 30% of all cancers, except for Korean women among whom lung cancers were most common.

- Breast cancer incidence rates increased rapidly over time for all racial/ethnic groups except Latinas, among whom incidence rates declined substantially. The rate of *in situ* breast cancers increased rapidly in all racial/ethnic groups, indicating broad-ranging effects of screening using mammography.

- Breast cancer mortality rates declined substantially for women of all racial/ethnic groups over time, except Filipinas who may have experienced a slight increase in breast cancer mortality in the past 14 years.

- Cervical cancer rates declined among all race/ethnic groups, presumably due to successful screening interventions, but the rate of decline was small in Koreans and Filipinas, possibly due to limited access to screening. Declining cervical cancer mortality rates for all racial/ethnic groups suggest that screening is successfully reducing death from the disease.

- Colorectal cancer rates, traditionally low among Filipinos and Koreans, are increasing among these groups, as well as among other Asian groups. Rates for blacks and Latino and non-Latino whites are declining.

- Esophageal cancer declined rapidly in blacks, but was steady or increased slightly in Asian populations. These differing trends reflect the fact that there are two very different types of esophageal cancer, one which is related to smoking and one which is not. The resulting trends in esophageal cancer by race/ethnicity reflect differences in smoking practices and other unknown risk factors for the disease by race/ethnicity.

- Kaposi sarcoma rates declined rapidly in all racial/ethnic groups following public health measures aimed at reducing the spread of HIV/AIDS.

- Kidney cancer rates have traditionally been highest among non-Latino blacks worldwide, but rates have been increasing rapidly among Latino females who now have the highest kidney cancer rates of any race/ethnic group in California.

- Overall, leukemia rates declined for all racial/ethnic groups at a similar rate, despite the fact that among some subtypes of the disease there were as much as threefold differences in incidence by race/ethnicity.

- Liver cancer rates declined or were stable in most Asian groups, but increased steadily among blacks, non-Latino whites and Latinos.

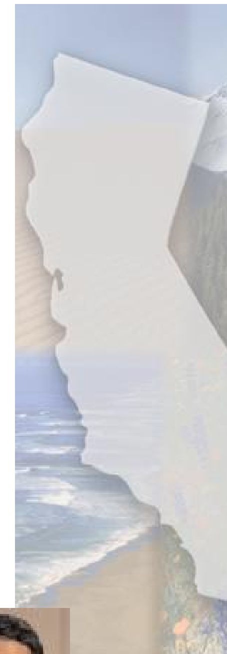
- Lung cancer rates initially increased among men and then declined in blacks and non-Latino whites, but have not yet done so for other race/ethnic groups. Lung cancer rates in women increased for all race/ethnic groups.

- Melanoma rates among non-Latino whites increased so rapidly in the past 14 years that they are now among the top five cancers for both males and females. Some of this increase is likely due to increased screening.

- Ovarian cancer rates declined steadily for all racial/ethnic groups, but mortality did not decline in Asian populations.

- Stomach cancer rates declined steadily among all racial/ethnic groups except Filipino women, who experienced a slight increase in incidence of the disease. This increase may be due to immigration, because stomach cancer rates are higher in the Philippines than in California.

- Thyroid cancer rates increased steadily among most racial/ethnic groups over the past 14 years for unknown reasons.



ACKNOWLEDGEMENTS

Cancer incidence and mortality data used in this report have been collected by the California Cancer Registry of the California Department of Health Services as part of its statewide cancer reporting program, mandated by Health and Safety Code Section 210 and 211.3. Support has also been provided by the Division of Cancer Prevention and Control, National Cancer Institute, U.S. Department of Health and Human Services, under contract N02-PC-15105, the Centers for Disease Control and Prevention National Program of Cancer Registries under contract U75/CCU910677, the Tobacco Tax and Health Promotion Act of 1988 and the Breast Cancer Act of 1993. This report would not have been possible without the support of William Wright, PhD, Chief, California Surveillance Section and the dedication and efforts of California's cancer registrars and other persons responsible for cancer data collection.

PREFACE

Most Californians have been touched by the effect of illness, disability or death because of cancer either personally or among family and friends. Medical science continues to battle this scourge with research on causes, treatment and outcomes. High quality cancer registries are central to those efforts. In each U.S. state, cancer registries identify newly diagnosed cancer patients, and regularly analyze cancer mortality data, to track these trends and create opportunities for involvement in research. Since 1988, the statewide population-based cancer surveillance system, the California Cancer Registry (CCR), has been trusted with this task in California. It is also part of the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) program. With the large and diverse population of California, and the many experts available statewide involved in cancer research, the CCR has served as a resource for many epidemiological studies of cancer.

This volume provides physicians, researchers, public health officials and the public with high quality data documenting the trends of many different types of cancer in California over the last 14 years. These data illustrate considerable differences in cancer incidence between men and women and among various racial/ethnic groups. These differences not only identify the types of persons at greater and lesser risk of each cancer but also offer intriguing clues that may lead to better understanding and prevention of cancer.

This report was prepared by the following researchers: Myles Cockburn, PhD, epidemiologist; Dennis Deapen, DrPH, director; Lihua Liu, PhD, demographer; all from the Cancer Surveillance Program of Los Angeles County; Sandy Kwong and Mark Allen, both research scientists from the CCR; and the contributing editors listed on pages 1-2. As with all reports produced by the CCR, great appreciation goes to the hospital cancer registrars, the field technicians and other staff whose dedication and hard work provide the foundation for this report.

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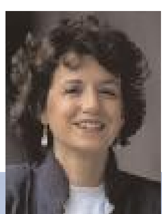
Dennis Deapen



INTRODUCTION

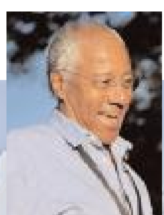
HISTORICAL BACKGROUND OF THE CCR

In California, uniform cancer data collection began in a few hospitals as early as 1948. Over time, this practice expanded to include entire counties. In 1972, through the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) program, health officials began collecting cancer data for five San Francisco Bay Area counties. Recognizing the value of having an accurate and complete statewide understanding of the distribution and determinants of cancer, state lawmakers then enacted legislation (Health and Safety Code, Sections 100300, 103875 and 103885) establishing the California Cancer Registry (CCR). For more information on the CCR, visit our Web site at **www.ccrcal.org**.

Since 1988, statewide cancer data have been reported in a uniform way. Today, the CCR is a statewide population-based cancer surveillance system that represents a cooperative relationship among hospitals and other cancer diagnostic or treatment facilities, regional registries, and the California Department of Health Services (CDHS). It comprises 10 regional registries (Figure 1) that report cancer incidence data to the Cancer Surveillance Section of CDHS:

REGION	AREA	COUNTIES
1	**Santa Clara**	Monterey, San Benito, Santa Clara, Santa Cruz
2	**Central**	Fresno, Kern, Kings, Madera, Mariposa, Merced, Stanislaus, Tulare, Tuolomne
3	**Sacramento**	Alpine, Amador, Calaveras, El Dorado, Nevada, Placer, Sacramento, San Joaquin, Sierra, Solano, Sutter, Yolo, Yuba
4	**Tri-County**	San Luis Obispo, Santa Barbara, Ventura
5	**Desert Sierra**	Inyo, Mono, Riverside, San Bernardino
6	**North**	Butte, Colusa, Del Norte, Glenn, Humboldt, Lake, Lassen, Mendocino, Modoc, Napa, Plumas, Shasta, Siskiyou, Sonoma, Tehama, Trinity
7	**San Diego**	Imperial, San Diego
8	**Bay Area**	Alameda, Contra Costa, Marin, San Francisco, San Mateo
9	**Los Angeles**	Los Angeles
10	**Orange**	Orange

FIGURE 1: THE TEN REGIONAL REGISTRIES OF THE CALIFORNIA CANCER REGISTRY

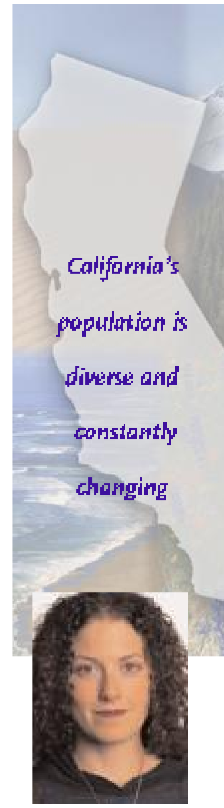


The CCR monitors changing cancer burden, changing cancer survival, and success in cancer prevention

The statewide, population-based, cancer surveillance system monitors the incidence (number of diagnoses) and mortality (number of deaths) of specific cancers over time and analyzes risks of cancer according to geographic region, age, race/ethnicity, sex and other characteristics of the population. The CCR uses the data to conduct research and collaborates with other researchers on investigations into the etiology (causes), treatment, risk factors and prevention of specific cancers. In addition, the system seeks to track the rates of patients who survive, according to the type of cancer, extent of disease, therapy, demographics and other prognostic factors. Information derived from the CCR forms the foundation for our knowledge of the nature and extent of cancer in California and serves as an authoritative and objective source for cancer policy and research into causes, prevention and treatment.

THE DIVERSE POPULATION OF CALIFORNIA

California has a population of approximately 34.5 million, about 12 percent of the total U.S. population, and is the most populous state. Because such a wide spectrum of racial and ethnic groups makes up its population, California is an ideal place to perform cancer sur-



veillance. Over the last two decades, California has experienced major growth in its non-white populations, particularly Latinos and Asians. California has the largest Asian/Pacific Islander population in the nation and a fast-growing Latino population. Though California's population does not represent the current U.S. population, in the future, the diversity seen in California will be seen across the U.S.

The population of California has changed dramatically from the 1990 Census to the 2000 Census. While non-Latino whites comprised more than 57 percent of California's population in 1990, they are no longer the majority in California. In 2000, Latinos, Asian/Pacific Islanders and blacks made up 51 percent of California's population.

In California, Latinos have rapidly increased from 25 percent of the population in 1990 to nearly one-third of the population in 2000, an average increase of 327,000 people each year over the decade. This increase was primarily due to births, which accounted for 70 percent of the gain over this period. The Latino population increased in all but three counties in California. Mono County had the fastest-growing Latino population because few Latinos lived in this rural area in 1990. Los Angeles, Orange, and San Bernardino counties had the largest numerical increase in the Latino population.

The Asian/Pacific Islander population as a whole also has increased, especially in the Chinese, South Asian, Filipino, and Vietnamese subgroups—while the Japanese population has slightly decreased. Whereas births accounted for the increase in the Latino population, the increase in the Asian/Pacific Islander population was primarily due to migration to California. The Asian/Pacific Islander population increased in all counties.

Rural counties such as Modoc, Placer, Alpine and Amador had the fastest-growing Asian/Pacific Islander populations, because few Asian/Pacific Islanders lived in these areas in 1990. Los Angeles County had the largest gain in sheer numbers of Asian/Pacific Islanders. In 2000, San Francisco County had the highest proportion of Asian/Pacific Islanders of any county.

The non-Latino white population decreased from 1990 to 2000 by nearly one million, primarily because more than a million non-Latino whites left the state. The non-Latino white population grew in 27 counties during the decade, with Placer and Riverside counties gaining the most, while the group's populations in Los Angeles, Santa Clara, and San Bernardino counties declined.

Blacks remain about 7 percent of California's population. San Benito, Nevada and Placer counties had the fastest-growing black populations during the 1990s. San Bernardino had the largest jump in the number of black residents. Alameda and Solano counties, meanwhile, had the highest proportion of blacks of any county. The black population decreased in 12 counties over the period.

HOW CANCER IS REGISTERED

About 140,000 new cancer cases and about 50,000 cancer deaths are reported to the CCR each year. Under California's reporting model—a passive cancer surveillance system—hospitals and other facilities where cancer is diagnosed or treated must identify and report cancer cases to the regional registry within six months after the patient's diagnosis or treatment. A network of 10 regional registries receives these data and checks for accuracy, performs analyses and conducts studies specific to the local area. The Cancer Surveillance Section collates these data, performs additional quality control and analyzes the data on a statewide basis.

USE OF CCR DATA FOR RESEARCH

The CCR data serve as a resource to generate hypotheses regarding specific cancer sites or histologic subtypes, monitor descriptive trends and patterns of cancer incidence, and identify demographic subgroups at high risk of cancer. A high priority is always placed on exploring demographic patterns and trends in cancer incidence among the racially and ethnically diverse population of California.

The CCR collaborates with other researchers on special cancer research projects concerning the etiology, treatment, risk factors for, and prevention of specific cancers. Data generated from the CCR are used to promote high-quality, population-based epidemiologic and clinical research, ultimately providing better information for cancer control. For more information on research performed using CCR data or how to access cancer data, visit our website at **www.ccrcal.org**.

THE IMPORTANCE OF INVESTIGATING TIME TRENDS

To keep an eye on cancer rates

Monitoring cancer rates provides clues about what causes cancer. When we observe a change in the rate of cancer that seems to follow a change in some environmental exposure, we consider the possibility of a link between the exposure and cancer. For example, increasing lung cancer rates followed the introduction and increasing popularity of cigarettes and smoking early last century.

To know whether cancer-control efforts are working

We also monitor cancer rates to provide a "report card" on how well cancer prevention programs work. We generally expect that a successful intervention program, such as the introduction of smoke-free dining and advertising campaigns aimed at preventing teenagers from starting to smoke, should be followed by a decline in rates of lung cancer and other smoking-related cancers. In fact, from the early 1990s onward, we have seen such a drop in these cancers in California.

To decide what resources are required to fight cancer

Because cancer is such an important health problem and results in heavy social costs, such as loss of productivity and reduced quality of life, it is important to have a clear idea of the changing burden of cancer on society. Government officials and policymakers use trends in cancer rates to determine funding for treatment and related social services, as well as to establish priorities for supporting effective research into the causes and prevention of cancer and the development of treatments.

To see the effect of changes in cancer screening and detection methods

Many things can cause a change in cancer rates, including changes in the distribution of the factors that cause the disease, changes in our ability to prevent or detect cancer early, changes in the population mix, changes in diagnostic criteria to define a type of cancer, and even simple random variation. Prostate cancer rates, for example, increased rapidly after the introduction of the prostate-specific antigen test, which provided better diagnostic ability than previous tests. This was not because prostate cancer truly became more common, but rather because physicians found prostate cancer cases that previously would have gone undiagnosed.

To make cancer a disease of the past

Keeping an eye on cancer rates provides clues about the cause of cancer, how successful we are at preventing cancer, and where we should focus our efforts in the future to make cancer a disease of the past.

PROTECTION OF CONFIDENTIALITY

All data collected by the CCR reporting system are subject to the confidentiality provisions of the Health and Safety Code and the Government Code. Confidentiality procedures at the CCR are rigidly formulated and maintained. All employees of the CCR and the regional registries sign a confidentiality pledge after being advised of the necessity for maintaining strict confidentiality of patient information and instructed in routines to assure this. Confidentiality of computerized data is assured by highly restricted access. All reports and summaries produced for distribution, such as those presented here, are presented in aggregated form without any personal identifiers.

Confidential information can only be released for research purposes to qualified investigators whose study protocols have been approved by a designated committee for the protection of human subjects, and who comply with additional conditions specified by the CCR. Individuals with cancer usually find it rewarding to participate in these studies, which offer an opportunity to personally engage in the fight against cancer. Researchers are strictly prohibited from pressuring patients into participating, and cancer patients may decline participation at any time, for any reason. Furthermore, cancer patients may request that their contact information be withheld from researchers. In its pursuit to improve the health of Californians, the CCR maintains that the protection of individual privacy is its highest priority.

MATERIALS AND METHODS

We present cancer incidence and mortality rates separately for race/ethnicity groups defined as follows: Latinos of any race, non-Latino whites, non-Latino blacks (African Americans), Chinese, Japanese, Filipinos, Koreans, South Asians (Asian Indian, Bangladeshi, Pakistani, and Sri Lankan), and Vietnamese. We describe how race/ethnicity is defined and obtained for cancer patients and the California population in Appendix A.

INCIDENCE DATA

Cancer incidence data contained in this report are based on new cases of cancer that were first diagnosed among California residents from January 1, 1988 to December 31, 2001 and were reported to the CCR as of November 2003. Cancers are distinguished by whether they are invasive (which means cancer has spread beyond the layer of cells where it first developed and is growing into surrounding healthy tissue) or *in situ* (an early cancer that has not invaded surrounding cells or tissue). In this report, we only consider invasive cancers, with two exceptions. First, because of the difficulty in interpreting the language used by pathologists to describe the extent of invasion in bladder cancer, *in situ* bladder cancers are combined with invasive bladder cancers, and both are included in the data for all invasive cancers combined. Second, for melanomas of the skin and cancers of the breast and of the colon and rectum combined, we included only invasive cancers in the overall trend presentation, but we provide separate, site-specific trend graphs showing *in situ* cancers for those sites.

A total of 1,933,540 cancers were diagnosed among California residents during the reporting period. Of these cancers, 1,739,795 (90.0 percent) cases were invasive malignancies, 193,237 (10.0 percent) cases were *in situ* malignancies, and 508 (0.03 percent) cases were of uncertain or unknown behavior. We excluded 3,181 (0.2 percent) malignancies for which the patient's age was unknown or sex was reported as neither male nor female. We also excluded 41,785 (2.2 percent) cases with unknown race/ethnicity from our analyses. Exclusion of these patients from the racial/ethnic group to which they belong means race/ethnicity-specific rates are slightly underestimated. Cases of unknown, ill-defined or rare sites—a total of 136,469 malignancies—were included in the overall counts and rates for all sites combined, but they do not appear in any of the site-specific analyses. The exclusion of cancers classified as unknown or ill-defined results in a slight underestimation of the true site-specific rates of cancer.

MORTALITY DATA

The CCR obtained computerized files containing information on cancer-related deaths from the California Department of Health Services' Center for Health Statistics. Death certificate master files were used for all years. Cause of death was coded by the International Classification of Diseases, Ninth Edition (ICD-9) for deaths occurring from 1988 through 1998 (International Classification of Diseases, Ninth Revision. Geneva: World Health Organization, 1977). Beginning in 1999 and thereafter, cause of death was coded by the International Classification of Diseases, Tenth Edition (ICD-10) (International Statistical Classification of Diseases and Related Health Problems, Tenth Revision. Geneva: World Health Organization, 1992). 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. As with incidence data, deaths at unknown age were excluded from these analyses. They represent less than 0.01 percent of cancer deaths reported for this time period. Deaths of unknown or ill-defined site, meanwhile, accounted for about 6.5 percent of cancer-related deaths. Exclusion of these unknown—or ill-defined-site cancers means that mortality rates will be underestimated for the cancer sites to which the cancers actually belonged.

Cancer deaths were grouped according to conventions of the SEER program for mortality data. It is impossible to use ICD-9 codes to reliably identify deaths due to Kaposi sarcoma or mesothelioma.

CAUTIONS IN INTERPRETATION

Cancer incidence data in this report are based on cases of primary cancer that were reported to the CCR by November 2003. At least 95 percent of all cases for 2001 are estimated to have been reported by that date. We expect that a few more cases for 2001 and earlier will continue to be reported in the coming years. This may have a minor effect on the final incidence rates for this period.

The reliability of race/ethnicity-specific rates depends on the accuracy of race/ethnicity classification of the cancer patients as well as of the California population. Some small part of the variations in race/ethnicity-specific rates may reflect misclassification, rather than a true difference in cancer risk. The state population estimates are based on self-identification at the time of the U.S. Census in 1990 and 2000. Race/ethnicity information for cancer cases is based primarily on information contained in the patients' medical records. The information may be based on self-identification of the patient, on assumptions made by an admission clerk or other medical personnel, or on an inference made using race/ethnicity of parents, birthplace, maiden name or last name. The reporting of race/ethnicity in any system may be influenced by the racial/ethnic distribution of the local population, local interpretation of data collection guidelines, and other factors. The use of surname lists partially compensates for misclassification of some racial/ethnic groups (see Appendix A for details).

Finally, special caution should be used when interpreting the meaning of rates that are based on only a few cases. Rates based on small numbers are statistically unstable. For this reason, we have adopted the convention of only graphing points that are based on at least 20 cases. In the tables of cases counts provided in Appendix B, we have not provided any count of fewer than 20 cases, denoting these with an asterisk. This is to avoid the possibility of identifying an individual, raising issues of privacy.

DISTRIBUTION OF ALL CANCERS COMBINED BY RACE/ETHNICITY

When considering the overall rate of cancer incidence or mortality by race/ethnicity, it is important to remember that cancers occurring at different sites are, in fact, very different diseases. Therefore, comparing the overall rate of all cancers in one racial/ethnic group to the overall rate in another group provides little practical information about the causes of cancer incidence and mortality. We provide the comparison of average annual age-adjusted rates for all cancer sites combined simply to demonstrate the importance of cancer incidence and mortality as a whole in each racial/ethnic group compared to others, and to provide overall counts of cancer incident cases and deaths for each racial/ethnic group.

NUMBER OF CANCER CASES OCCURRING BETWEEN 1988 AND 2001 FOR EACH RACIAL/ETHNIC GROUP

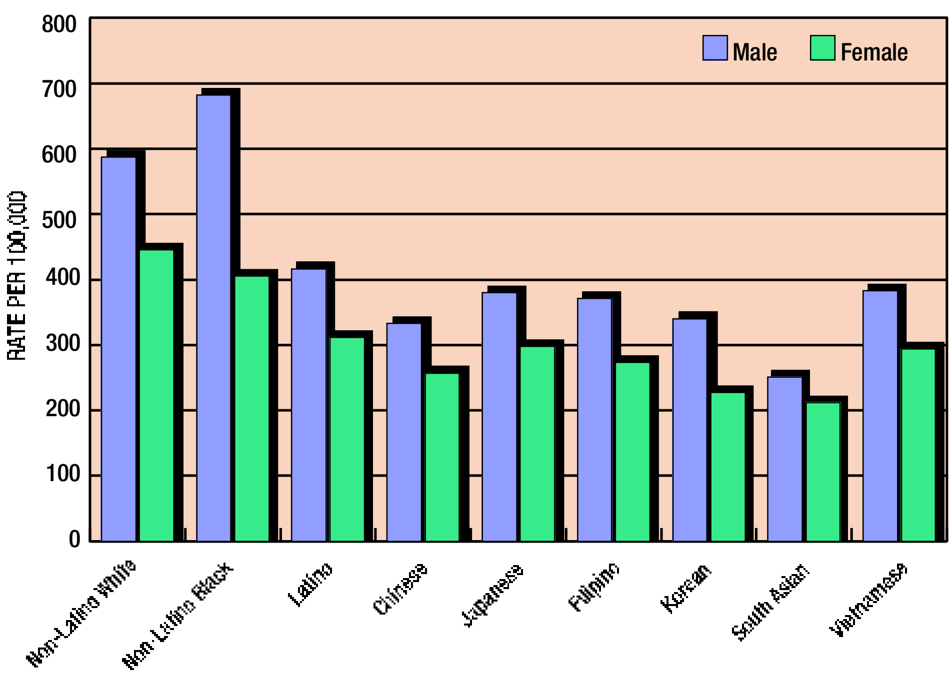
	Males	Females
Race/ethnicity	Number	Number
Non-Latino White	677,563	638,201
Non-Latino Black	60,862	49,368
Latino	98,601	102,820
Chinese	15,102	14,327
Japanese	7,946	8,882
Filipino	14,503	15,038
Korean	3,882	4,114
South Asian	2,118	2,149
Vietnamese	4,652	4,538

CANCER INCIDENCE

Black men had the highest overall rates of cancer incidence between 1988 and 2001, almost twice the rates of cancer incidence among Latinos and each of the Asian groups. Non-Latino white men also had very high rates of cancer incidence, compared to Latino men and the Asian groups. Among the Asian groups, Filipino, Japanese and Vietnamese men had the highest overall rates of cancer incidence.

In contrast, among women, non-Latino whites had the highest rates of all cancers combined. Incidence rates among black women were second-highest. Rates among Latinas were comparable to those of most Asian female sub-groups. Korean and South Asian women had the lowest overall rates of cancer incidence.

AVERAGE ANNUAL AGE-ADJUSTED INCIDENCE RATES PER 100,000 PERSONS, OF ALL CANCERS COMBINED 1988-2001, FOR EACH MAJOR RACIAL/ETHNIC GROUP



CANCER MORTALITY

Non-Latino blacks also had the highest rates of cancer mortality among men, with non-Latino white men having mortality rates somewhere between non-Latino blacks and the Asian subgroups. Latino men had very similar cancer mortality rates to most Asian subgroups. Among Asian subgroups, Koreans had the highest cancer mortality rates, and South Asians had very low cancer mortality rates.

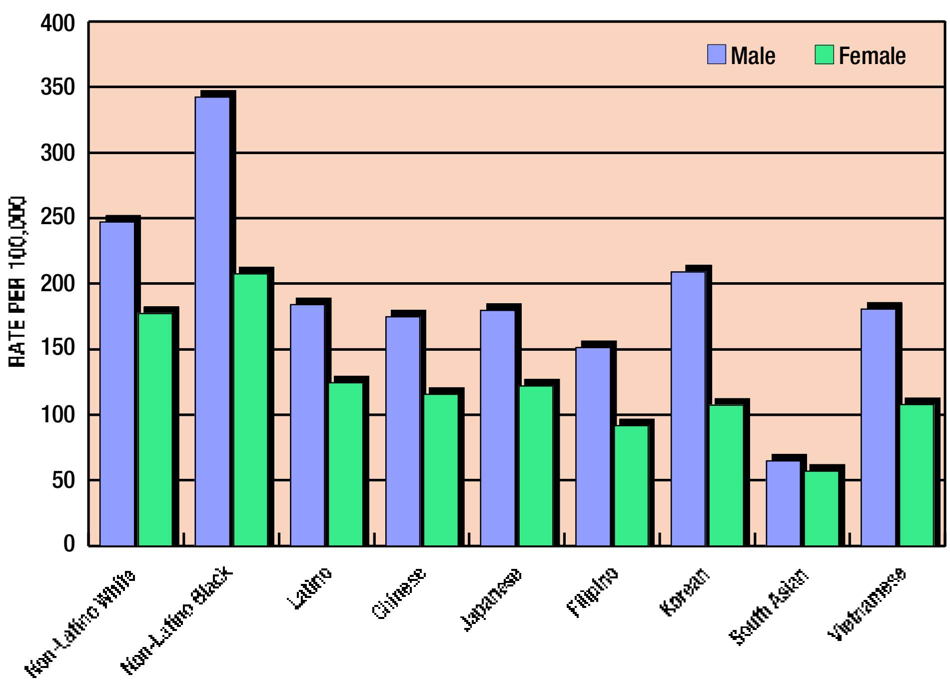
Among women, non-Latino blacks had the highest cancer mortality rates of any racial/ethnic group, followed closely by non-Latino white women. Latinas had very similar cancer mortality rates to the Asian subgroups, but among those Asian subgroups there was some variation: South Asian women had only half the cancer mortality rates of Japanese women.

NUMBER OF CANCER DEATHS OCCURRING BETWEEN 1988 AND 2001 FOR EACH RACIAL/ETHNIC GROUP

	Males	Females
Race/ethnicity	Number	Number
Non-Latino White	274,391	266,155
Non-Latino Black	28,008	24,449
Latino	37,764	35,784
Chinese	7,574	6,052
Japanese	3,552	3,648
Filipino	5,686	4,567
Korean	2,181	1,749
South Asian	495	478
Vietnamese	2,026	1,426

Blacks had the highest rates of cancer incidence among males but not females

AVERAGE ANNUAL AGE-ADJUSTED MORTALITY RATES PER 100,000 PERSONS, OF ALL CANCERS COMBINED 1988-2001, FOR EACH MAJOR RACIAL/ETHNIC GROUP

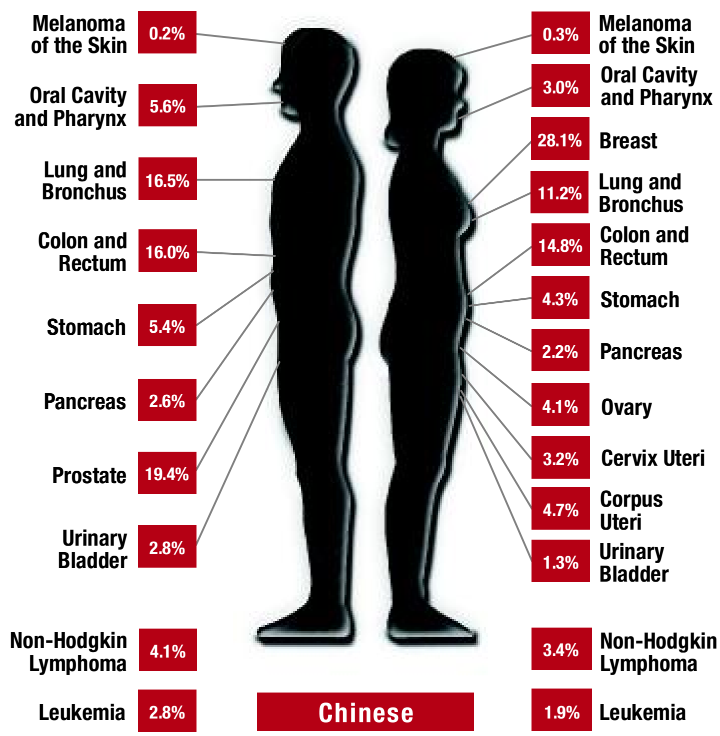


DISTRIBUTION OF CANCERS BY ANATOMIC SITE, SEX AND RACE/ETHNICITY

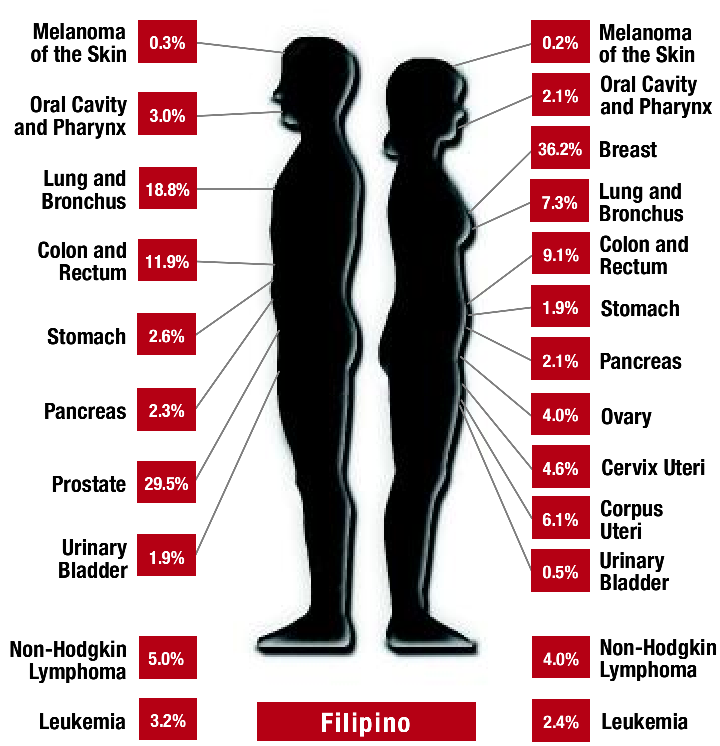
In this section we provide an overview of the distribution of cancer cases and deaths between 1988 and 2001 in California according to the location in the body where they occur (also called the anatomic site). In the following pages we present cancer incidence and mortality figures, by sex, for Chinese, Filipinos, Japanese, Koreans, Latinos, non-Latino blacks, non-Latino whites, South Asians and Vietnamese.

The figures present the most common anatomic sites for cancer in each racial/ethnic group. Each anatomic site is listed alongside its share, or percentage, of the overall total of cancers occurring in the group. The percentages do not add up to 100 percent because only the top anatomic sites are included.

DISTRIBUTION OF CANCER CASES BY ANATOMIC SITE IN CALIFORNIA, 1988-2001



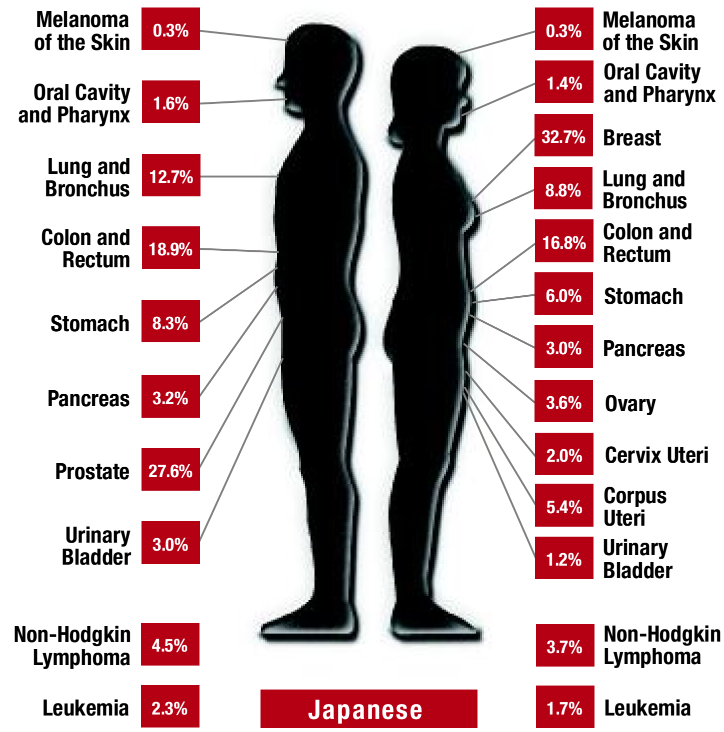
DISTRIBUTION OF CANCER CASES BY ANATOMIC SITE IN CALIFORNIA, 1988-2001



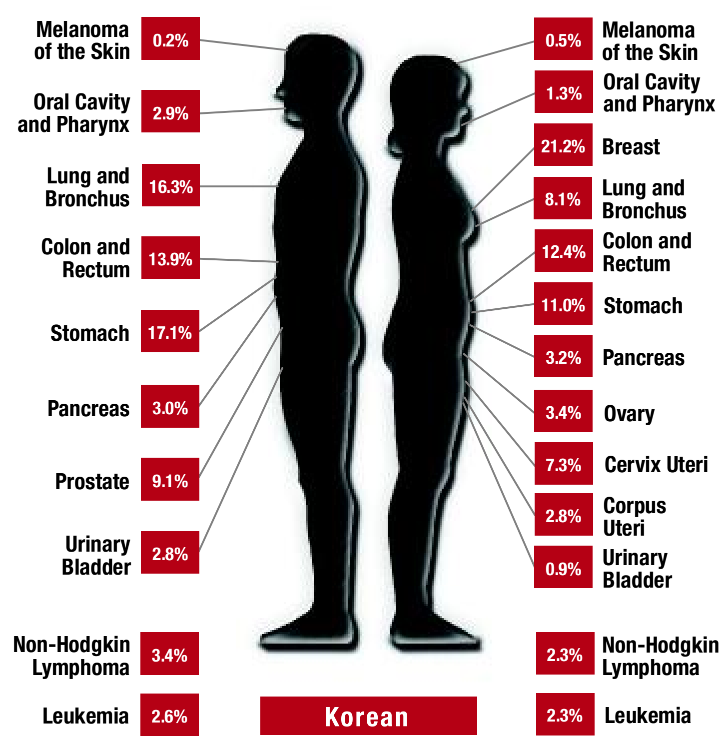
THE MOST COMMON SITES OF CANCER INCIDENCE AMONG MEN

Prostate cancer was the most commonly diagnosed male cancer among all ethnic groups (comprising 25 percent to 30 percent of cases) except among Koreans and Vietnamese (in whom prostate cancer accounted for only about 10 percent of cancers). Among Korean men, stomach cancer was the most common cancer, accounting for 17 percent of all cancer cases, in stark contrast to all other racial/ethnic groups, where stomach cancer was comparatively rare. Among Vietnamese men, however, lung cancer was the most common cancer, because prostate cancer was not as common as in other racial/ethnic groups. Lung cancer was the second most commonly diagnosed cancer among non-Latino whites and blacks, as well as among Filipinos. However, among Japanese and South Asian men, cases of cancer in the colon and rectum were second most common. Among Latino men, lung cancers and colon and rectum cancers each accounted for about 10% of cancer cases, and in all other racial/ethnic

DISTRIBUTION OF CANCER CASES BY ANATOMIC SITE IN CALIFORNIA, 1988-2001



DISTRIBUTION OF CANCER CASES BY ANATOMIC SITE IN CALIFORNIA, 1988-2001

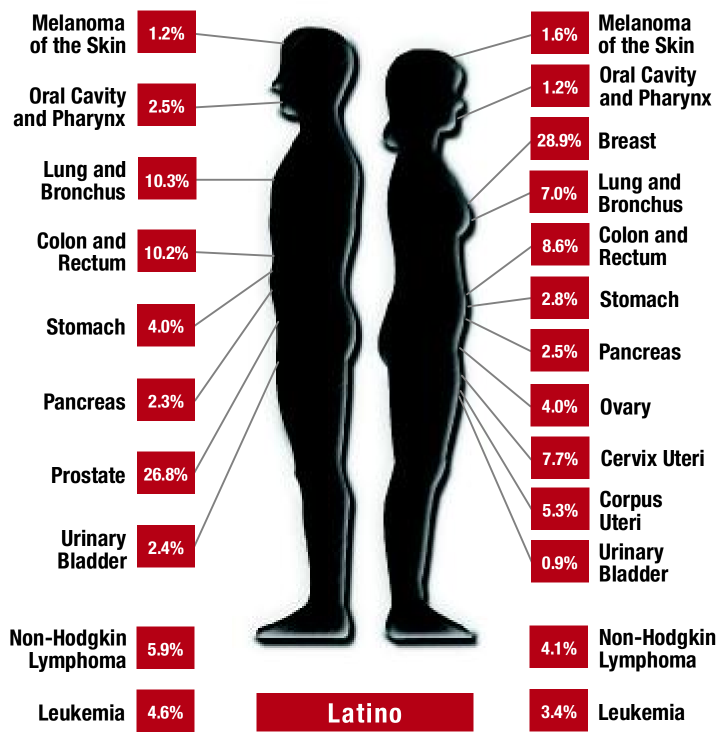


groups, colon-and-rectum cancers accounted for at least 10 percent of all cancer cases. Almost 5 percent of cancers among non-Latino whites were melanomas, but among only one other group, Latinos, did melanomas account for more than 1 percent of cancer cases. Non-Hodgkin lymphoma accounted for around 5 percent of cancer cases in men of all racial/ethnic groups.

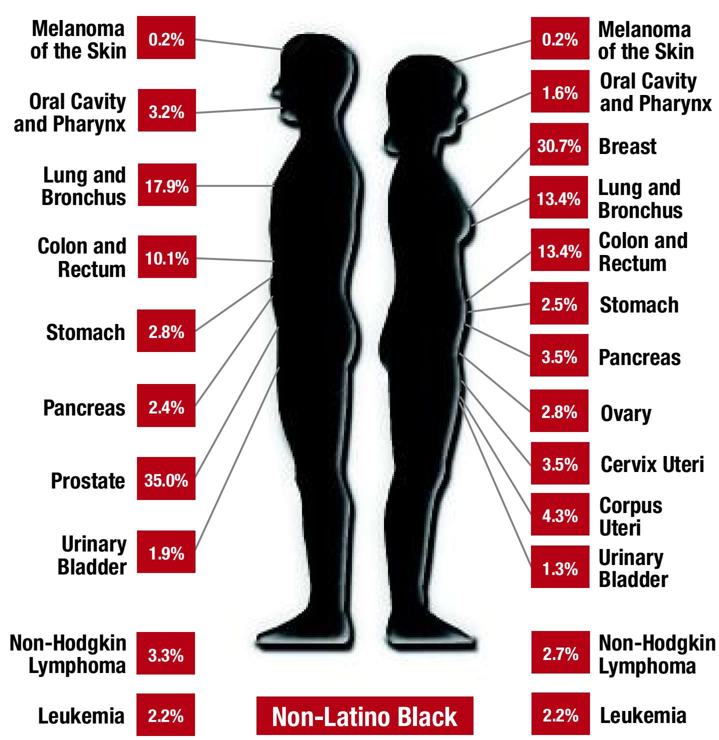
THE MOST COMMON SITES OF CANCER INCIDENCE AMONG WOMEN

Breast cancer accounted for about 30 percent of all cancer cases among women of all racial/ethnic groups except Koreans and Vietnamese, in whom breast cancer comprised only about 20 percent of all cancers. For non-Latino white and non-Latino black women, lung and colon-and-rectum cancers each represented 11 percent to 13 percent of cancer cases. Among women of other racial/ethnic groups, colon-and-rectum cancers were more common than lung cancer cases. This is in contrast to men of most racial/ethnic groups (apart from Japanese) among

DISTRIBUTION OF CANCER CASES BY ANATOMIC SITE IN CALIFORNIA, 1988-2001

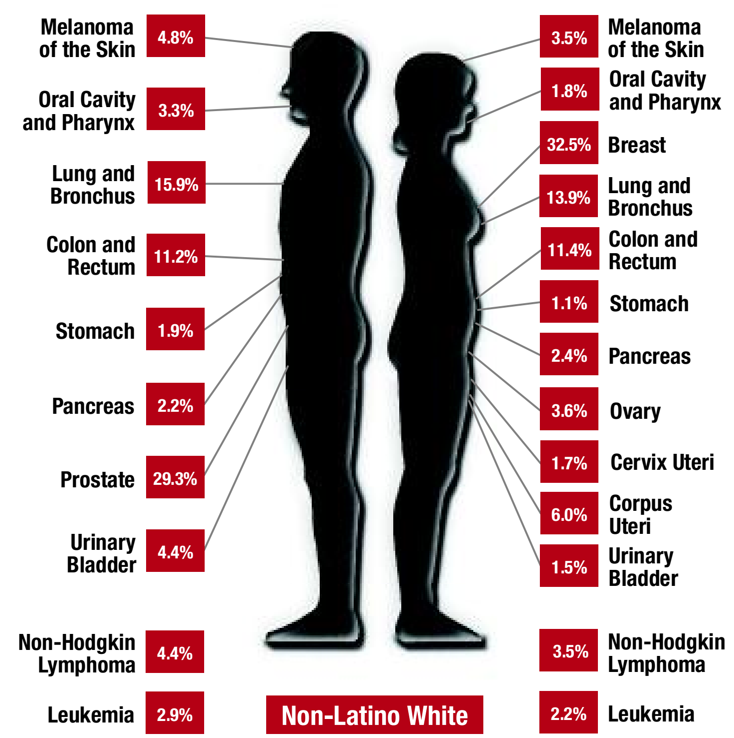


DISTRIBUTION OF CANCER CASES BY ANATOMIC SITE IN CALIFORNIA, 1988-2001

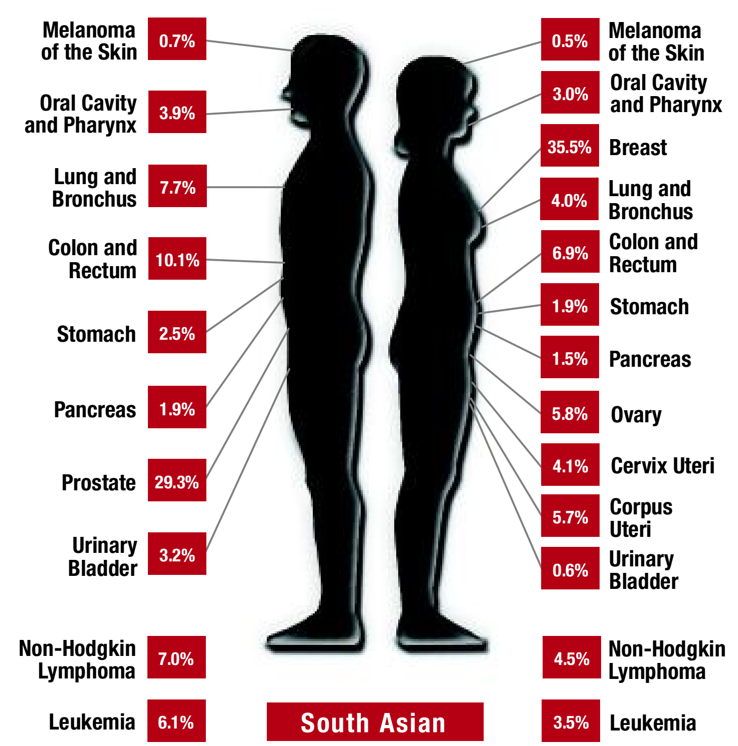


whom lung cancer was more common than colon-and-rectum cancer. Cervical cancer accounted for almost 10 percent of all cancer cases among Vietnamese women, but less than 5 percent of all cancer cases among Chinese, Japanese, Filipino, South Asian, non-Latino white and non-Latino black women. Stomach cancer accounted for 5 percent or more of cancer cases among Japanese, Korean and Vietnamese women, but it was much less common among women of all other racial/ethnic groups. Endometrial cancer (cancer of the corpus uteri) accounted for about 5 percent of all cancer cases among women of each racial/ethnic group, except in Korean and Vietnamese women, among whom it was less common.

DISTRIBUTION OF CANCER CASES BY ANATOMIC SITE IN CALIFORNIA, 1988-2001



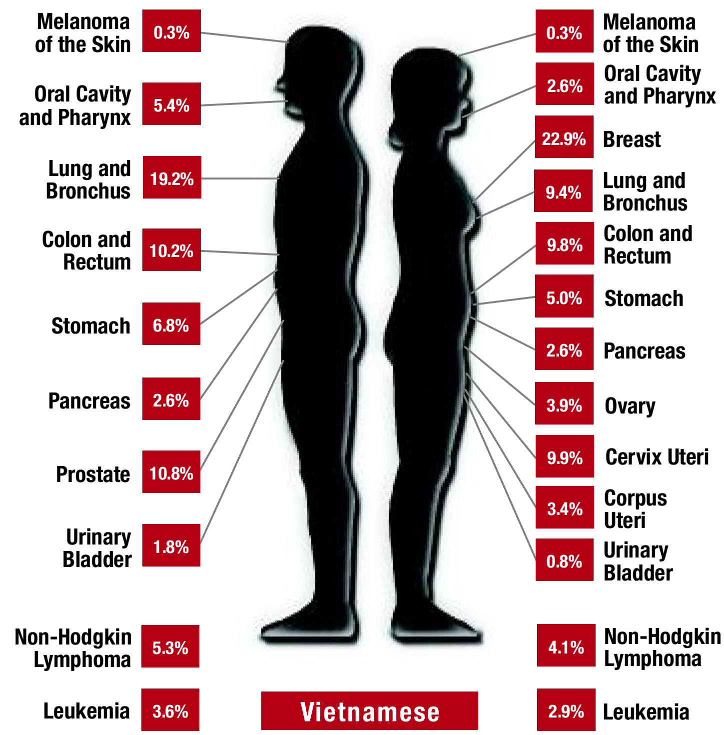
DISTRIBUTION OF CANCER CASES BY ANATOMIC SITE IN CALIFORNIA, 1988-2001



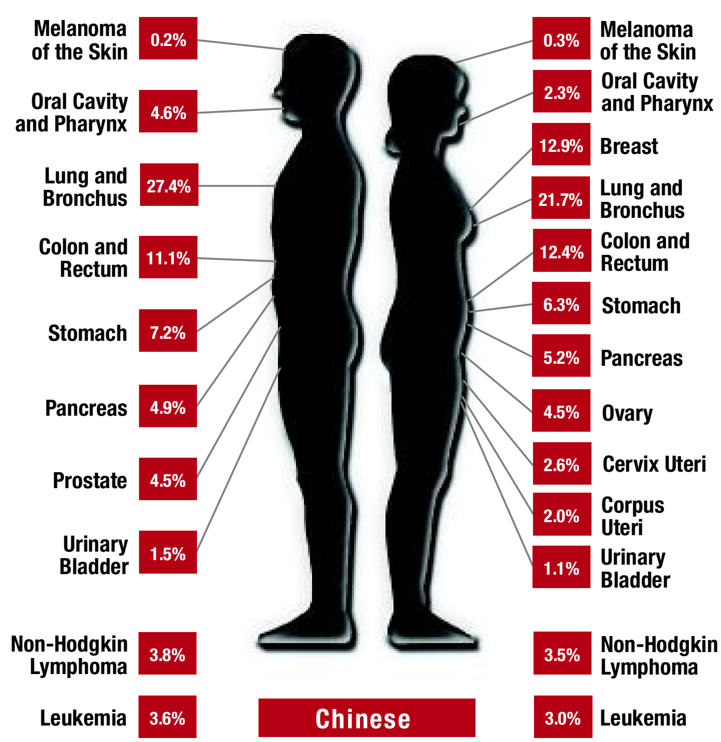
THE MOST COMMON SITES OF CANCER MORTALITY AMONG MEN

While prostate cancer was the most commonly diagnosed cancer among men of most racial/ethnic groups, cancer of the lung was the most common cause of cancer deaths among men in all racial/ethnic groups, reflecting the fact that lung cancers are fatal more often than prostate cancers. Colon-and-rectum cancers accounted for about 10 percent of all cancer deaths among men of most racial/ethnic groups; however, among Korean, South Asian and Vietnamese men, colon-and-rectum cancer deaths were less common (as little as about 6 percent of cancer deaths), while among Japanese men, colon-and-rectum cancers accounted for 15 percent of all cancer deaths. In racial/ethnic groups where stomach cancer was more commonly diagnosed, it also tended to be a more common cause of cancer death, reflecting the poor prognosis for that disease regardless of race/ethnicity.

DISTRIBUTION OF CANCER CASES BY ANATOMIC SITE IN CALIFORNIA, 1988-2001



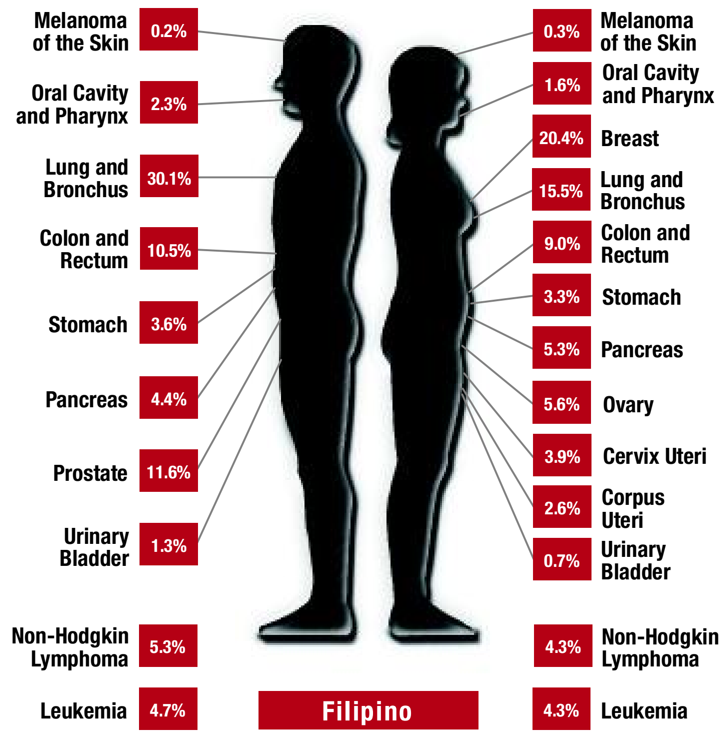
DISTRIBUTION OF CANCER DEATHS BY ANATOMIC SITE IN CALIFORNIA, 1988-2001



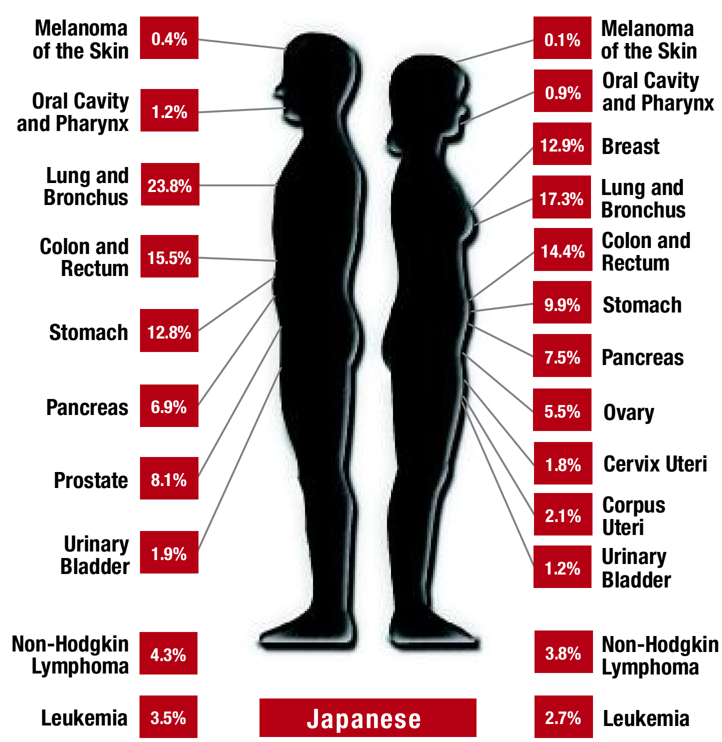
THE MOST COMMON SITES OF CANCER MORTALITY AMONG WOMEN

In Chinese, Japanese, Korean, Vietnamese, non-Latino white and non-Latino black women, deaths from lung cancer were more common than deaths from breast cancer, despite the fact that breast cancer occurred more often than lung cancer in these racial/ethnic groups. Among Filipinas and South Asian women, deaths from breast cancer remained more common than deaths from lung cancers, presumably because the diagnoses of breast cancer so far outpaced those of lung cancer in women from these two race/ethnic groups. Stomach cancer deaths were as common as lung cancer deaths among Korean women. Among Japanese women, stomach cancer deaths were almost as common as breast cancer deaths.

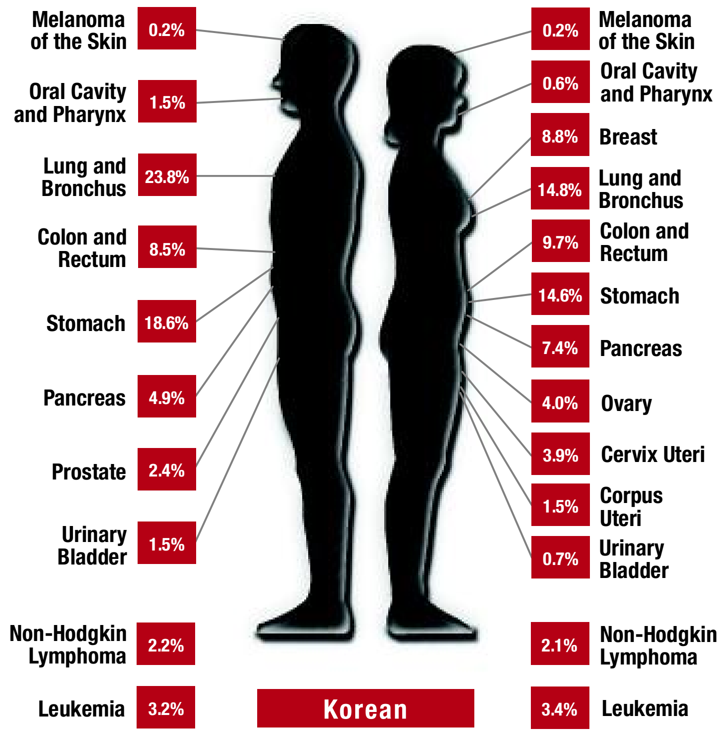
DISTRIBUTION OF CANCER DEATHS BY ANATOMIC SITE IN CALIFORNIA, 1988-2001



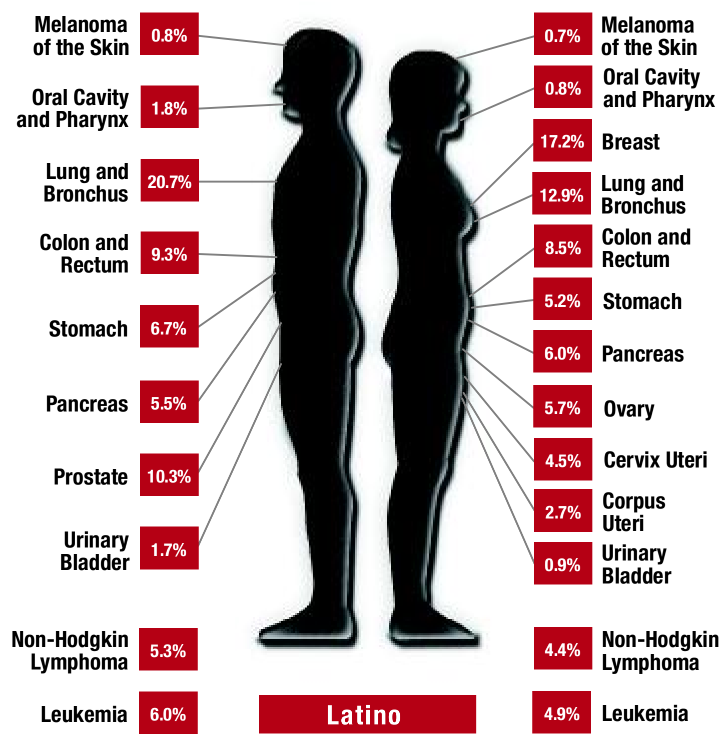
DISTRIBUTION OF CANCER DEATHS BY ANATOMIC SITE IN CALIFORNIA, 1988-2001



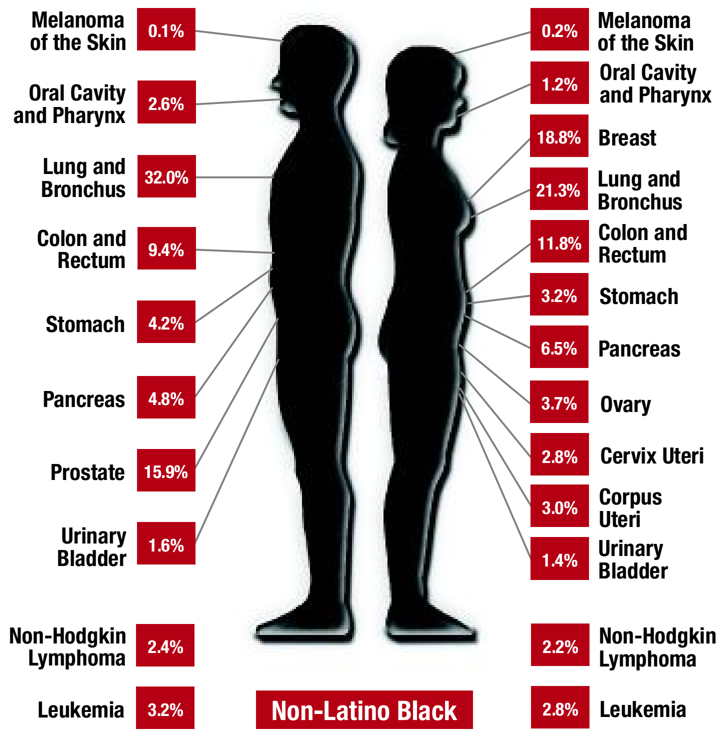
DISTRIBUTION OF CANCER DEATHS BY ANATOMIC SITE IN CALIFORNIA, 1988-2001



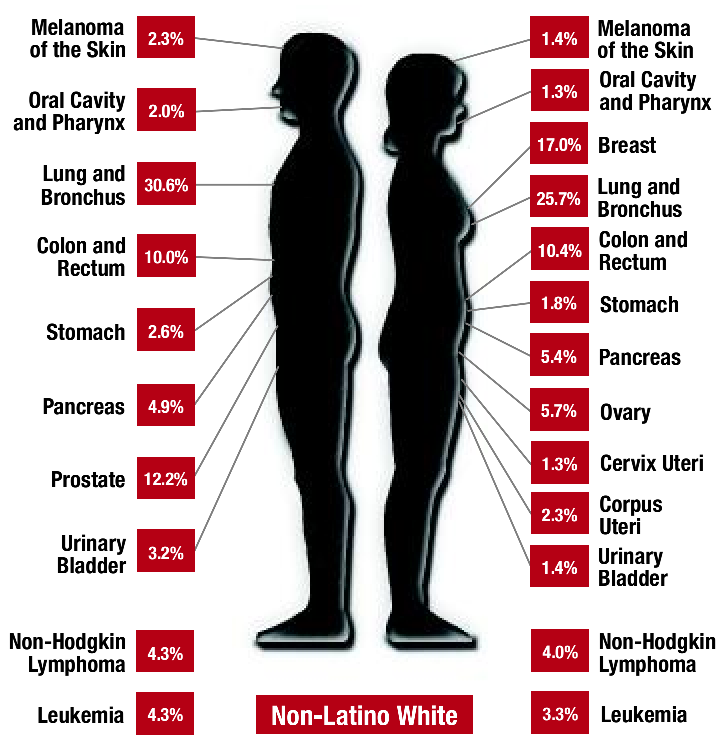
DISTRIBUTION OF CANCER DEATHS BY ANATOMIC SITE IN CALIFORNIA, 1988-2001



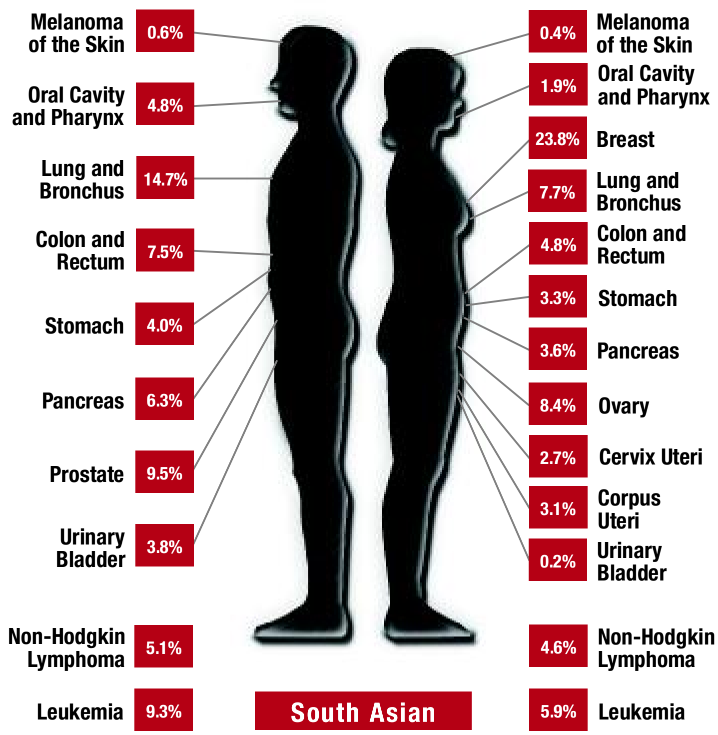
DISTRIBUTION OF CANCER DEATHS BY ANATOMIC SITE IN CALIFORNIA, 1988-2001



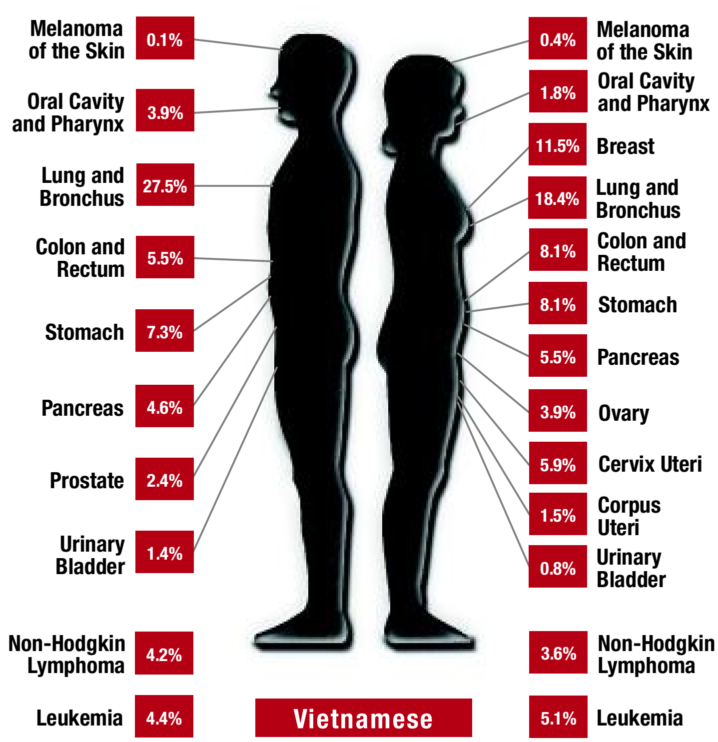
DISTRIBUTION OF CANCER DEATHS BY ANATOMIC SITE IN CALIFORNIA, 1988-2001



DISTRIBUTION OF CANCER DEATHS BY ANATOMIC SITE IN CALIFORNIA, 1988-2001



DISTRIBUTION OF CANCER DEATHS BY ANATOMIC SITE IN CALIFORNIA, 1988-2001



TRENDS IN THE MOST COMMON CANCERS BY SEX AND RACE/ETHNICITY

In this section we present trends for the most common anatomic sites for cancer cases and cancer deaths from 1988 to 2001.

Previously, we looked at the proportion of cases allotted to each anatomic site over the entire 14-year period. But to more accurately compare racial/ethnic groups to each other, we need to look at age-adjusted incidence and mortality rates—because differences in age distributions among the various groups can obscure how different cancers truly impact the groups. There have been significant changes in the racial/ethnic composition of the California population since 1988, and because of differences in birth rates over time, some populations are on average older than others. This makes it even more important to adjust rates for age. All rates are calculated using the same standard population (the U.S. 2000 standard population), so that we can account for the changing age structures of each racial/ethnic group's population over time. Details on the calculation of age-adjusted rates and more information on the importance of comparing age-adjusted rates can be found in Appendix A.

Here we present only the top five sites of cancer incidence and mortality for each racial/ethnic group. The "top five" position is based on the rate in the last time period (1999-2001), so not all cancers shown were always "top five" cancers. For example, melanoma in non-Latino whites has only in the past five years become one of the top five most common incident cancers; in 1988, it ranked sixth among incident cancers for non-Latino white men, and eighth among incident cancers for non-Latino white women.

The notable trends in each of the cancer sites presented in these graphs are outlined in more detail in later sections. Here we are simply contrasting the differences in the incidence and mortality trends in the most common cancers across the racial/ethnic groups, to highlight which cancers are most common for each of the different racial/ethnic groups and how those most common cancers have changed over time.

TRENDS IN THE FIVE MOST COMMON SITES OF CANCER INCIDENCE AMONG MEN

Prostate cancer incidence rates behaved very similarly between 1988 and 2001 among Japanese, Latino, non-Latino white, non-Latino black and Vietnamese men: following a peak in incidence around 1990-1992, incidence rates declined again. Similarly, among Filipino men, prostate cancer incidence rates increased rapidly and then declined again, but in this group the peak occurred later, around 1993-1995. In contrast, prostate cancer incidence among Chinese men increased from 1988 to 2001 without subsequently declining. Different still were the trends in prostate cancer incidence among South Asian and Korean men, whose incidence rates seemed to decline between 1988 and 2001 without having first reached a peak.

Incidence rates of lung cancers appeared to decline steadily between 1988 and 2001 for men of all racial/ethnic groups, although for Filipino men the decline was only from 1990-1992 onwards, and was very small, and among Korean men, the lung cancer rate was volatile. Rates of colon-and-rectum cancers declined steadily among non-Latino black, non-Latino white but remained largely unchanged between 1988 and 2001 for men in other race/ethnic groups men (apparent declines among other groups were based on small numbers of cases). In stark contrast, colon-and-rectum cancer incidence rates increased rapidly between 1988 and 2001 among Korean men. Despite the differences in stomach cancer incidence rates among various racial/ethnic groups, all groups for whom stomach cancer was one of the five most common cancers experienced steadily declining stomach cancer rates between 1988 and 2001.

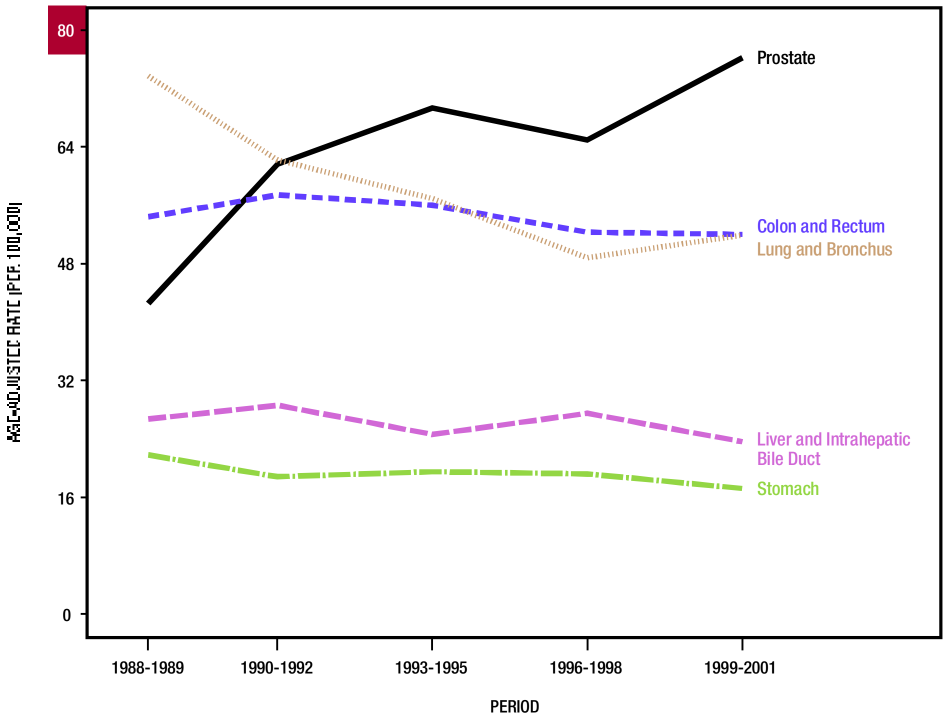
Melanoma was one of the five most common cancers only for non-Latino white men: incidence rates of melanoma increased steadily between 1988 and 2001 for this group. Liver cancer, meanwhile, was common only among Chinese, Korean and Vietnamese men; incidence of the cancer declined between 1988 and 2001 for Chinese and Korean men, but remained fairly stable for Vietnamese men.

TRENDS IN THE FIVE MOST COMMON SITES OF CANCER INCIDENCE AMONG WOMEN

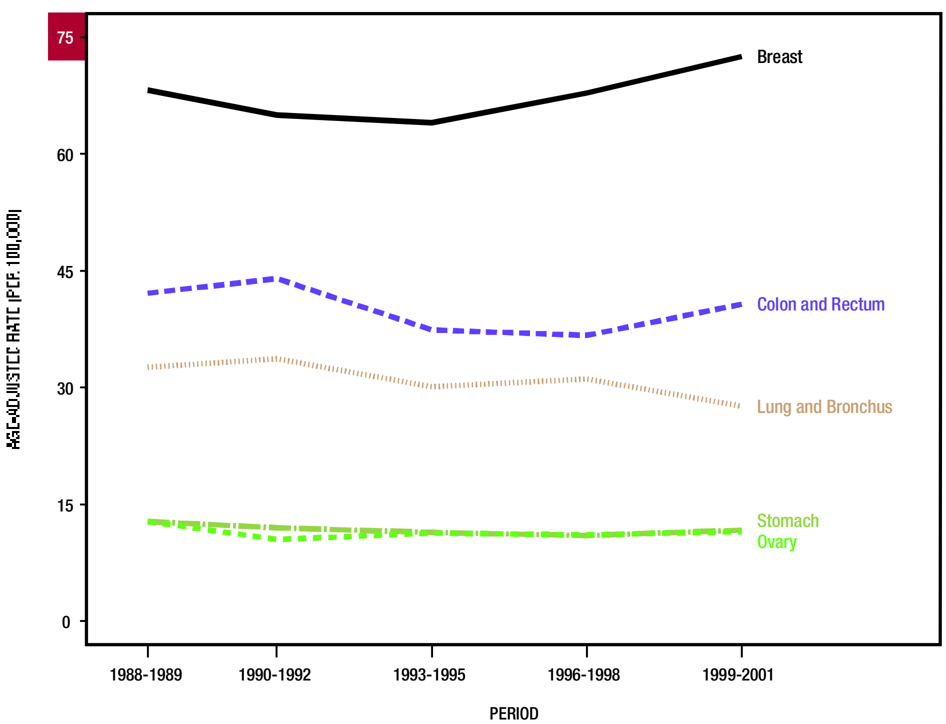
Despite the disparate rates of breast cancer among racial/ethnic groups, breast cancer incidence rates appeared to increase steadily among women of almost all racial/ethnic groups between 1988 and 2001. Incidence rates of lung cancers declined steadily between 1988 and 2001 for Chinese, non-Latino black, non-Latino white and Vietnamese women, but remained steady over that time period for Filipino, Japanese, Latino and South Asian women. Lung cancer incidence rates seemed to increase among Korean women between 1990 and 2001.

For Latinas and Vietnamese women, the cervix was one of the five most common sites for cancer. Incidence rates of cervical cancer declined between 1988 and 2001 for Vietnamese women, but remained stable for Latinas. Endometrial cancer (cancer of the corpus uterus) was among the five most common cancers for all but Chinese, Korean and Vietnamese women, and in all instances, incidence rates of endometrial cancer did not change much between 1988 and 2001. In contrast to other women, Vietnamese and Korean women experienced high incidence rates of liver cancers; while liver cancer incidence rates appeared unchanged over time for Korean women, they probably increased substantially for Vietnamese women.

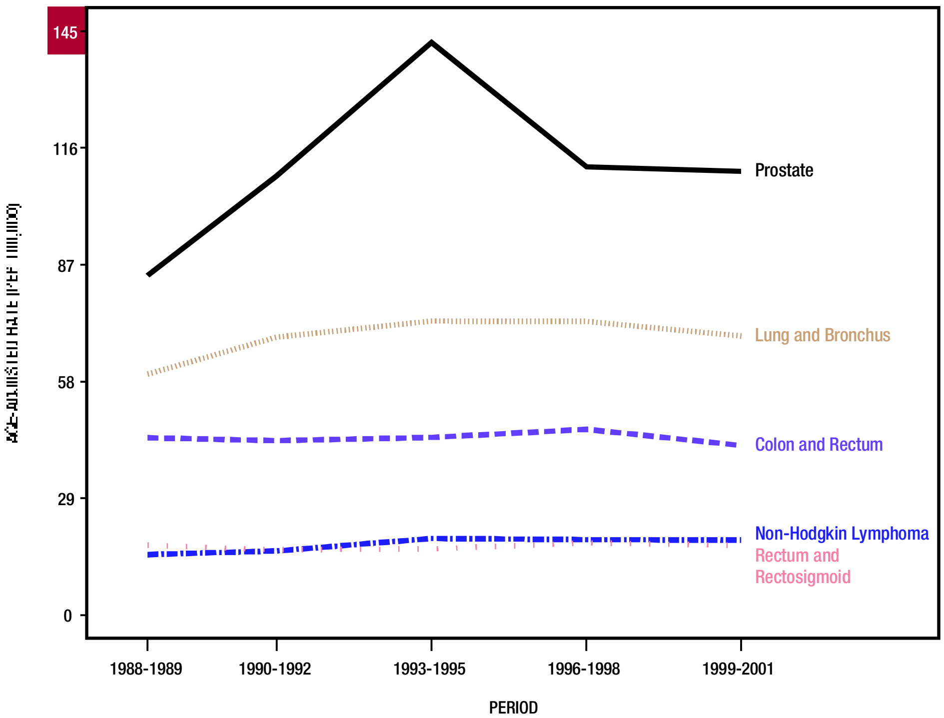
TRENDS IN THE TOP 5 AGE-ADJUSTED CANCER INCIDENCE RATES IN CALIFORNIA (1988-2001): CHINESE MALE



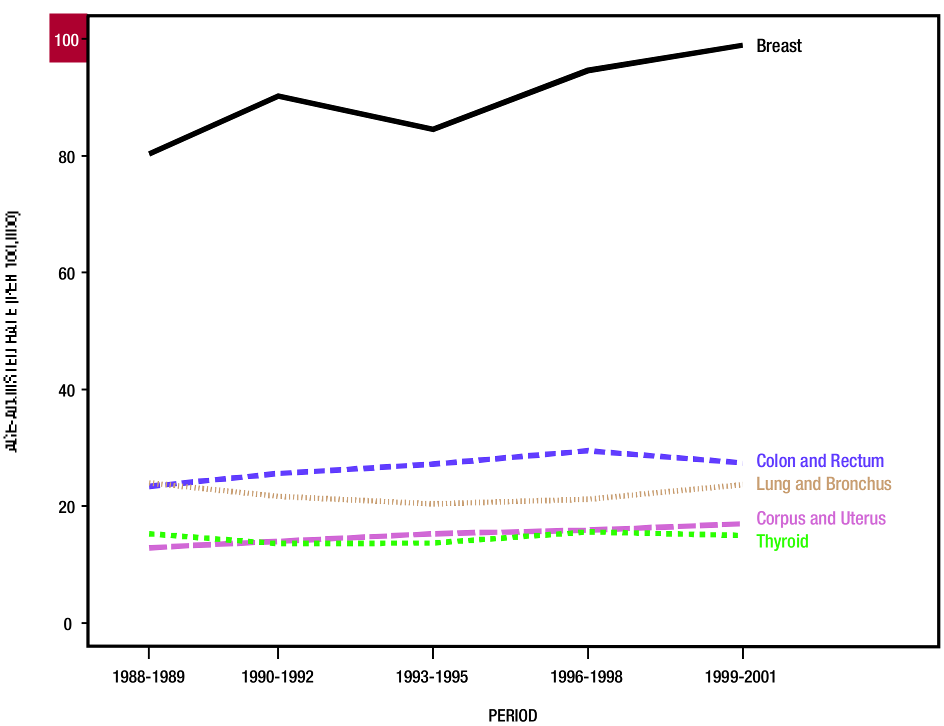
TRENDS IN THE TOP 5 AGE-ADJUSTED CANCER INCIDENCE RATES IN CALIFORNIA (1988-2001): CHINESE FEMALE



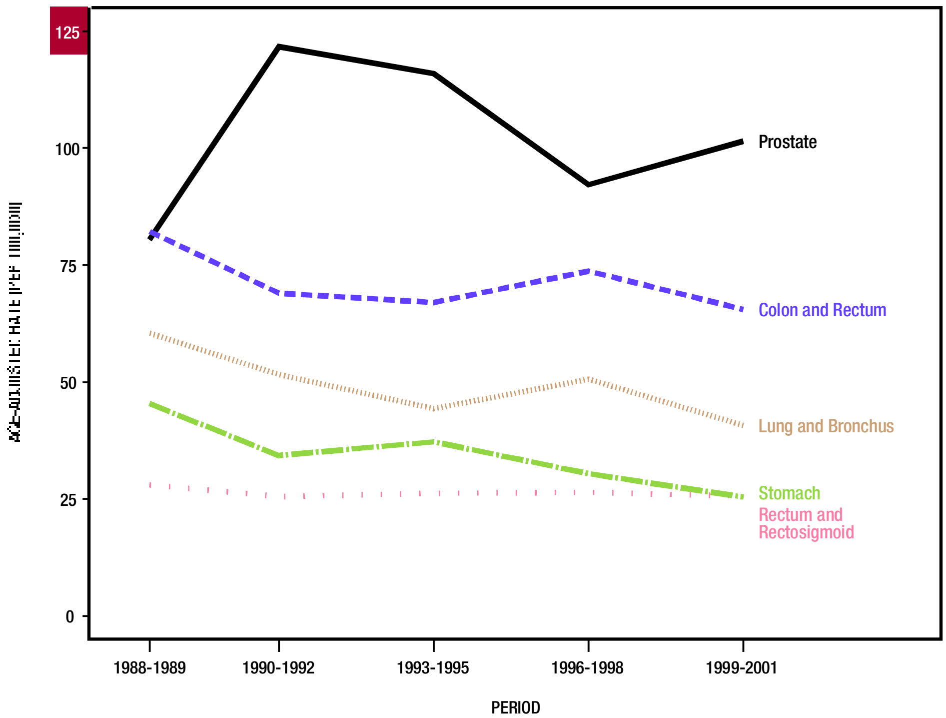
**TRENDS IN THE TOP 5 AGE-ADJUSTED CANCER INCIDENCE RATES IN CALIFORNIA (1988-2001):
FILIPINO MALE**



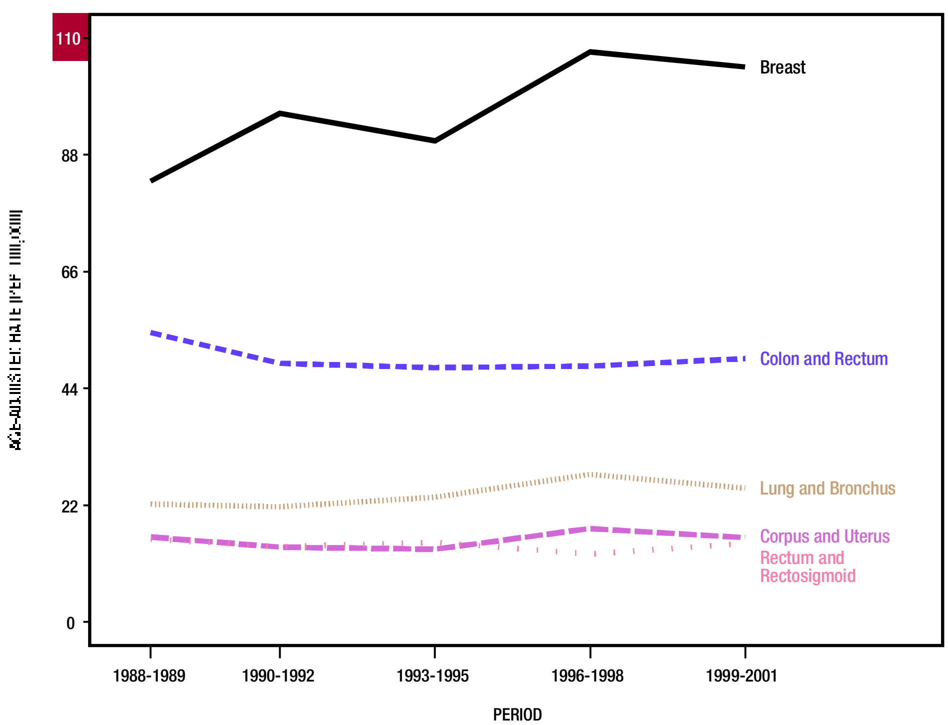
**TRENDS IN THE TOP 5 AGE-ADJUSTED CANCER INCIDENCE RATES IN CALIFORNIA (1988-2001):
FILIPINO FEMALE**



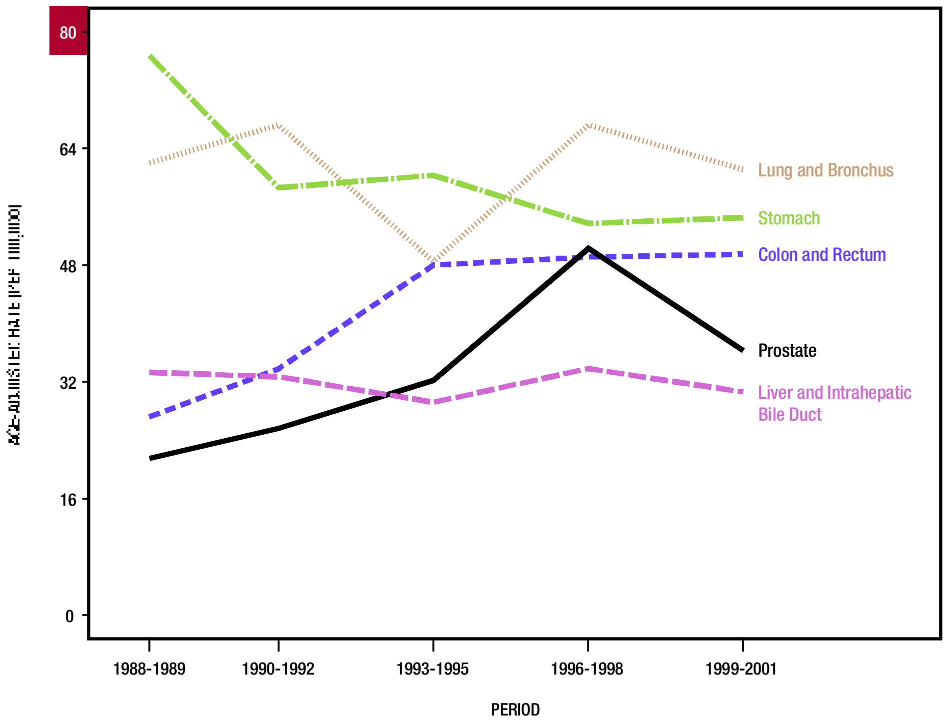
TRENDS IN THE TOP 5 AGE-ADJUSTED CANCER INCIDENCE RATES IN CALIFORNIA (1988-2001): JAPANESE MALE



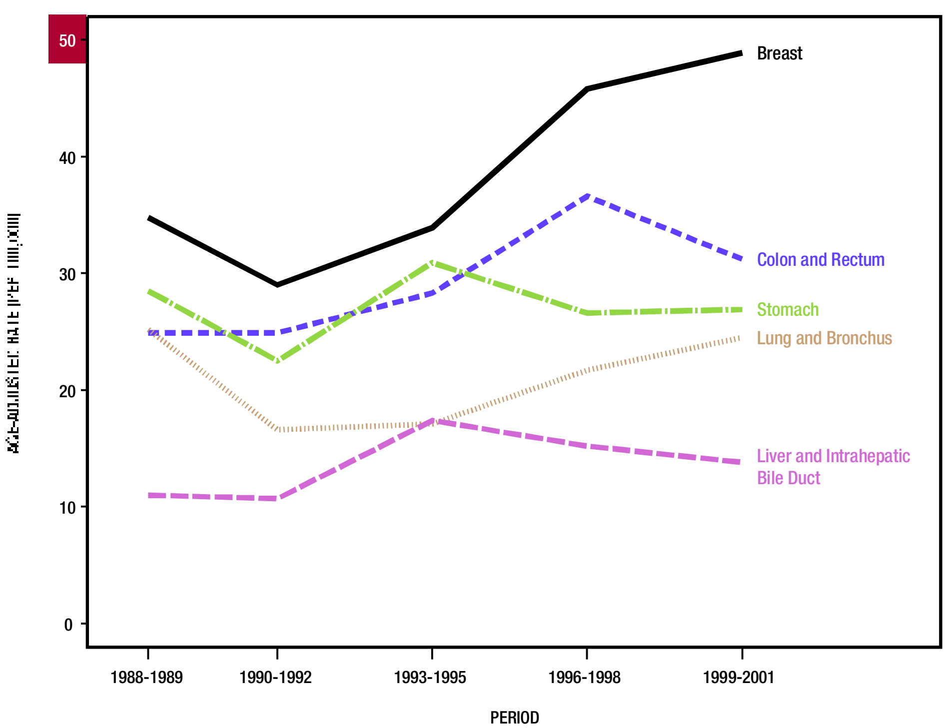
TRENDS IN THE TOP 5 AGE-ADJUSTED CANCER INCIDENCE RATES IN CALIFORNIA (1988-2001): JAPANESE FEMALE



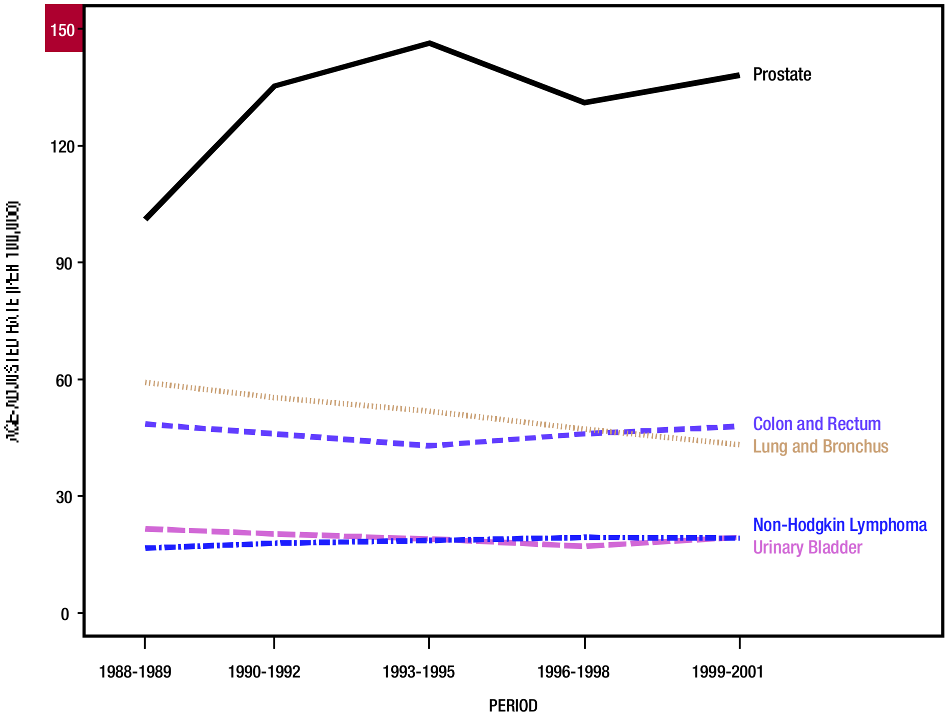
TRENDS IN THE TOP 5 AGE-ADJUSTED CANCER INCIDENCE RATES IN CALIFORNIA (1988-2001):
KOREAN MALE



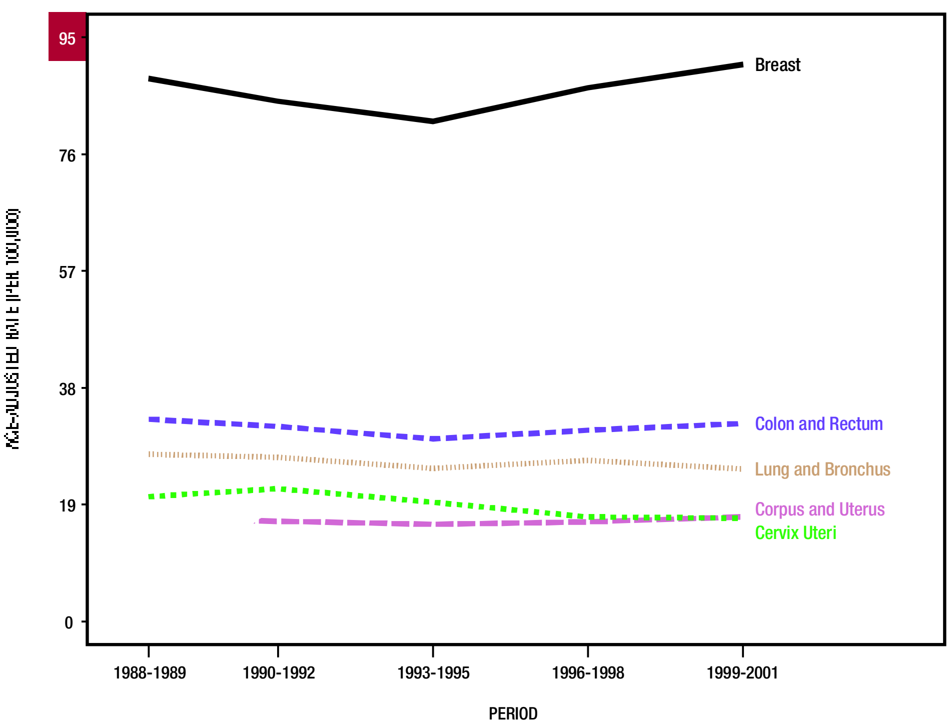
TRENDS IN THE TOP 5 AGE-ADJUSTED CANCER INCIDENCE RATES IN CALIFORNIA (1988-2001):
KOREAN FEMALE



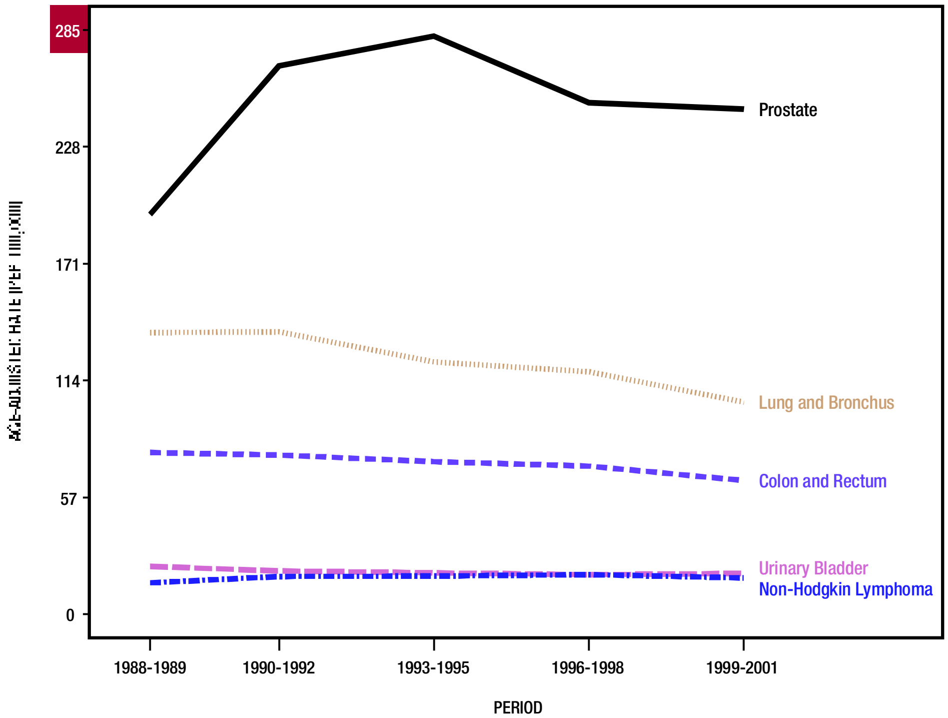
TRENDS IN THE TOP 5 AGE-ADJUSTED CANCER INCIDENCE RATES IN CALIFORNIA (1988-2001): LATINO MALE



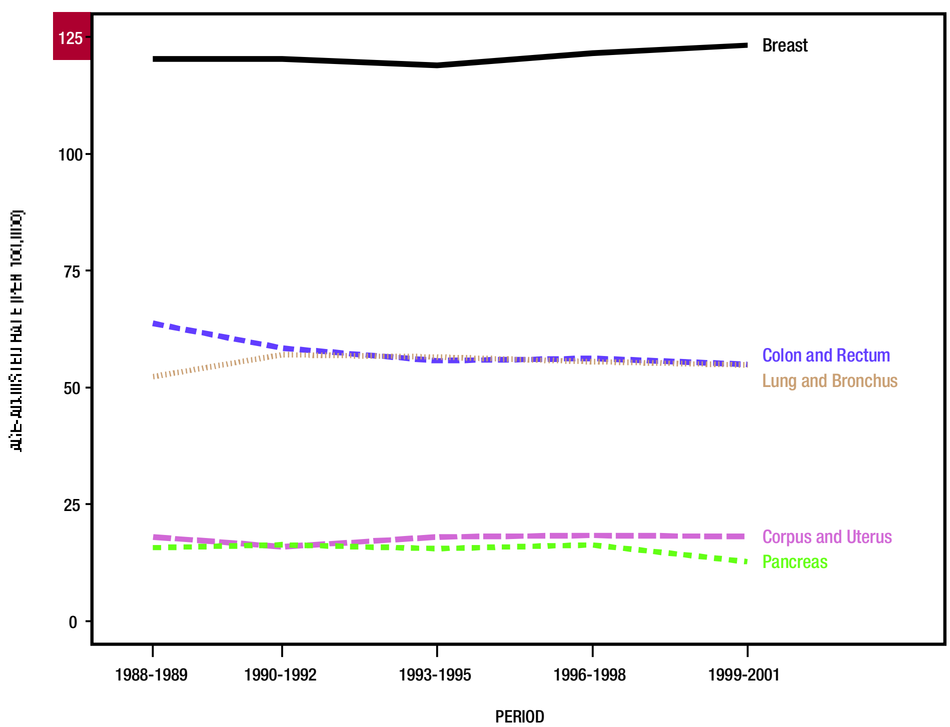
TRENDS IN THE TOP 5 AGE-ADJUSTED CANCER INCIDENCE RATES IN CALIFORNIA (1988-2001): LATINO FEMALE



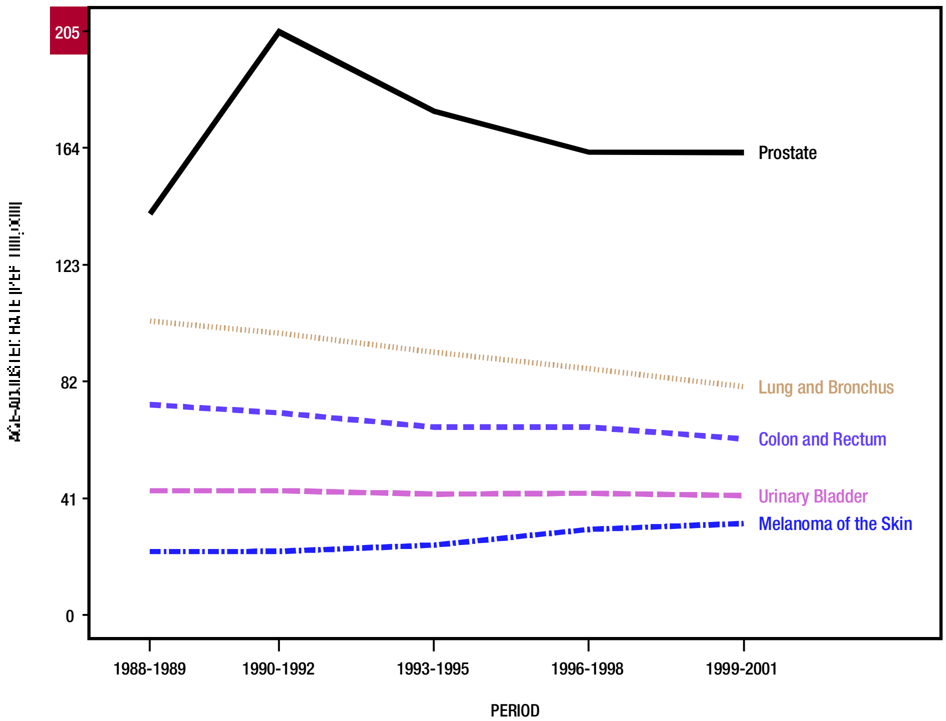
TRENDS IN THE TOP 5 AGE-ADJUSTED CANCER INCIDENCE RATES IN CALIFORNIA (1988-2001): NON-LATINO BLACK MALE



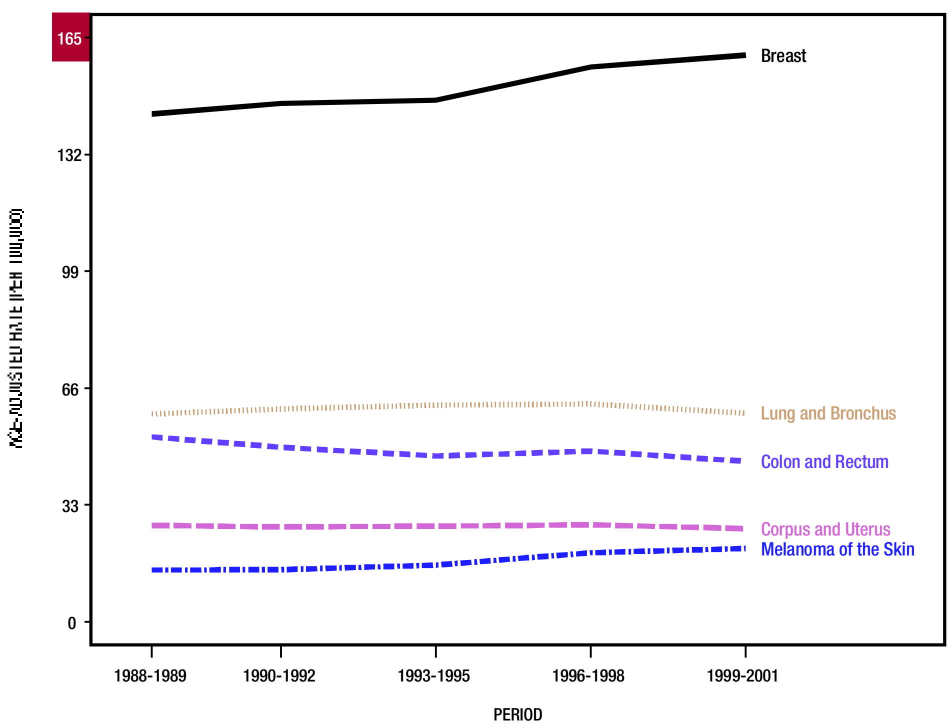
TRENDS IN THE TOP 5 AGE-ADJUSTED CANCER INCIDENCE RATES IN CALIFORNIA (1988-2001): NON-LATINO BLACK FEMALE



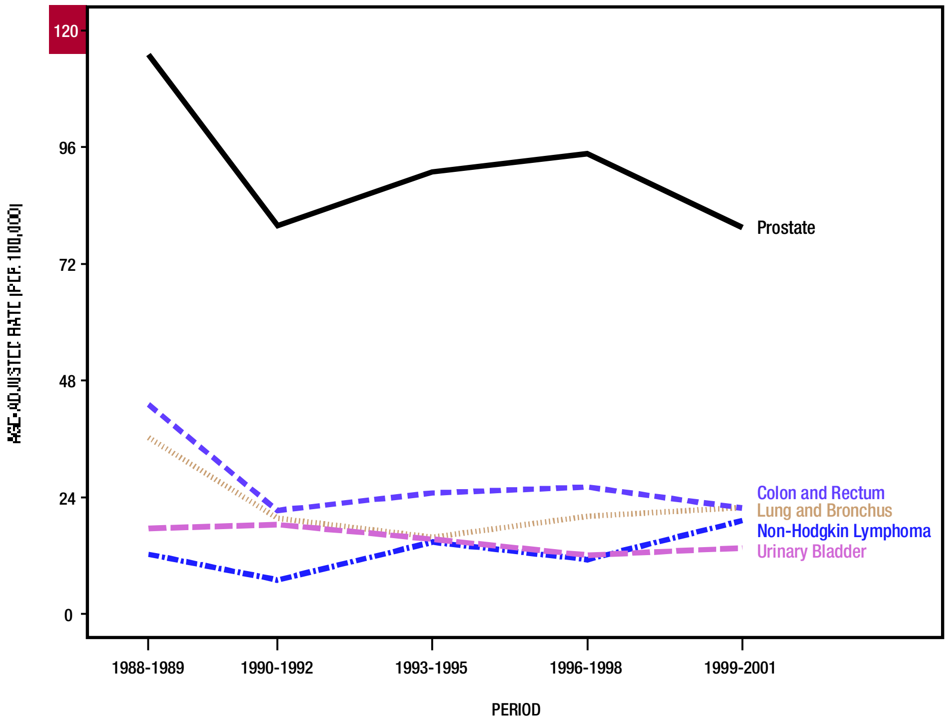
TRENDS IN THE TOP 5 AGE-ADJUSTED CANCER INCIDENCE RATES IN CALIFORNIA (1988-2001): NON-LATINO WHITE MALE



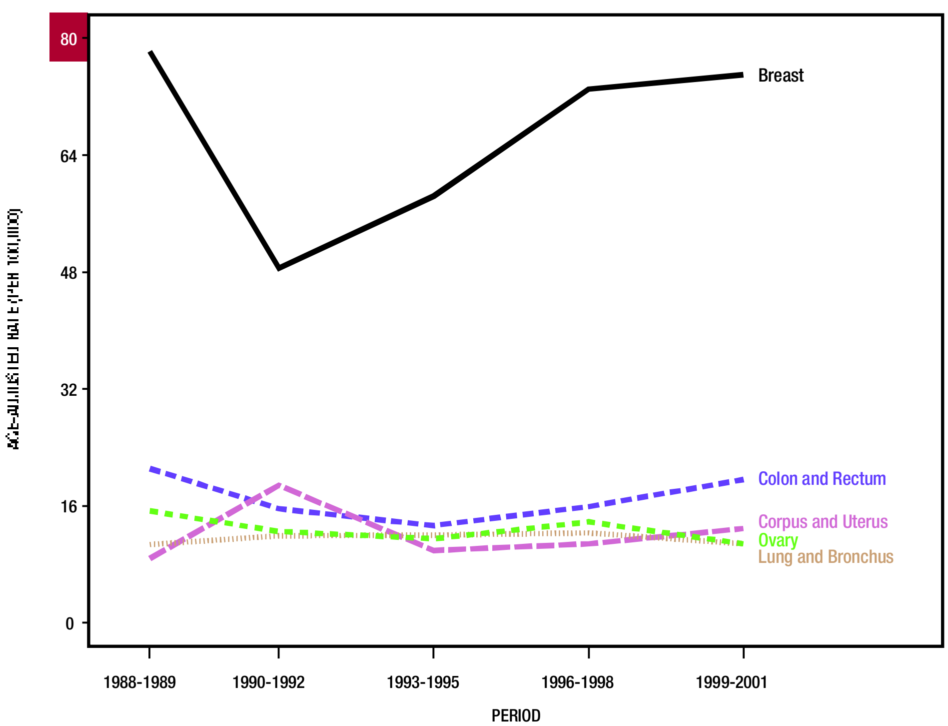
TRENDS IN THE TOP 5 AGE-ADJUSTED CANCER INCIDENCE RATES IN CALIFORNIA (1988-2001): NON-LATINO WHITE FEMALE



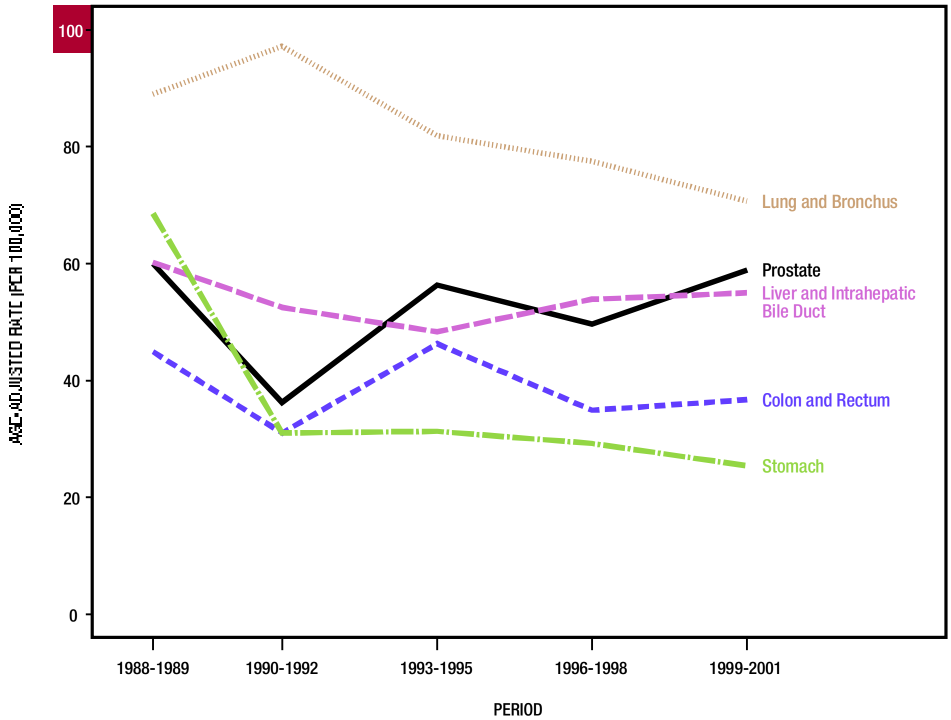
TRENDS IN THE TOP 5 AGE-ADJUSTED CANCER INCIDENCE RATES IN CALIFORNIA (1988-2001): SOUTH ASIAN MALE



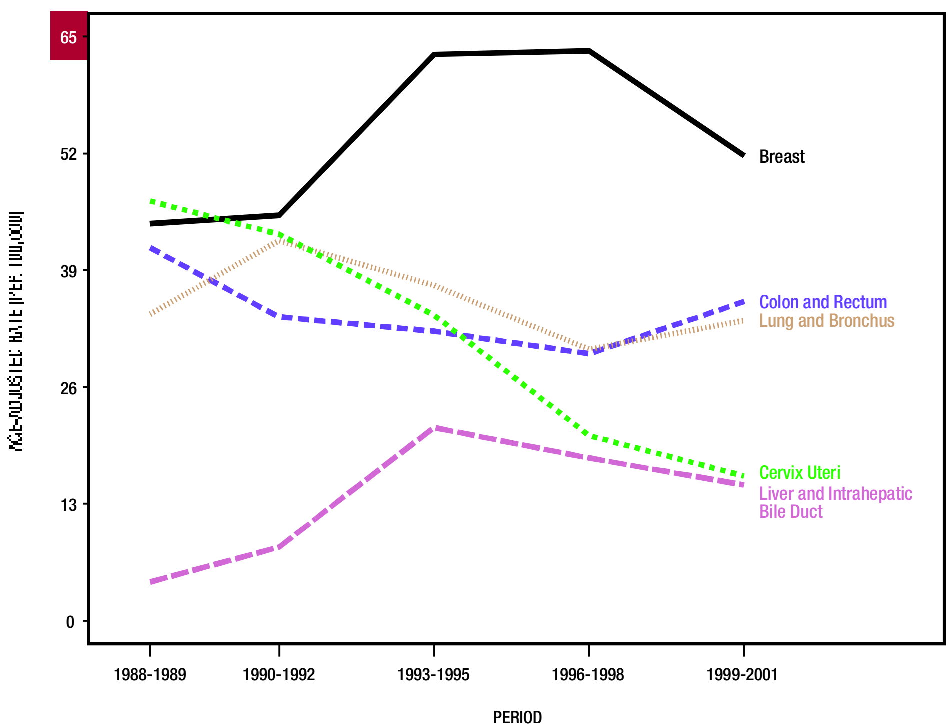
TRENDS IN THE TOP 5 AGE-ADJUSTED CANCER INCIDENCE RATES IN CALIFORNIA (1988-2001): SOUTH ASIAN FEMALE



TRENDS IN THE TOP 5 AGE-ADJUSTED CANCER INCIDENCE RATES IN CALIFORNIA (1988-2001): VIETNAMESE MALE



TRENDS IN THE TOP 5 AGE-ADJUSTED CANCER INCIDENCE RATES IN CALIFORNIA (1988-2001): VIETNAMESE FEMALE



TRENDS IN THE FIVE MOST COMMON SITES OF CANCER MORTALITY AMONG MEN

Lung cancer was the most common cause of cancer death among men in all racial/ethnic groups. However, the time trends in lung cancer mortality were not the same in all racial/ethnic groups: lung cancer mortality declined gradually between 1988 and 2001 for Chinese, Japanese and Vietnamese men, declined steadily and rapidly for Latino, non-Latino black and non-Latino white men, and increased for Filipino and South Asian men. Prostate cancer also was a leading cause of cancer deaths among most racial/ethnic groups, but likewise did not experience the same trends in all racial/ethnic groups: while prostate cancer mortality rapidly declined among Filipino, Japanese, non-Latino black, non-Latino white and South Asian men, it declined only slightly among Latino men and appeared to change little among Chinese men. Prostate cancer was not one of the five most common sites of cancer deaths for either Korean or Vietnamese men.

Colon-and-rectum cancers were among the top five causes of cancer deaths among men of all racial/ethnic groups except South Asian men. However, consistent with prostate cancer mortality, the trends in colon-and-rectum cancer deaths over time differed among racial/ethnic groups. While these mortality rates declined steadily among Chinese, Japanese and non-Latino white men, for all other racial/ethnic groups, mortality rates from colon-and-rectum cancers either remained stable or increased slightly.

Because stomach cancer mortality declined between 1988 and 2001, the disease was only a leading cause of cancer death for a few racial/ethnic groups. Despite the decline, it remained the second-highest cause of cancer mortality among Korean men and third among Japanese men. Liver cancer was an important cause of cancer mortality for Filipino, Latino and Vietnamese men, for whom rates increased between 1988 and 2001, and for Chinese and Korean men, for whom rates declined slightly during this same period.

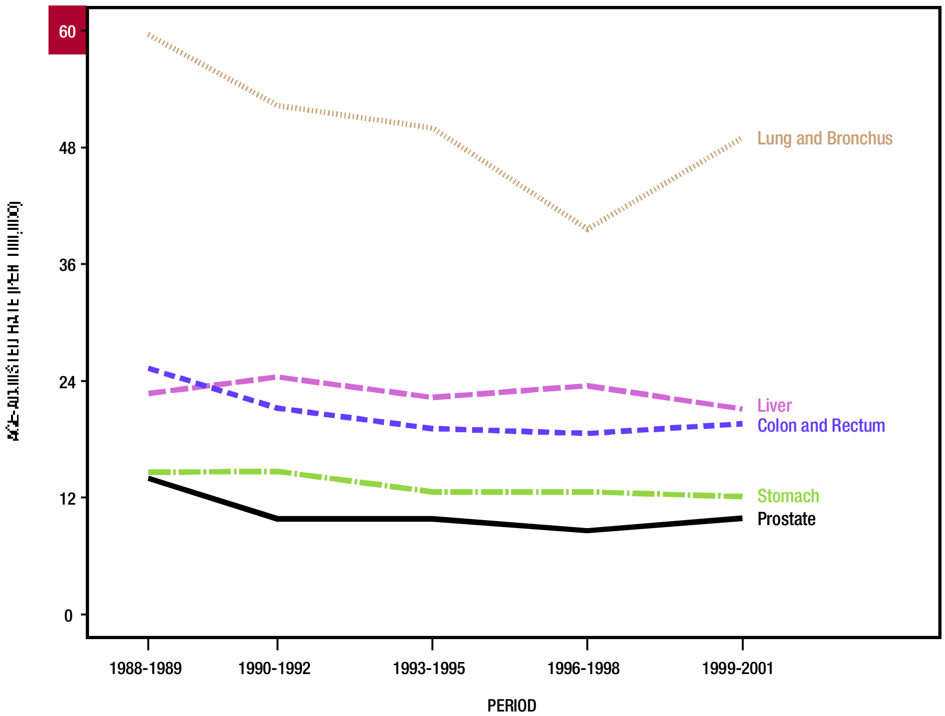
TRENDS IN THE FIVE MOST COMMON SITES OF CANCER MORTALITY AMONG WOMEN

Breast cancer was among the top five causes of cancer death for all racial/ethnic groups, but as was noted above for prostate and other cancers among men, there were notable differences in trends in breast cancer mortality rates between 1988 and 2001 by racial/ethnic group. While breast cancer mortality rates declined rapidly for non-Latino white, non-Latino black, Latino and Korean women, they increased markedly for South Asian women. At the same time, they remained relatively unchanged for Chinese, Filipino and Japanese women.

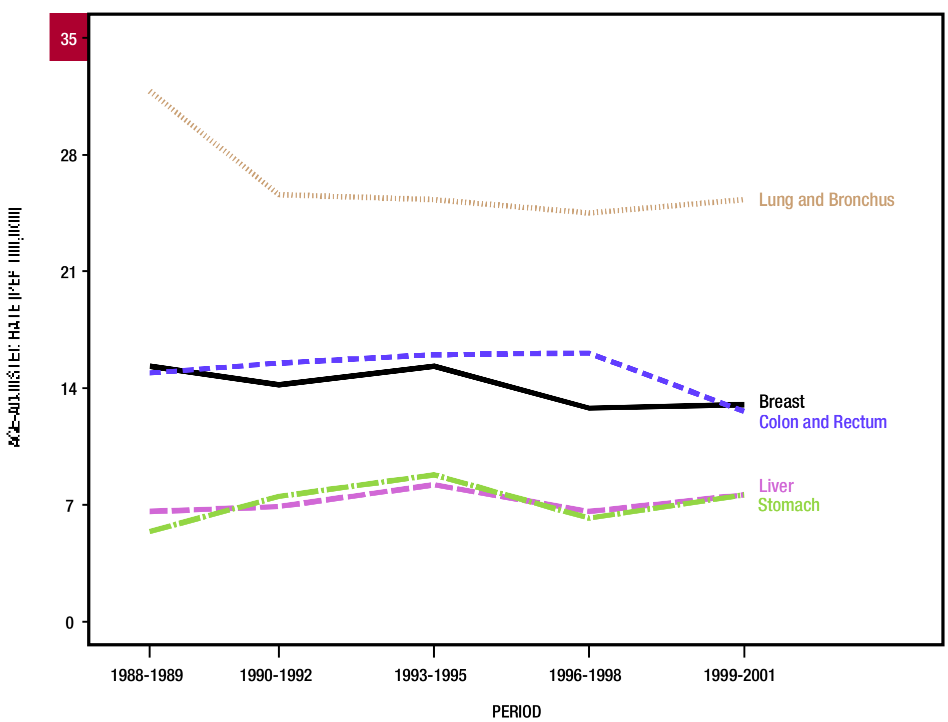
Similarly, lung cancers were important causes of cancer mortality for women of all racial/ethnic groups, but the patterns in mortality rates over time were very different for each racial/ethnic group: lung cancer mortality rates declined for Vietnamese women, increased markedly for Korean and Filipino women, and remained largely unchanged for women of all other racial/ethnic groups.

Stomach cancer was a leading cause of cancer mortality for Chinese, Korean and Japanese women, but in all cases, rates declined between 1988 and 2001. Colon-and-rectum cancer mortality increased for Korean and South Asian women, but declined for Filipino, Japanese, non-Latino black and non-Latino white women, and remained unchanged for Chinese and Latino women.

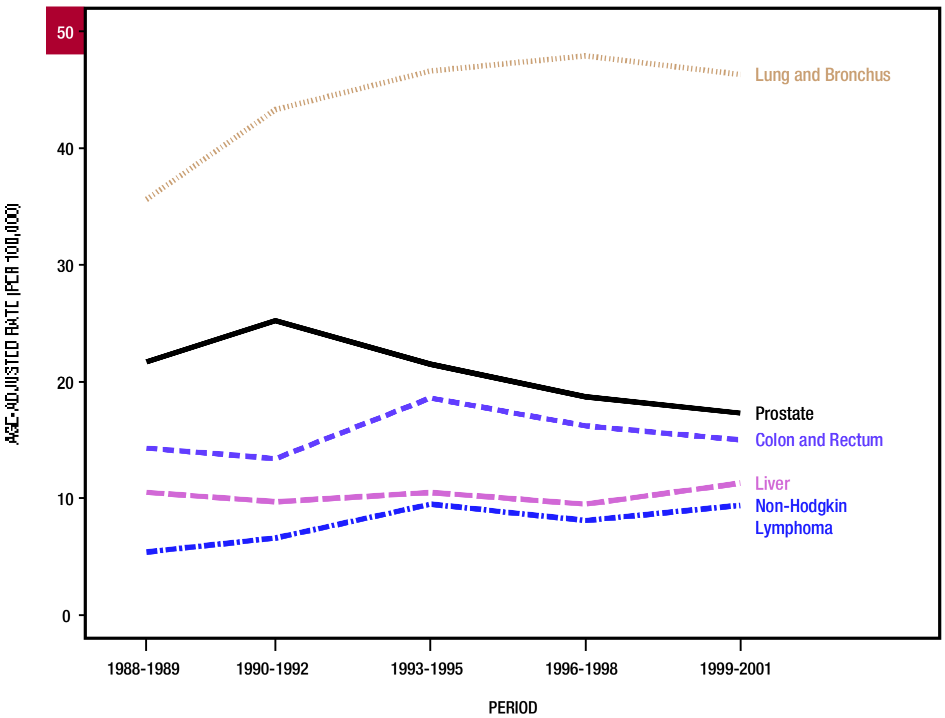
TRENDS IN THE TOP 5 AGE-ADJUSTED CANCER MORTALITY RATES IN CALIFORNIA (1988-2001): CHINESE MALE



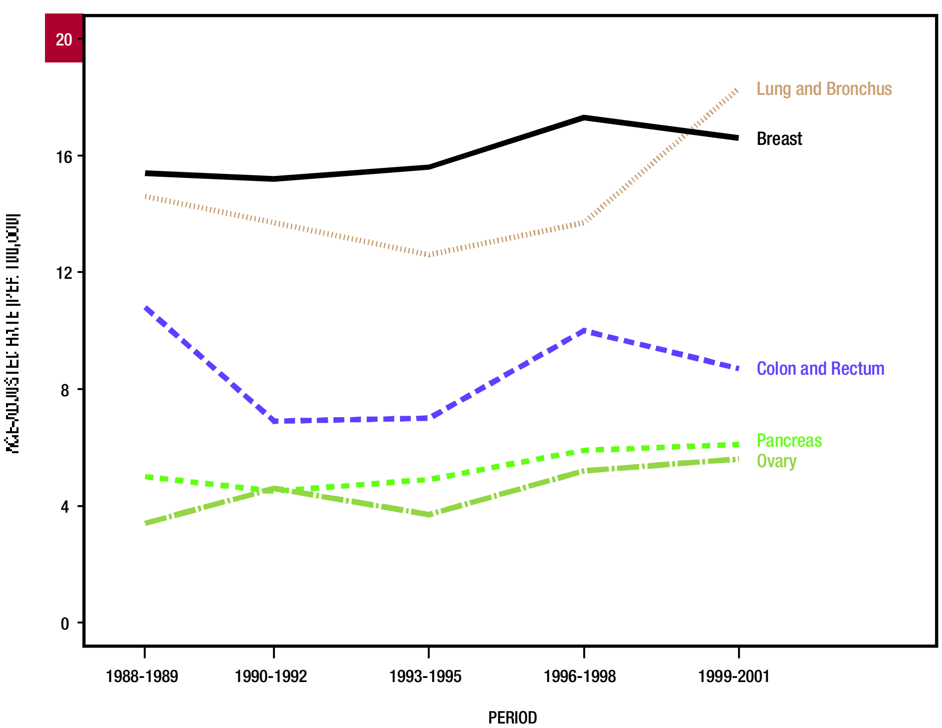
TRENDS IN THE TOP 5 AGE-ADJUSTED CANCER MORTALITY RATES IN CALIFORNIA (1988-2001): CHINESE FEMALE



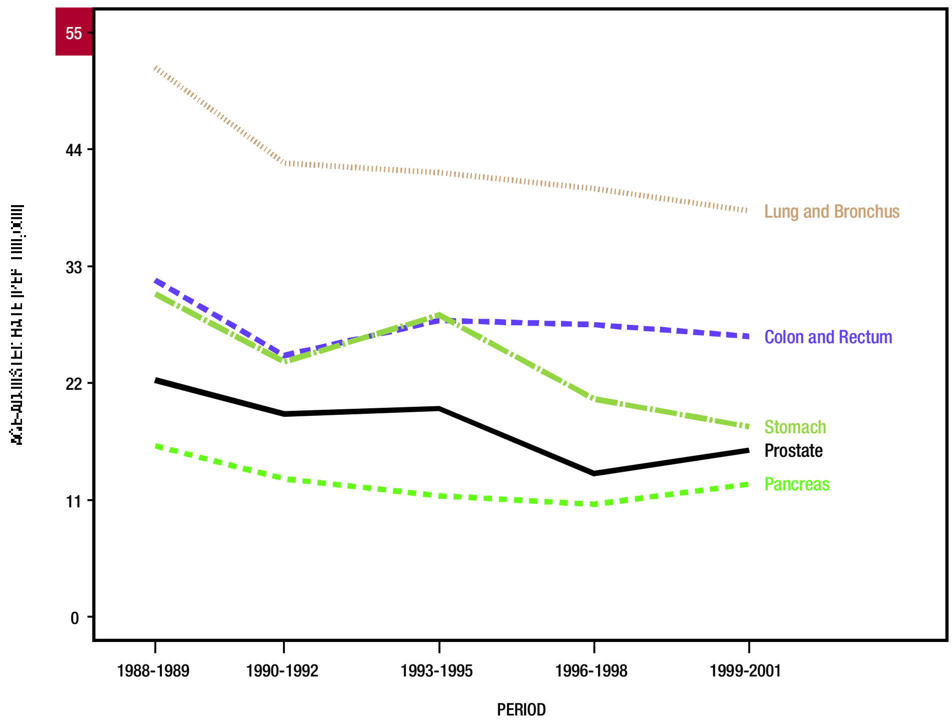
TRENDS IN THE TOP 5 AGE-ADJUSTED CANCER MORTALITY RATES IN CALIFORNIA (1988-2001): FILIPINO MALE



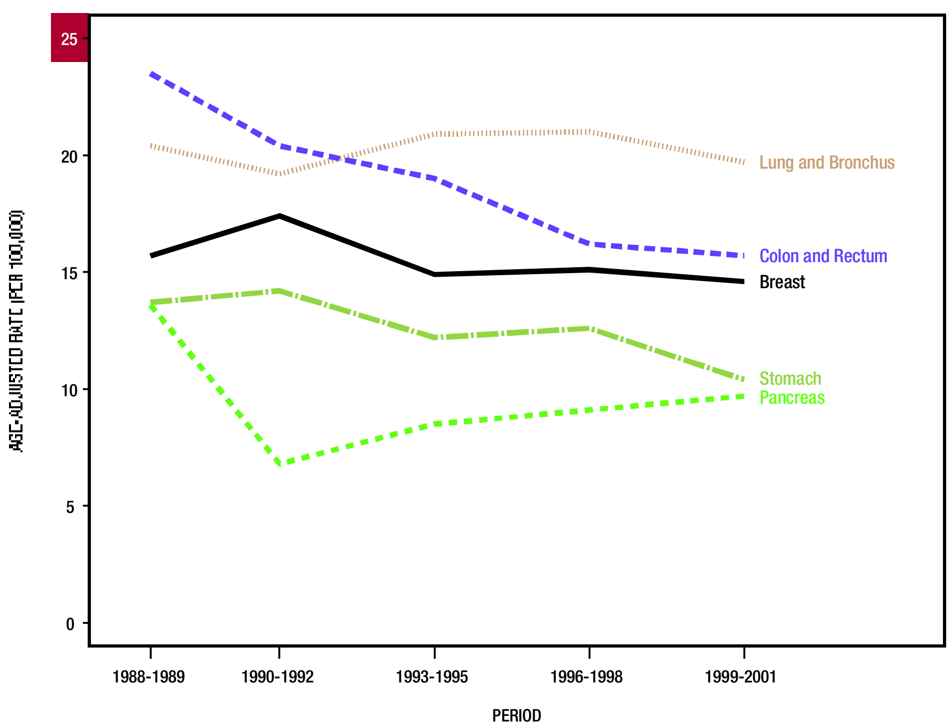
TRENDS IN THE TOP 5 AGE-ADJUSTED CANCER MORTALITY RATES IN CALIFORNIA (1988-2001): FILIPINO FEMALE



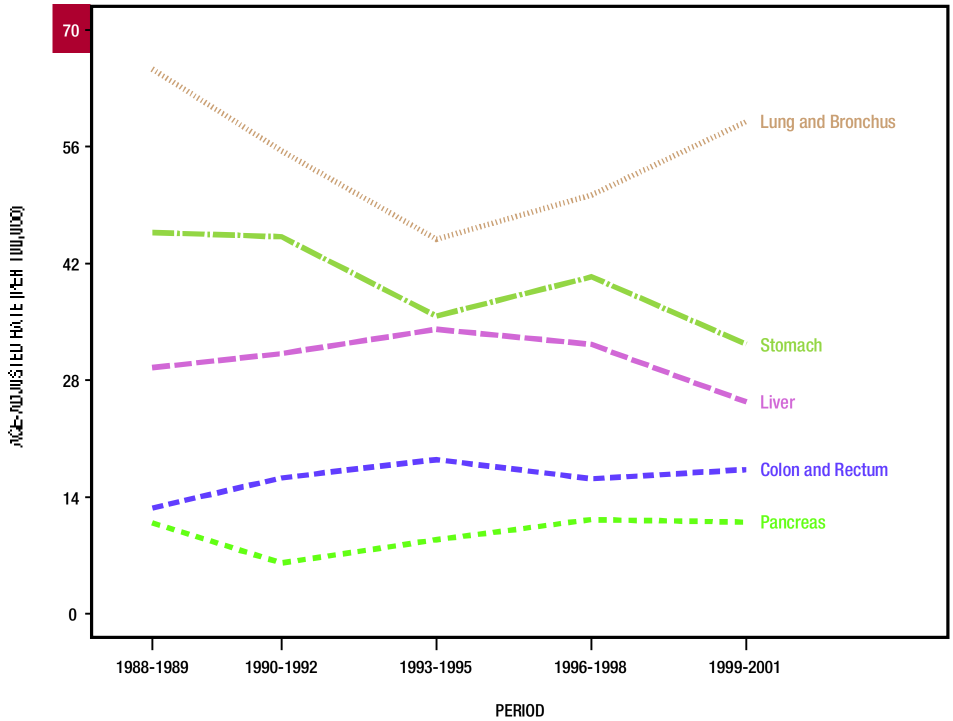
TRENDS IN THE TOP 5 AGE-ADJUSTED CANCER MORTALITY RATES IN CALIFORNIA (1988-2001): JAPANESE MALE



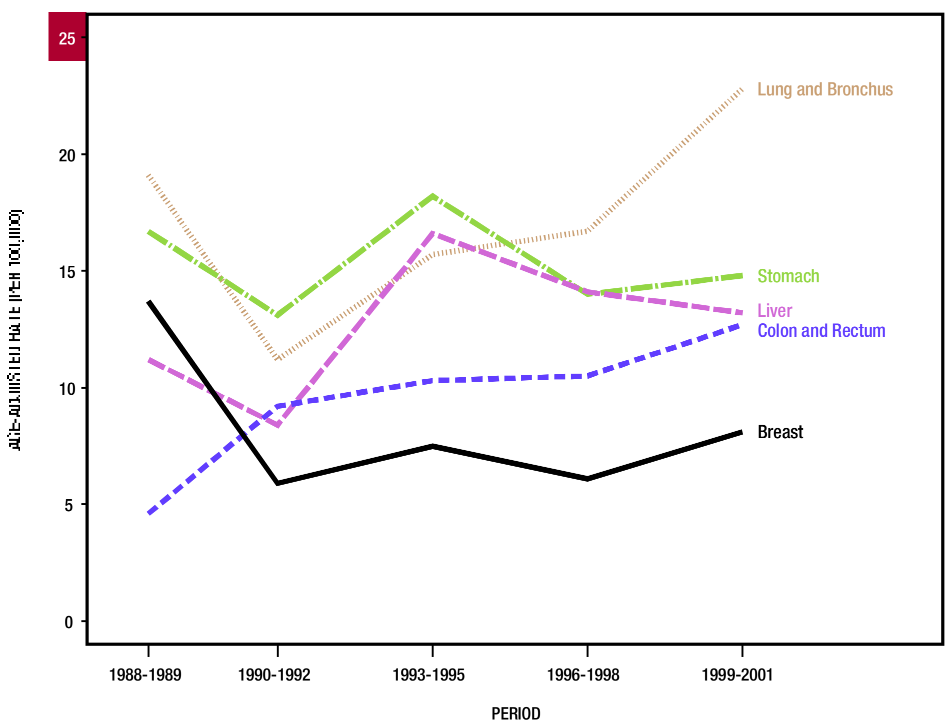
TRENDS IN THE TOP 5 AGE-ADJUSTED CANCER MORTALITY RATES IN CALIFORNIA (1988-2001): JAPANESE FEMALE



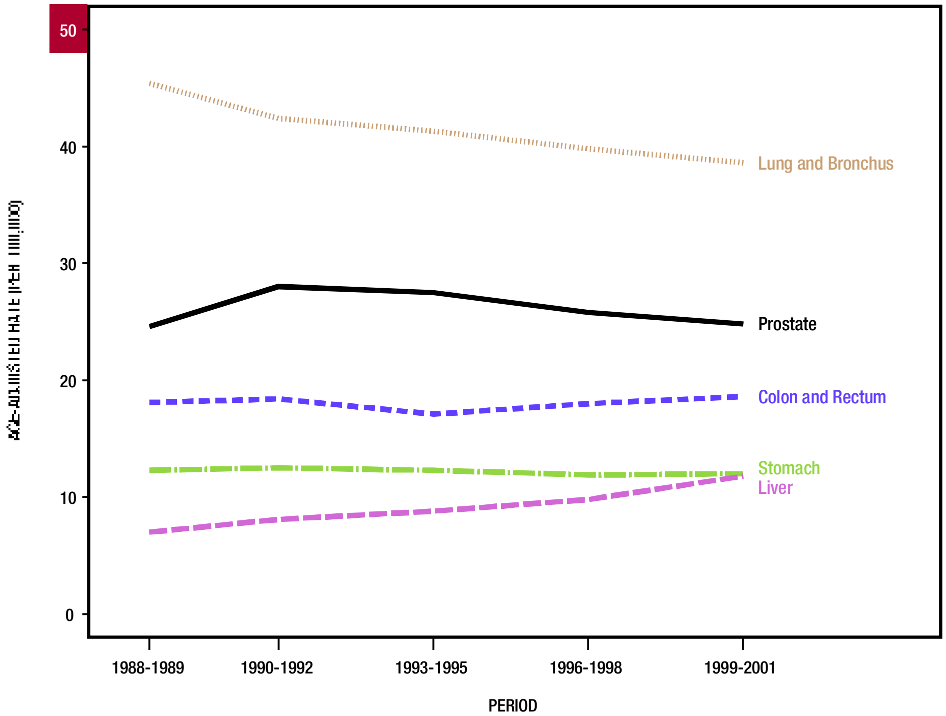
TRENDS IN THE TOP 5 AGE-ADJUSTED CANCER MORTALITY RATES IN CALIFORNIA (1988-2001): KOREAN MALE



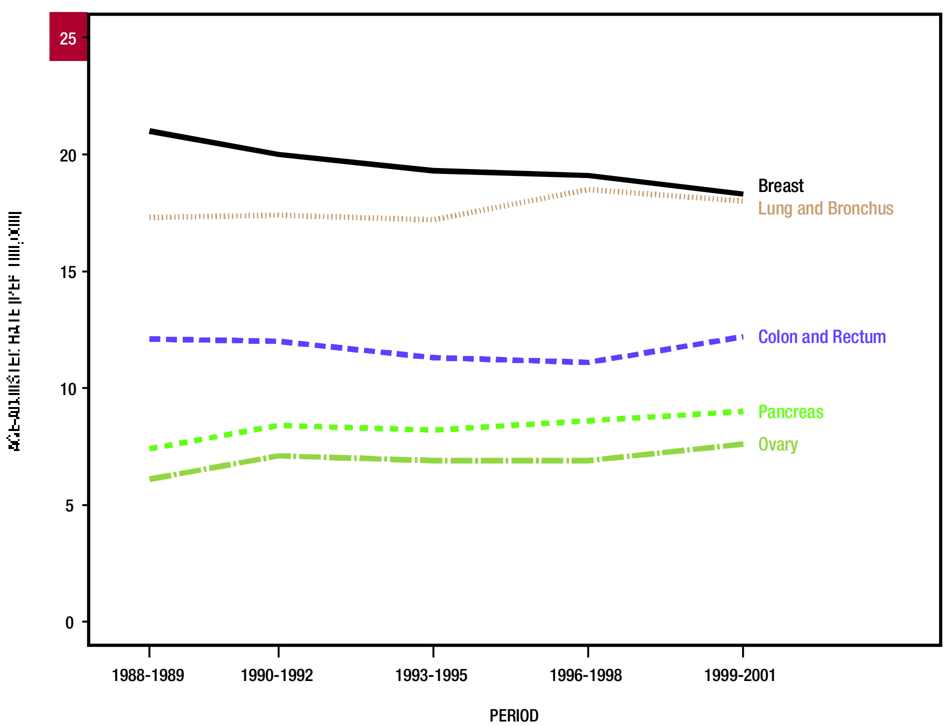
TRENDS IN THE TOP 5 AGE-ADJUSTED CANCER MORTALITY RATES IN CALIFORNIA (1988-2001): KOREAN FEMALE



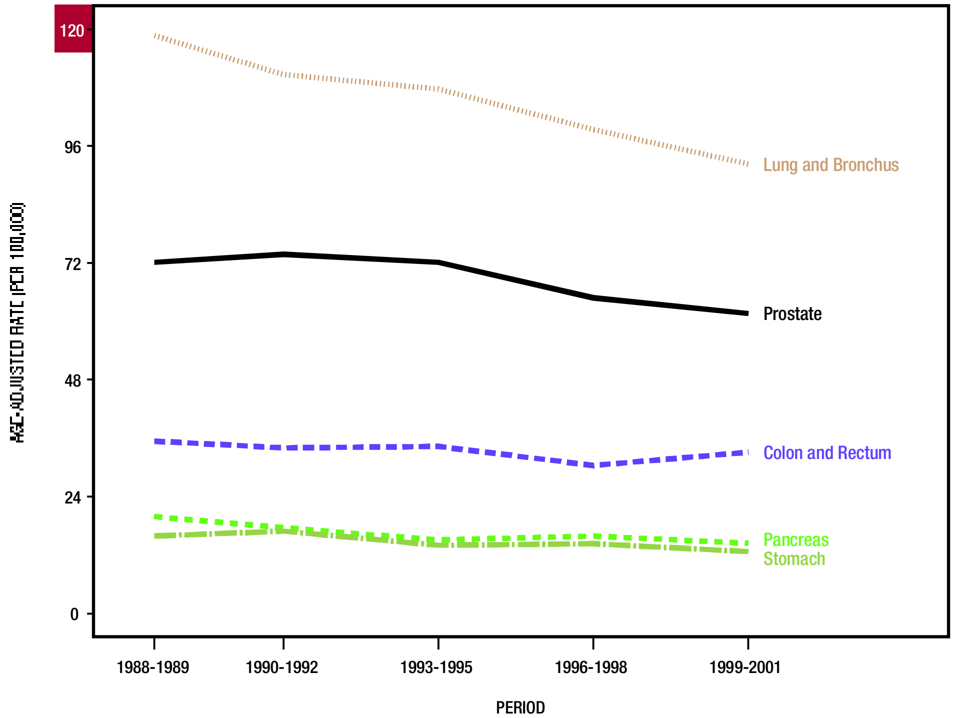
TRENDS IN THE TOP 5 AGE-ADJUSTED CANCER MORTALITY RATES IN CALIFORNIA (1988-2001): LATINO MALE



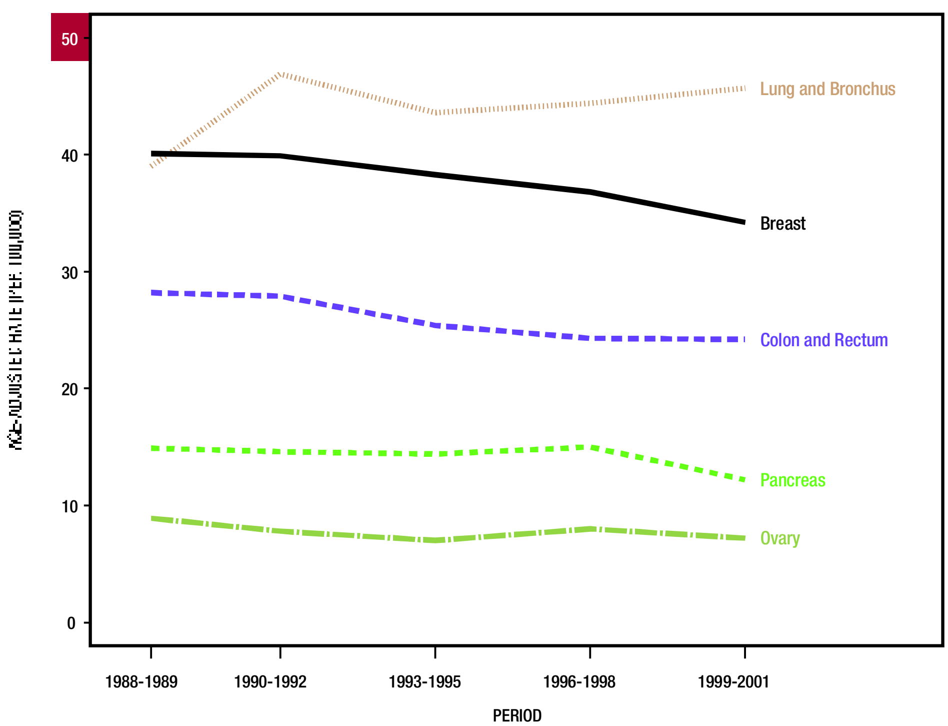
TRENDS IN THE TOP 5 AGE-ADJUSTED CANCER MORTALITY RATES IN CALIFORNIA (1988-2001): LATINO FEMALE



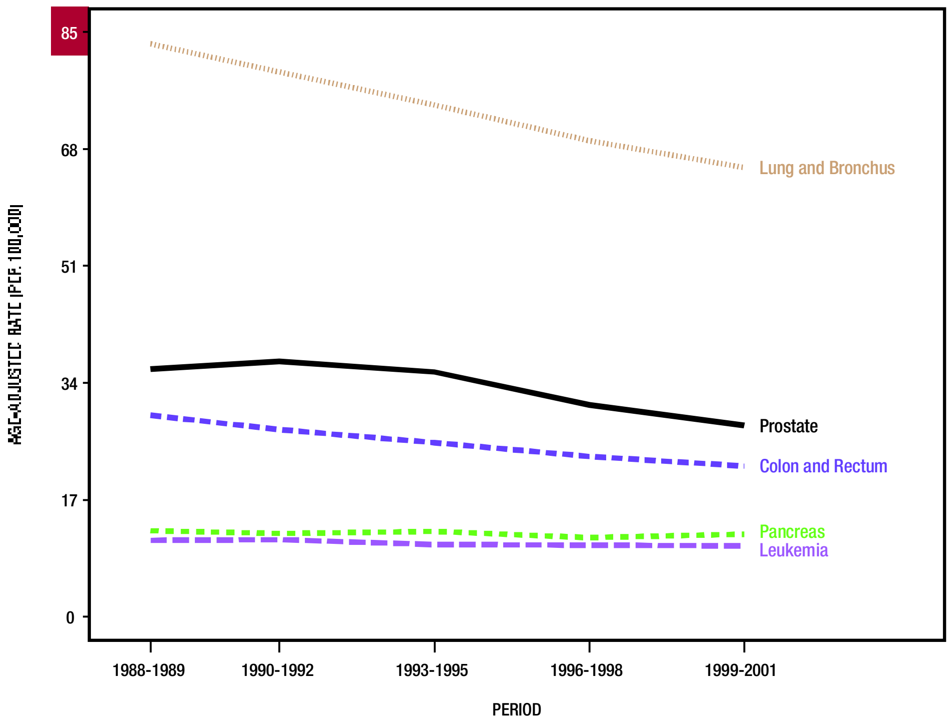
TRENDS IN THE TOP 5 AGE-ADJUSTED CANCER MORTALITY RATES IN CALIFORNIA (1988-2001):
NON-LATINO BLACK MALE



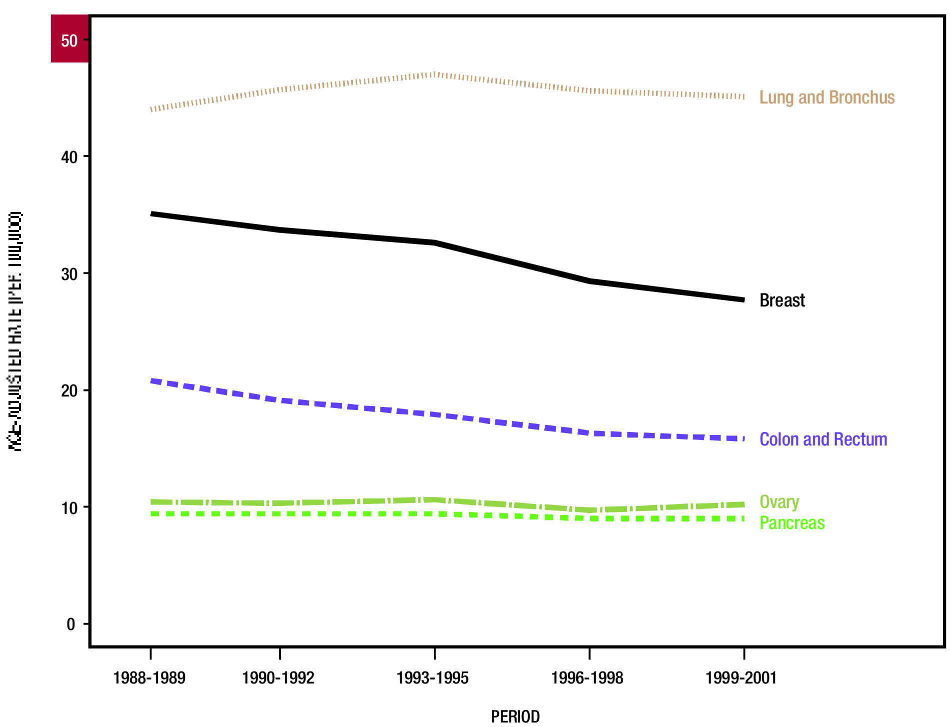
TRENDS IN THE TOP 5 AGE-ADJUSTED CANCER MORTALITY RATES IN CALIFORNIA (1988-2001):
NON-LATINO BLACK FEMALE



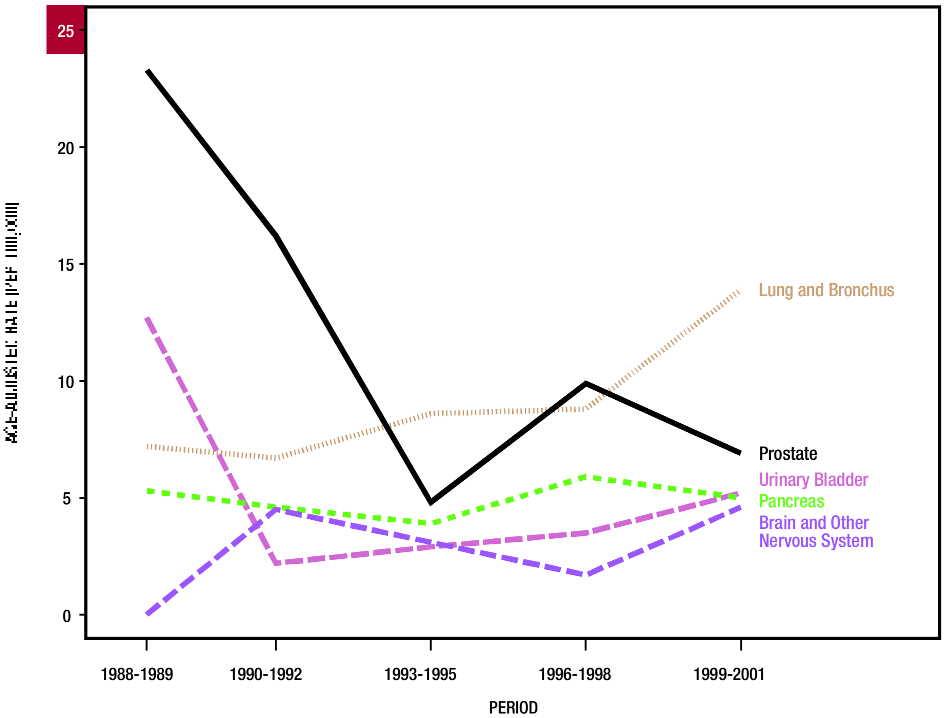
TRENDS IN THE TOP 5 AGE-ADJUSTED CANCER MORTALITY RATES IN CALIFORNIA (1988-2001): NON-LATINO WHITE MALE



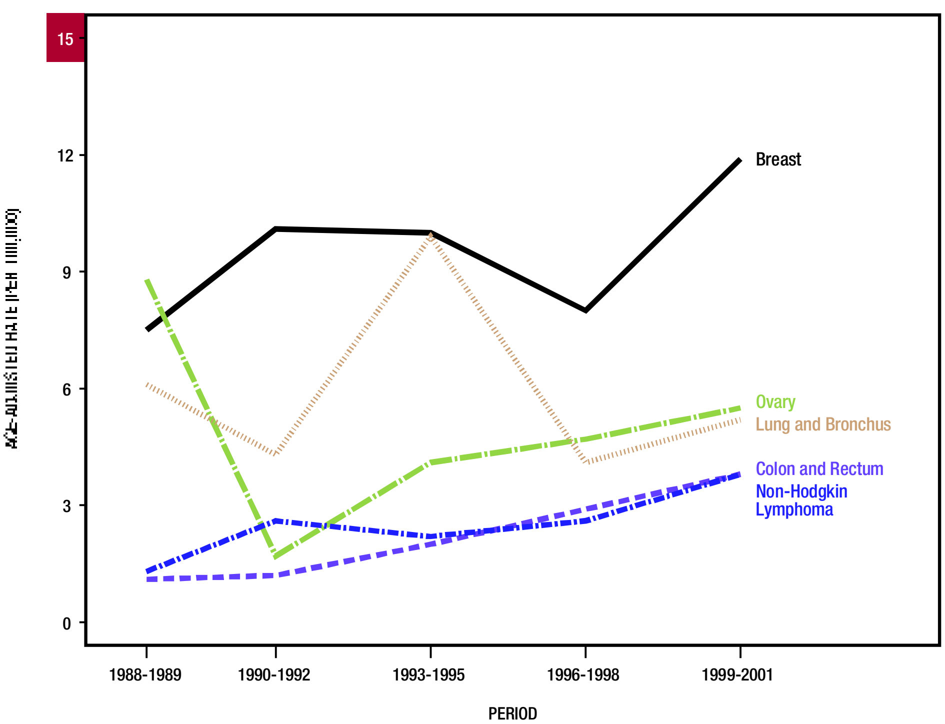
TRENDS IN THE TOP 5 AGE-ADJUSTED CANCER MORTALITY RATES IN CALIFORNIA (1988-2001): NON-LATINO WHITE FEMALE



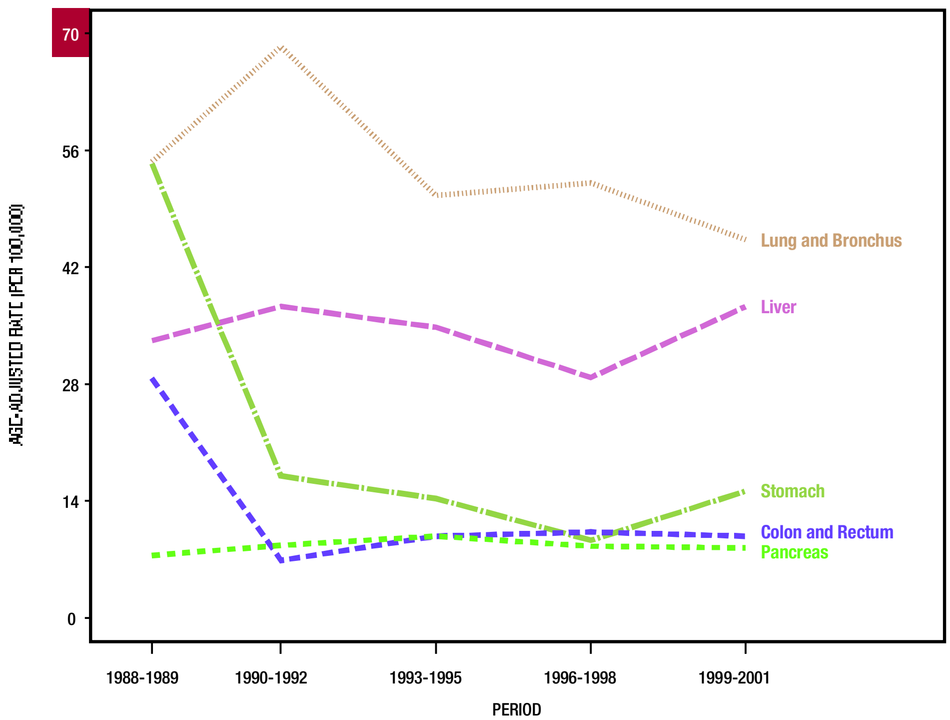
TRENDS IN THE TOP 5 AGE-ADJUSTED CANCER MORTALITY RATES IN CALIFORNIA (1988-2001): SOUTH ASIAN MALE



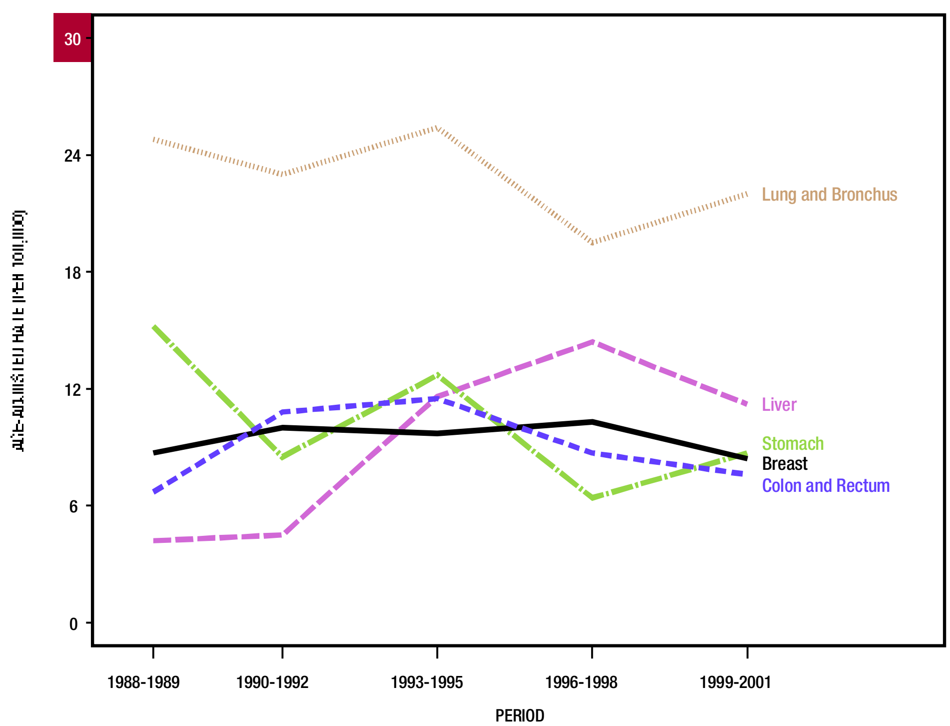
TRENDS IN THE TOP 5 AGE-ADJUSTED CANCER MORTALITY RATES IN CALIFORNIA (1988-2001): SOUTH ASIAN FEMALE



TRENDS IN THE TOP 5 AGE-ADJUSTED CANCER MORTALITY RATES IN CALIFORNIA (1988-2001): VIETNAMESE MALE



TRENDS IN THE TOP 5 AGE-ADJUSTED CANCER MORTALITY RATES IN CALIFORNIA (1988-2001): VIETNAMESE FEMALE



SITE-SPECIFIC TRENDS BY SEX AND RACE/ETHNICITY

In this section we present trends in cancer incidence and mortality rates in California between 1988 and 2001 for major locations in the body (groupings of anatomic sites) and for Kaposi sarcoma, a cancer that is found at many anatomic sites but is of unique interest in its own right.

For each cancer site we provide a description of worldwide trends in the cancer of interest, along with a brief description of what is known about the cancer's causes. A short description of the trends in incidence and mortality in California between 1988 and 2001 is presented for that cancer site, along with a summary of the reasons—where they are known—for the observed trends.

For each cancer site we provide two incidence graphs and two mortality graphs, one for men and one for women (except for sex-specific cancers, such as cervix and prostate). Each graph contains one line describing the trend in cancer incidence (or mortality) for each of the nine major racial/ethnic groups: Latinos, blacks, non-Latino whites, Chinese, Japanese, Filipinos, Vietnamese, Koreans and South Asians. However, where a point on the graph would be based on fewer than 20 cases, the point and the line joining it to other points are omitted. We use this approach so that the plotted lines are based on enough cases to draw firm conclusions.

The numbers of cases or deaths graphed in each time period, as well as statistical measures of the significance of any apparent trends in rates, are provided in Appendix B. Where special graphs are presented that focus on a subtype of the cancer site, the distinctions used to arrive at those special groupings can be found in Appendix C.

BRAIN AND OTHER NERVOUS SYSTEM

Susan Preston-Martin, PhD

CAUSES AND WORLDWIDE TRENDS

The causes of most brain cancers remain unknown. High exposure to X-rays and to other forms of ionizing radiation is one known cause. Another is the presence of a specific, predisposing genetic syndrome. But these known causes account for few cases occurring in California.

Cancer of the brain and other nervous system is a relatively rare cancer that accounts for less than 2 percent of all cancers in the U.S. Of these nervous system cancers, most occur in the central nervous system (almost 99 percent). Nearly 95 percent of these central nervous system tumors arise in the brain, and the remainder arises in the spine.

Comparing information on brain and central nervous system cancers from different time periods and geographic areas is difficult because of differences in which cancers are counted. Rates vary relatively little worldwide, especially after considering factors that affect the completeness of diagnosis, such as the availability of brain imaging. The most common type of brain cancer is gliomas, which are more common in men than women.

Much controversy surrounded the issue of whether or not the true incidence of brain tumors increased in the decades before 1990. Most of this increase is now thought to relate to improved brain imaging by computed tomography (CT) scans and magnetic resonance imagery (MRI), which have allowed for more complete diagnosis, particularly among the elderly, who showed the greatest increase in rates. While rates of these tumors increased in past decades, this increase has leveled off since the mid 1980s, when MRI became widely available in California.

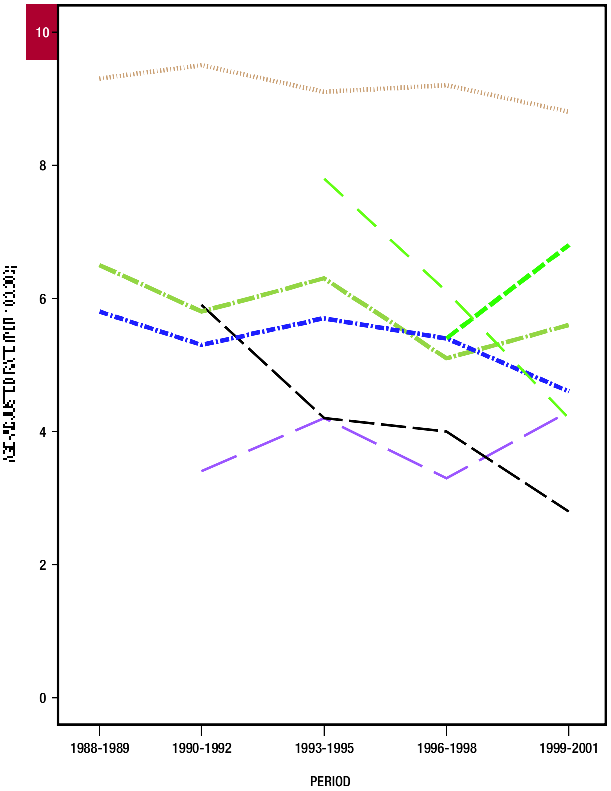
TRENDS IN INCIDENCE AND MORTALITY IN CALIFORNIA

Among both men and women of the most common racial/ethnic groups, the incidence rates of brain cancers have remained fairly level from 1988 to 2001. This is most apparent in non-Latino whites, who have by far the highest rates of brain cancer of any racial/ethnic group, as well as among blacks. For other subgroups, rates have probably declined since 1988. Level or somewhat declining incidence rates is seen among Chinese and Filipino Californians, but because the numbers of cases in these groups are small, the rates appear to jump around from year to year.

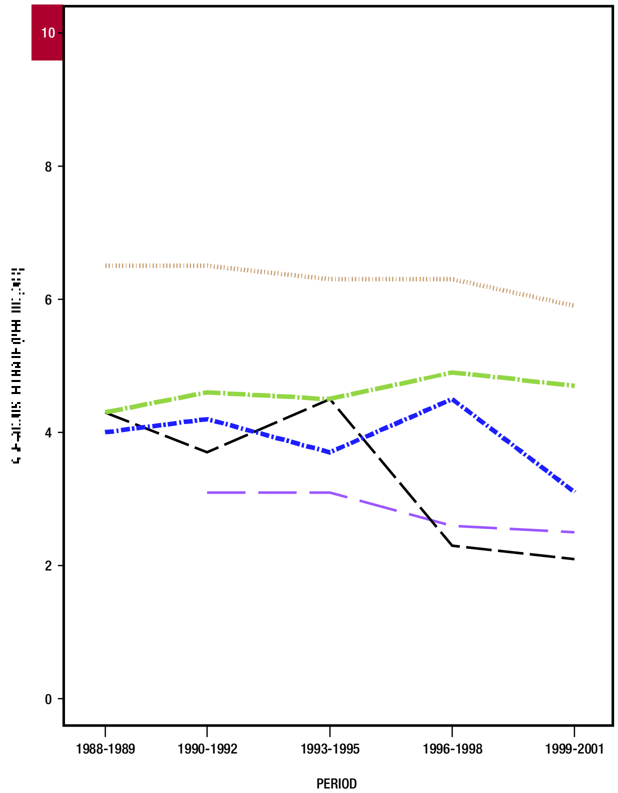
Brain cancer mortality rates appeared to increase for Latinas between 1988 and 2001, but not for other race/ethnic groups, nor for men of any race/ethnicity. On the contrary, mortality rates for brain cancer appeared to decline slightly for Latino men from 1988 to 2001.

Clear examination of trends over time in brain tumor incidence for less populous ethnic groups is limited by the low incidence of, and mortality from, the disease.

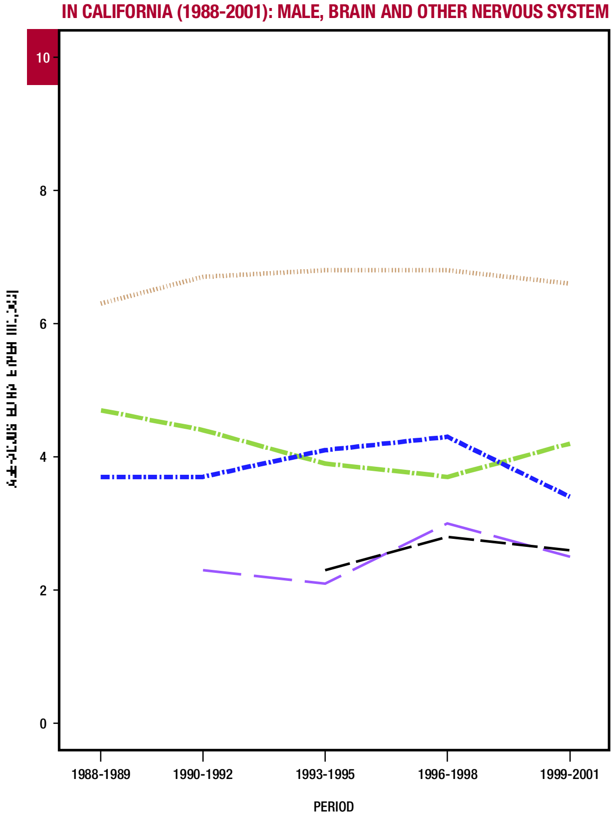
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE
IN CALIFORNIA (1988-2001): MALE, BRAIN AND OTHER NERVOUS SYSTEM



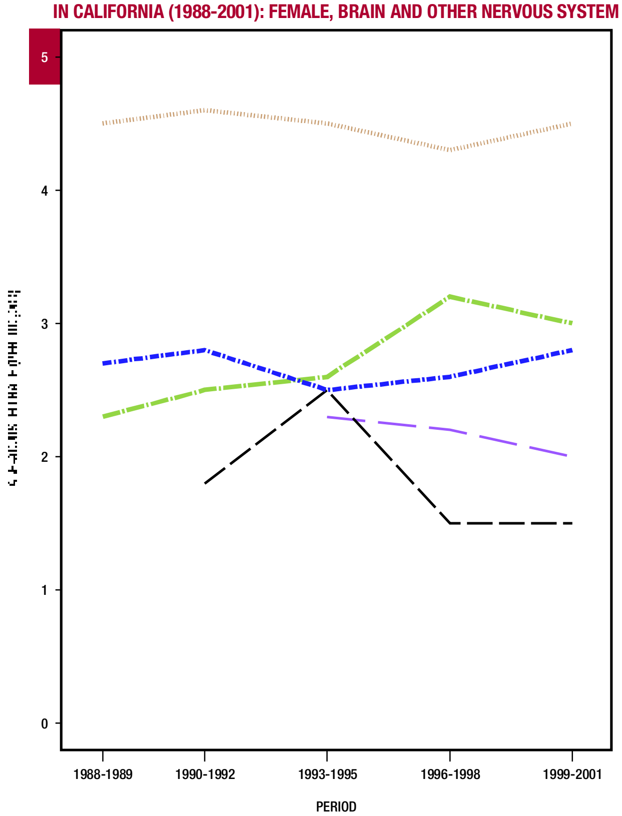
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE
IN CALIFORNIA (1988-2001): FEMALE, BRAIN AND OTHER NERVOUS SYSTEM



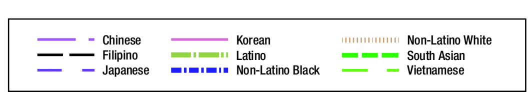
TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE
IN CALIFORNIA (1988-2001): MALE, BRAIN AND OTHER NERVOUS SYSTEM



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE
IN CALIFORNIA (1988-2001): FEMALE, BRAIN AND OTHER NERVOUS SYSTEM



*Where a rate is based on fewer than 20 cases (or deaths), that rate, and the lines joining it to adjacent rates, are omitted.



BREAST

Sharan Campleman, PhD, MPH, CTR

CAUSES AND WORLDWIDE TRENDS

Most of the factors associated with increased risk of breast cancer suggest that excess ovarian hormones—estrogen and progesterone—are behind the disease. These risk factors include young age at first menstruation ("periods"), early regular periods, few or no pregnancies, older age at first full-term pregnancy, shorter periods of breastfeeding and older age at menopause. Alcohol, which may cause liver damage resulting in an increase in hormone levels, appears to increase risk, as does greater height, which may be related to early puberty. Older women who are obese are at higher risk, presumably because fat cells are the most important source of estrogens after menopause. Regular physical activity, which may delay first menstruation and regular periods and reduce obesity, reduces risk. Genetic factors are important in the causation of breast cancer, although more is known about a few rare examples than about the factors responsible for most hereditary breast cancers. Although it is presumed that hormonal factors are also responsible for male breast cancer, the evidence is not as clear.

In most countries, breast cancer is often seen to be increasing over time, because girls are having their first periods at a younger age, women are having fewer pregnancies and are having them later in life, and women are becoming less physically active. Not only are the basic factors relating to ovarian hormone exposure increasing, but so is the routine use of mammography, which leads to breast cancer diagnosis at an earlier stage.

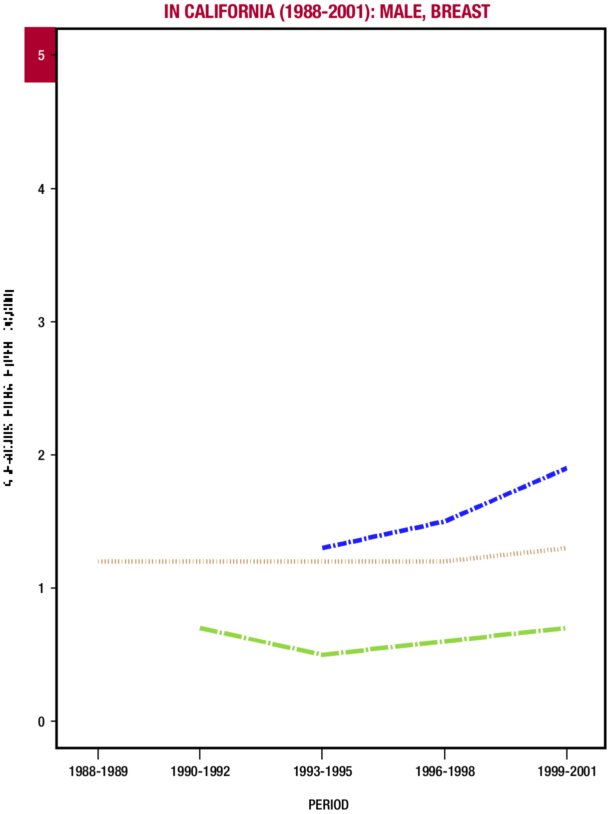
TRENDS IN INCIDENCE AND MORTALITY IN CALIFORNIA

Incidence rates of invasive breast cancer increased steadily for non-Latino white women from 1988 to 2001. Non-Latino black women also continue to have high rates of invasive breast cancer but with no overall change in the rate in this time period. Rates for Latinas, which are less than half those of non-Latino whites, have also remained largely unchanged since 1988. Although breast cancer rates in Asian groups remain lower than those in others, over time, the incidence of invasive breast cancer has grown substantially among Japanese, South Asian, Chinese and Korean women, with the steepest increases among Koreans and South Asians. Incidence rates of invasive breast cancer among men can only be tracked with confidence among non-Latino whites, non-Latino blacks and Latinos. They have risen slightly since 1993, but this may be due to chance.

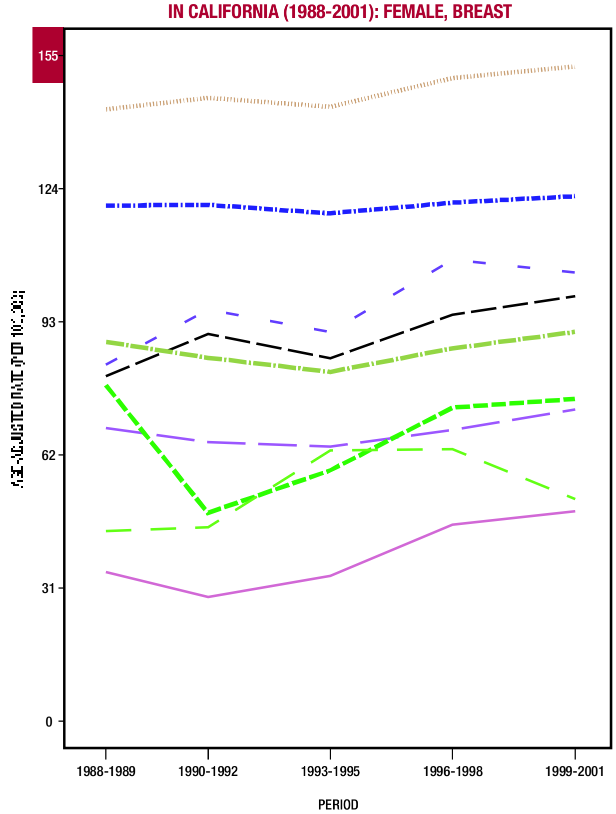
Breast cancer mortality rates decreased or changed little for most women in California since 1988, with the exception of South Asians and Filipinas for whom rates may have increased slightly. These trends indicate that although breast cancer incidence rates remain relatively high for some groups, particularly among non-Latino whites and blacks, early detection programs have contributed to declines in mortality for large segments of California's population.

Rate increases have been observed for *in situ* breast cancer in women, with rates increasing two- to three-fold among non-Latino whites, non-Latino blacks, Latinas, Japanese, Filipinas, and Chinese since 1988. Since the mid-1990's rates also rose steeply for South Asian, Vietnamese and Korean women. Although it is difficult to measure how much of this is due to increasing use of mammography, it seems apparent that improved access to early detection contributed in some part to the increasing trends in most groups for this early form of breast cancer.

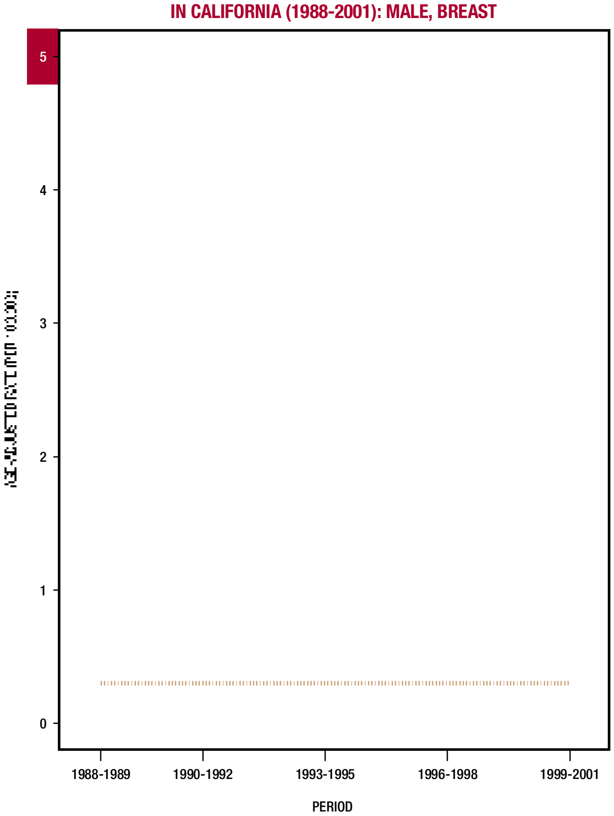
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE IN CALIFORNIA (1988-2001): MALE, BREAST



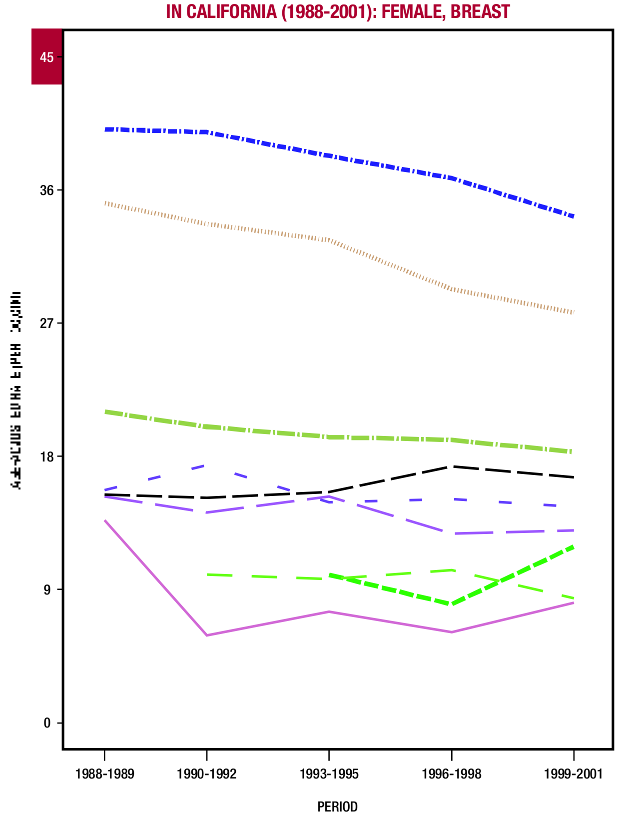
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE IN CALIFORNIA (1988-2001): FEMALE, BREAST



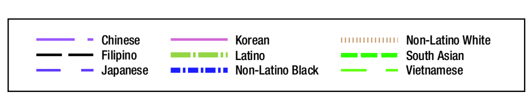
TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE IN CALIFORNIA (1988-2001): MALE, BREAST



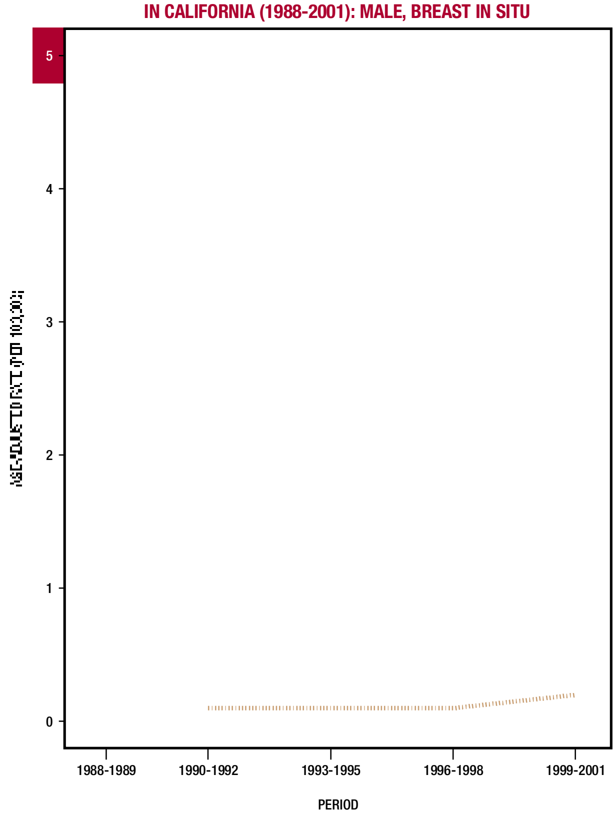
TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE IN CALIFORNIA (1988-2001): FEMALE, BREAST



*Where a rate is based on fewer than 20 cases (or deaths), that rate, and the lines joining it to adjacent rates, are omitted.

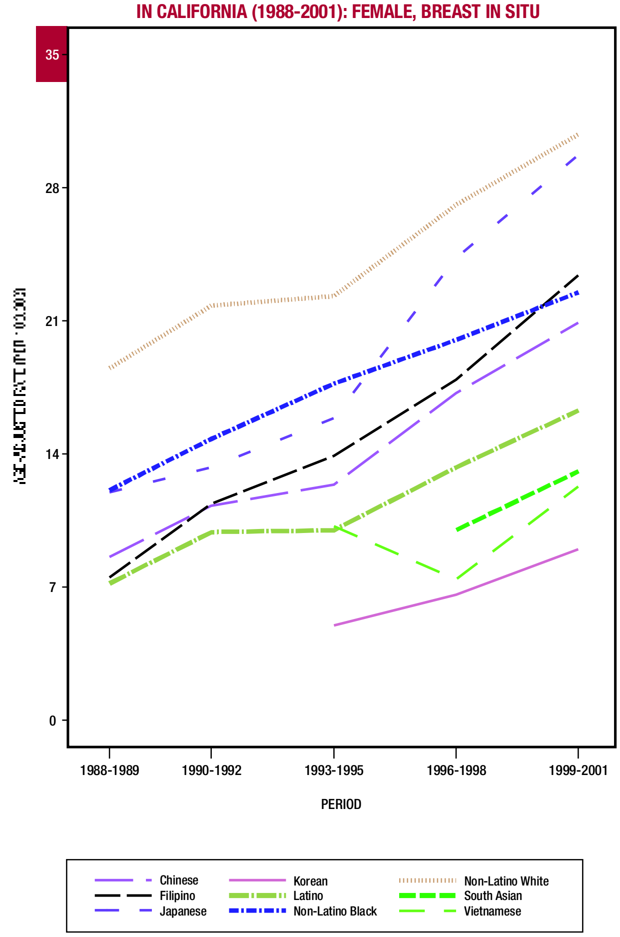


TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE IN CALIFORNIA (1988-2001): MALE, BREAST IN SITU



*Where a rate is based on fewer than 20 cases (or deaths), that rate, and the lines joining it to adjacent rates, are omitted.

TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE IN CALIFORNIA (1988-2001): FEMALE, BREAST IN SITU



Lisa C. Scott, MS

CAUSES AND WORLDWIDE TRENDS

Cervical cancer is the result of a viral infection, caused by one of a small number of human papillomaviruses. These days, most cervical cancers are detected through "pap" screening before they become invasive, and they are removed by local biopsy. Failure to obtain regular "pap" smears hinders the prevention of this cancer. The source of the original infection is sexual activity with an infected partner; infection is particularly related to exposure that occurs at younger ages, often in the teenage years. Not surprisingly, the likelihood of infection and cervical abnormalities is related to the number of sexual partners and the past sexual experience of each of those partners.

Other viruses, such as herpes simplex virus-2, are suspected of causing cervical cancer and are also spread by sexual activity. Susceptibility to the causal viruses might be enhanced by smoking and the use of oral contraceptives, but the facts are as yet unclear. It is clear that immunosuppression, most notably by HIV infection and AIDS, leads to increased likelihood of papillomavirus infection and therefore of cancer.

Nonetheless, because of increased awareness—and in no small part, increased availability of screening—the cancer's incidence is decreasing. However, in general, decreases are less evident among the poor, particularly at older ages.

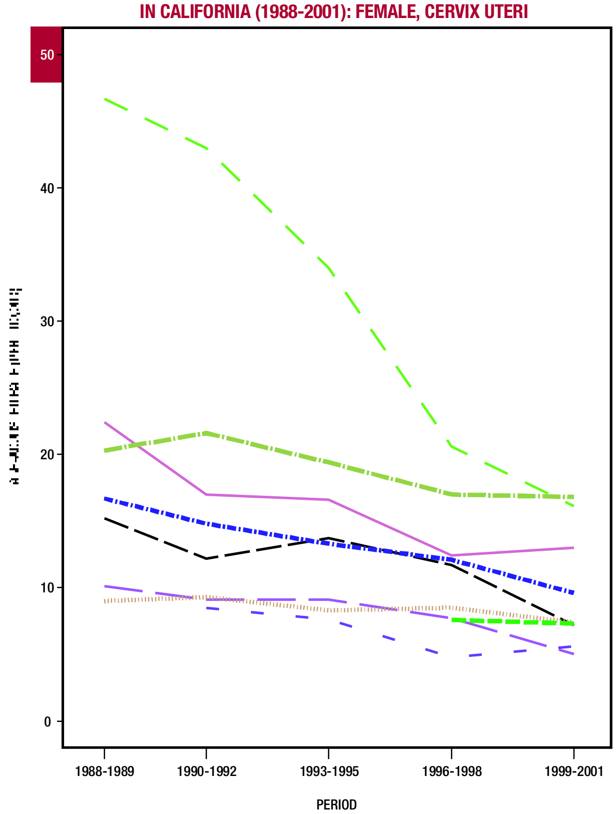
TRENDS IN INCIDENCE AND MORTALITY IN CALIFORNIA

Incidence rates among non-Latino white women have remained substantially lower than those among Latinas and non-Latino black women and have decreased only slightly from 1988 to 2001. In comparison, rates among Latinas and non-Latino blacks have decreased significantly—by almost half among blacks. These decreases might be due to the factors listed above, in particular increased access to screening.

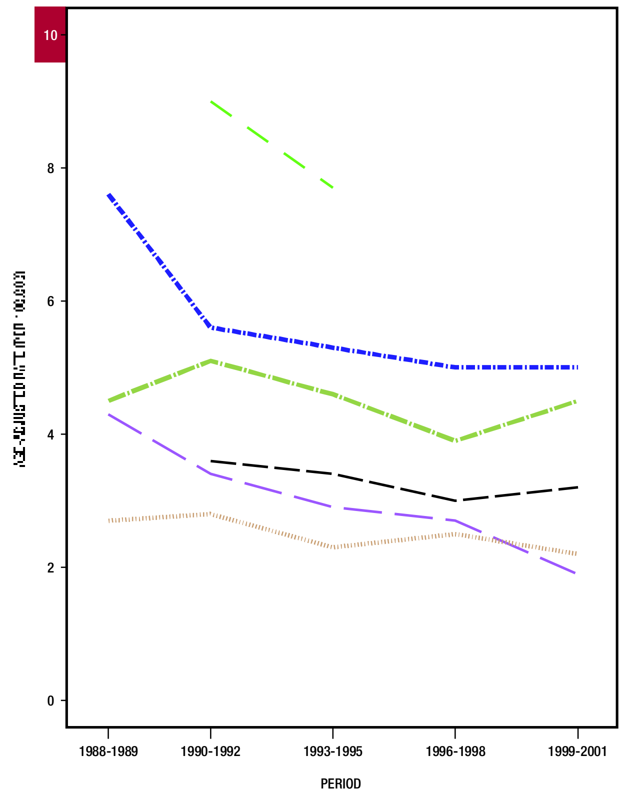
Although incidence rates among Vietnamese women are higher than those for any other group, they have steadily decreased since 1988. Incidence rates among Filipinas also have decreased steadily. Korean women and Latinas experienced similar decreases in rates in the last decade. Among other Asian women with rates roughly comparable to non-Latino white women, Chinese women experienced decreasing incidence rates and Japanese women had a slight increase in rates, but the level of occurrence is low for both.

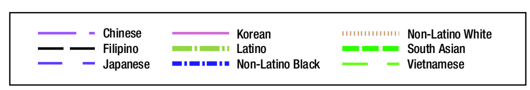
Cervical cancer mortality rates between 1988 and 2001 decreased slightly for non-Latino whites, non-Latino blacks, and Filipinas and stayed about the same for Latinas. Mortality rates decreased by about half among Chinese and Korean women, though not significantly for Koreans.

TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE IN CALIFORNIA (1988-2001): FEMALE, CERVIX UTERI



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE IN CALIFORNIA (1988-2001): FEMALE, CERVIX UTERI





*Where a rate is based on fewer than 20 cases (or deaths), that rate, and the lines joining it to adjacent rates, are omitted.

CAUSES AND WORLDWIDE TRENDS

Cancers of the colon and rectum often are combined as colorectal cancer because the organs are similar. Yet they have slightly different risk factors and incidence patterns. Researchers have shown that low physical activity and diet high in fat and red meat increase risk of these cancers, while a diet high in calcium, vegetables and fiber is protective. Evidence also suggests that risk of colorectal cancer is reduced among regular users of aspirin and other similar drugs such as ibuprofen, as well as among women who receive hormone therapy.

Historically, incidence of colorectal cancer is highest in Western countries, including the U.S., Canada, nations in northern and western Europe, Australia and New Zealand, while it is low in Japan and other Asian countries. Studies have shown that when people migrate from low-incidence to high-incidence countries, their colorectal cancer risk level rises to that of the new country of residence, demonstrating the influence of environmental factors such as diet. Dramatic increases in colorectal cancer incidence have been reported in Japan, Singapore, China and in many areas of eastern Europe in the last two decades, presumably because of the adaptation of a more westernized lifestyle. In most countries and among most racial/ethnic groups, incidence rates are at least 20 percent to 30 percent higher in men than in women.

In the U.S., colorectal cancer incidence peaked in the 1980s among non-Latino whites and in the early 1990s among non-Latino blacks. The decline in incidence in recent decades occurred in both men and women, but was more apparent in women. Screening for cancer of the colon and rectum, which includes the use of sigmoidoscopy and colonoscopy, can result in a shift toward diagnosis of early stage, rather than later-stage, cancers, as well as a decrease in incidence of all cancer stages through the detection and removal of pre-cancerous lesions.

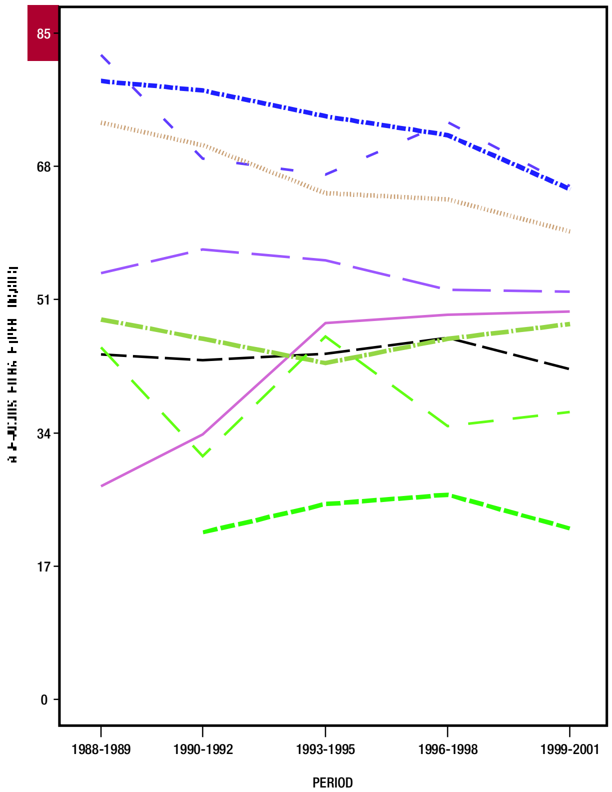
TRENDS IN INCIDENCE AND MORTALITY IN CALIFORNIA

Cancers of the colon and rectum combined are the third most commonly diagnosed cancer and the second leading cause of cancer death among both men and women in California. Between 1988 and 2001, both incidence and mortality of colon cancer were highest among non-Latino black, non-Latino white and Japanese men and women in California. Incidence declined during this period among non-Latino white and non-Latino black men and women, while it rose among Korean men and women and among South Asian and Filipino women.

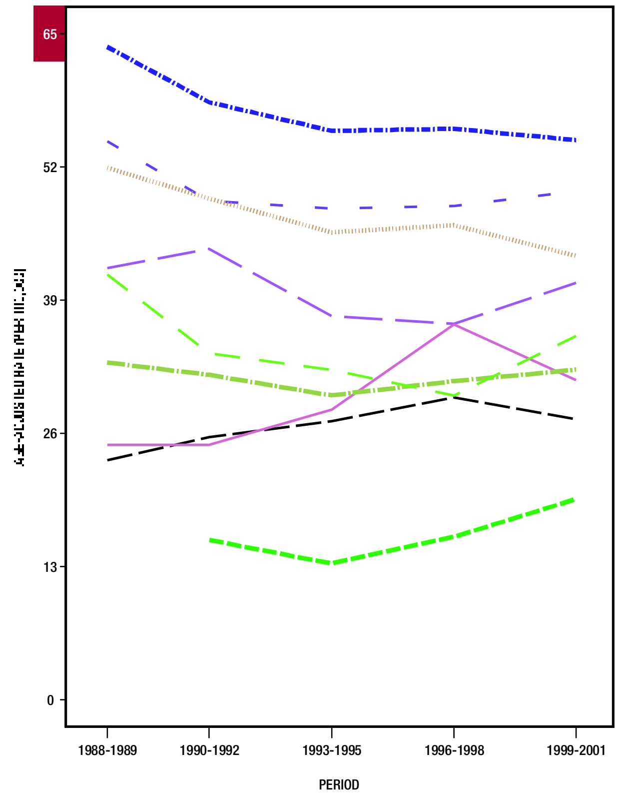
Mortality declined among non-Latino white and Chinese men and women and among non-Latino black and Japanese women, but it increased among Korean women. Similar trends were seen for incidence and mortality for invasive cancer of the colon and rectum combined and for incidence of *in situ* colon-and-rectum cancer. The increased rates of colon cancer among Koreans, a group traditionally at low risk, most likely are a result of adoption of Western culture, diet and sedentary lifestyle.

Incidence of rectal cancer was highest among Japanese men and women, and mortality was highest among Japanese men. Among non-Latino blacks, incidence and mortality declined dramatically among women but not among men. Both incidence and mortality declined for non-Latino white men and women, and incidence declined among Chinese men. The decline of incidence and mortality from colon-and-rectum cancer in several racial/ethnic groups is likely attributable to the effect of screening, but more work is clearly needed to extend this benefit to all Californians.

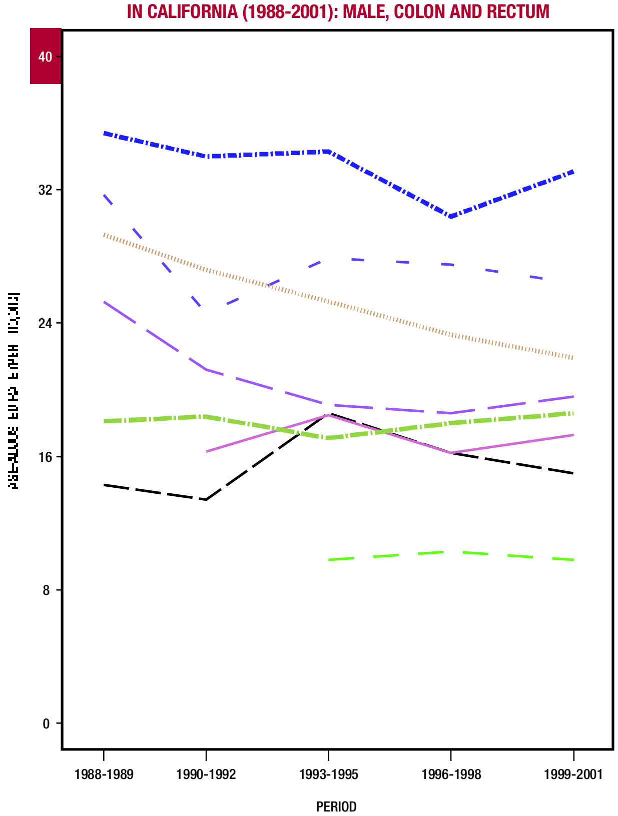
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE IN CALIFORNIA (1988-2001): MALE, COLON AND RECTUM



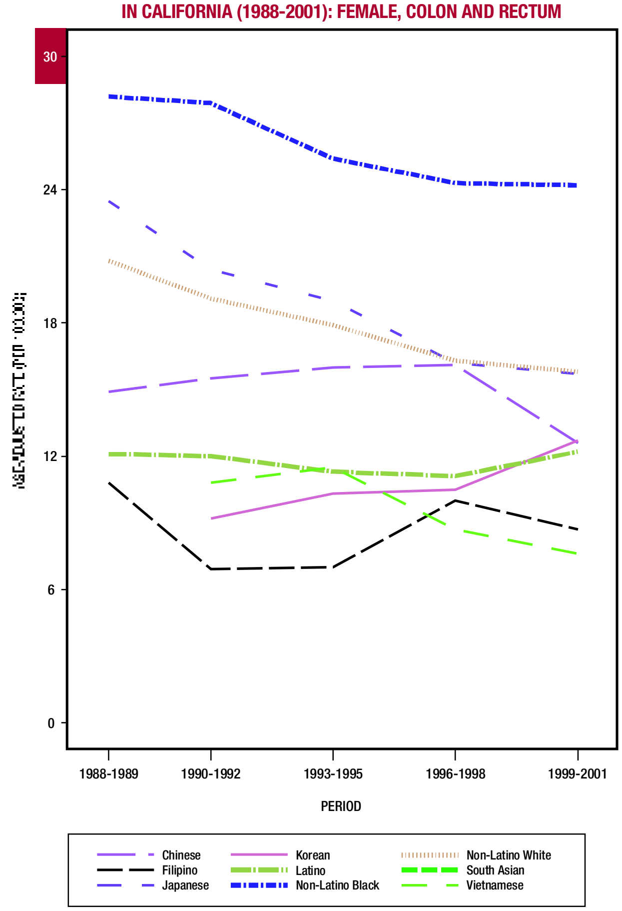
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE IN CALIFORNIA (1988-2001): FEMALE, COLON AND RECTUM



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE IN CALIFORNIA (1988-2001): MALE, COLON AND RECTUM

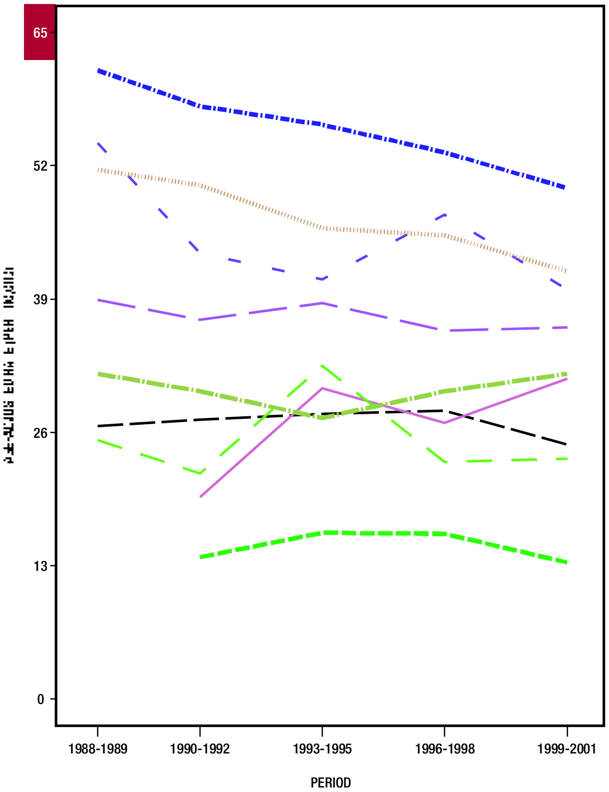


TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE IN CALIFORNIA (1988-2001): FEMALE, COLON AND RECTUM

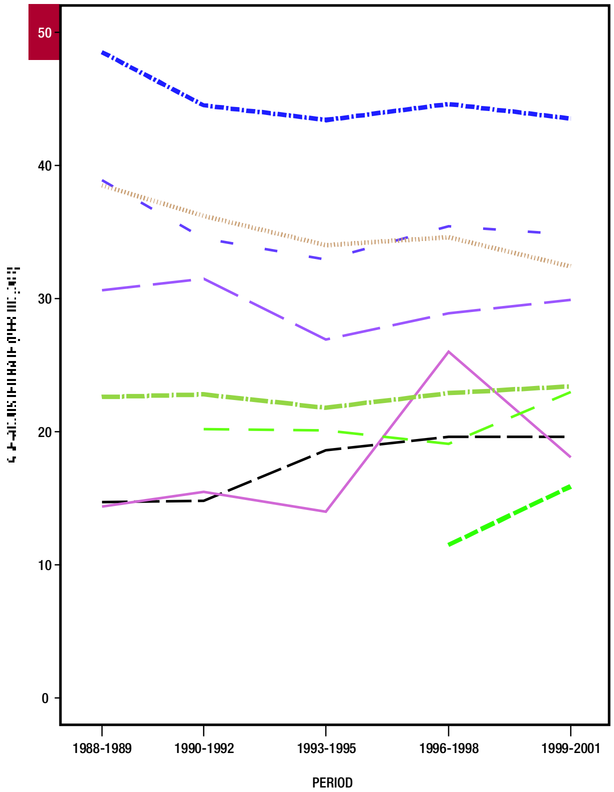


*Where a rate is based on fewer than 20 cases (or deaths), that rate, and the lines joining it to adjacent rates, are omitted.

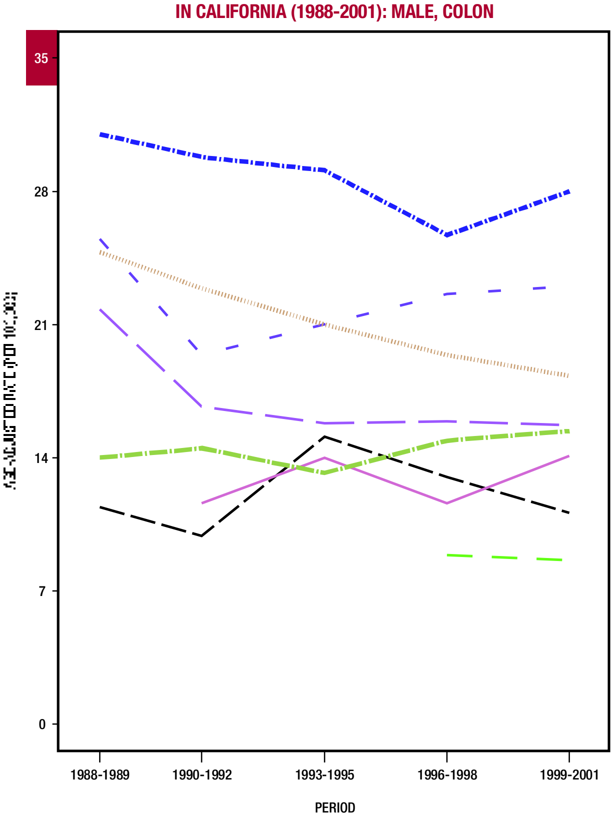
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE
IN CALIFORNIA (1988-2001): MALE, COLON



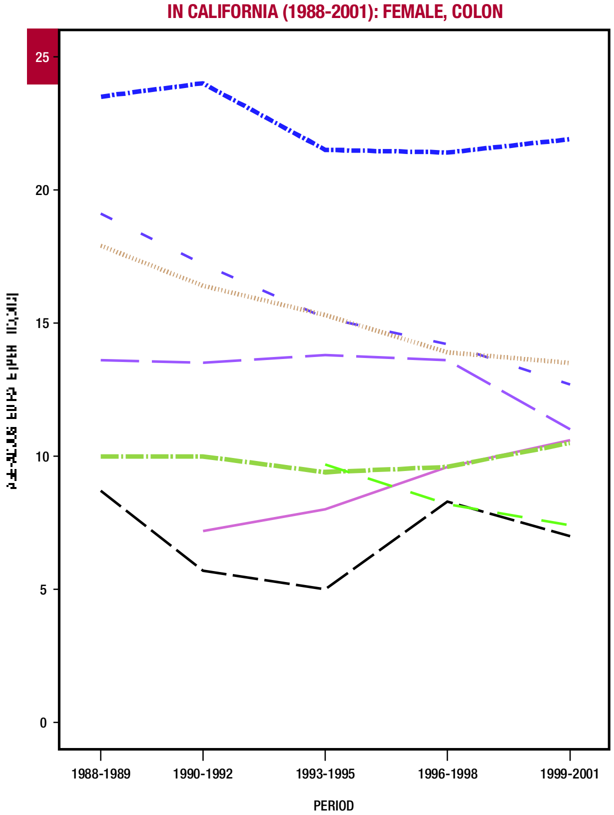
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE
IN CALIFORNIA (1988-2001): FEMALE, COLON



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE
IN CALIFORNIA (1988-2001): MALE, COLON



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE
IN CALIFORNIA (1988-2001): FEMALE, COLON



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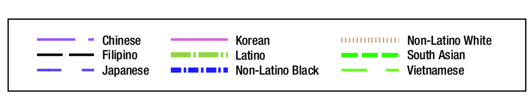
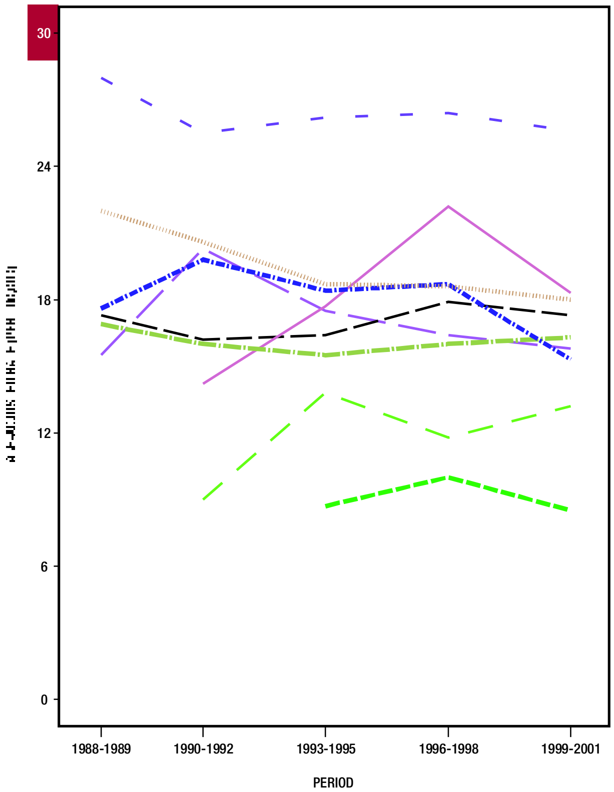
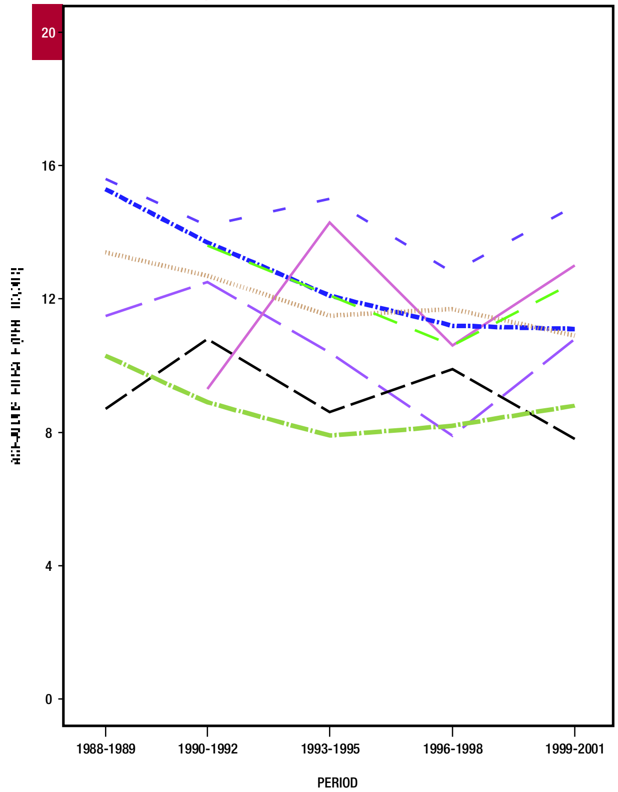


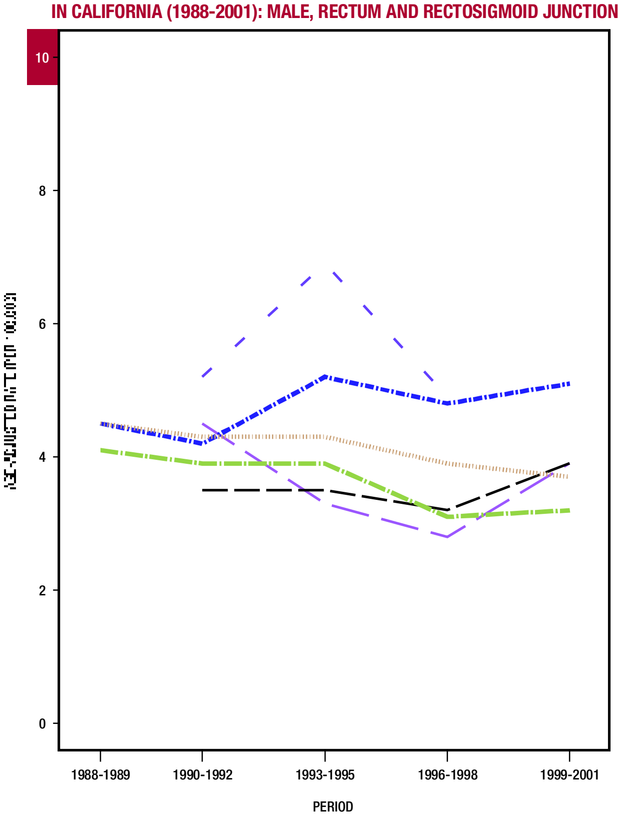
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE
IN CALIFORNIA (1988-2001): MALE, RECTUM AND RECTOSIGMOID



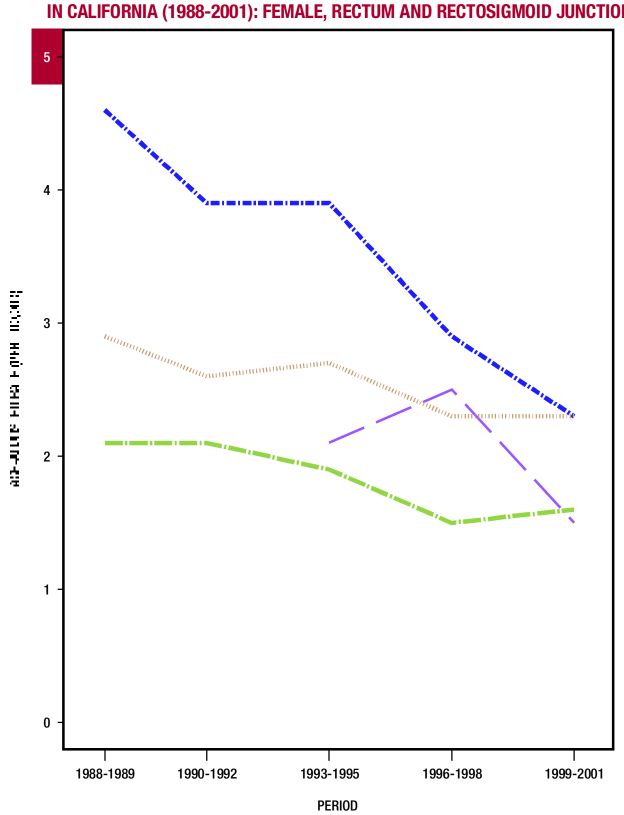
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE
IN CALIFORNIA (1988-2001): FEMALE, RECTUM AND RECTOSIGMOID



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE
IN CALIFORNIA (1988-2001): MALE, RECTUM AND RECTOSIGMOID JUNCTION



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE
IN CALIFORNIA (1988-2001): FEMALE, RECTUM AND RECTOSIGMOID JUNCTION



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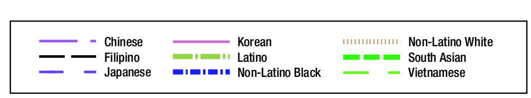

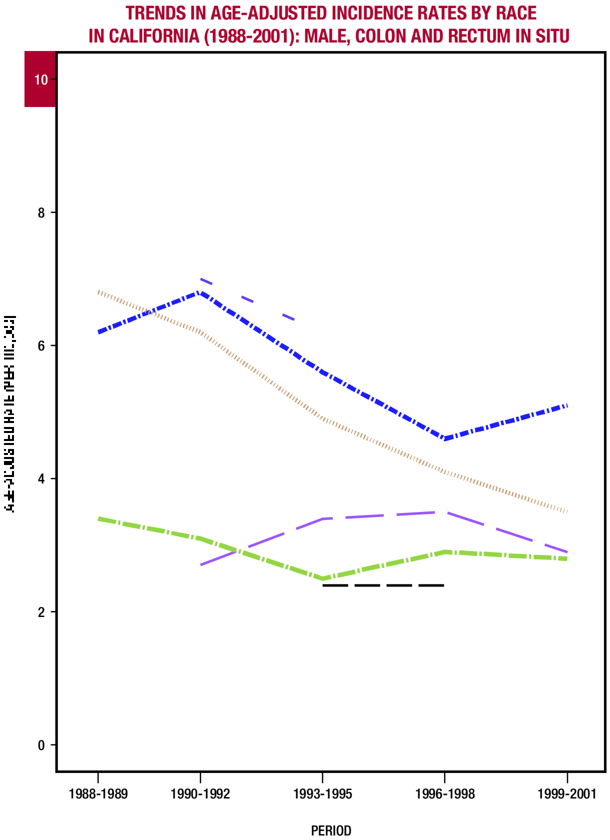

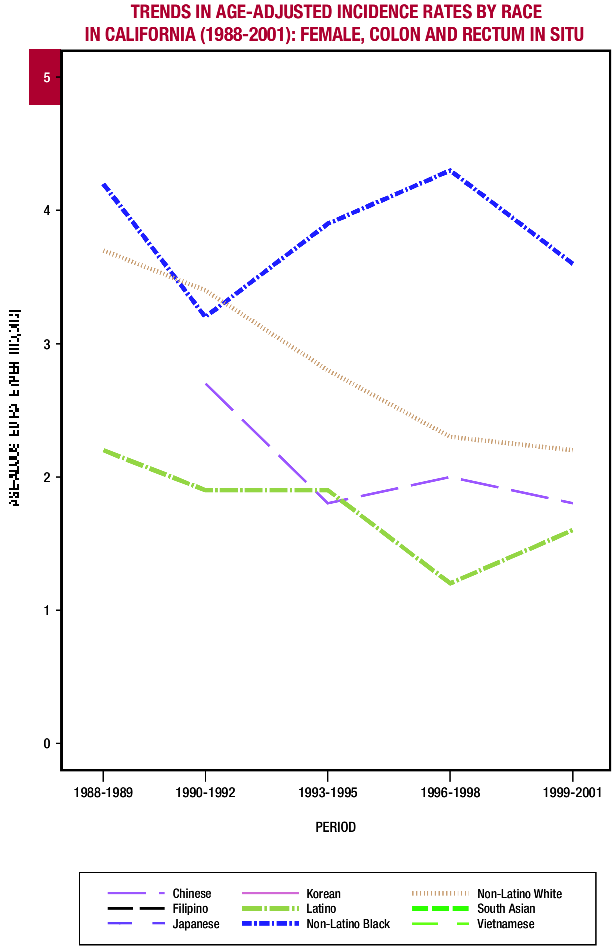

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CORPUS AND UTERUS

Janet Bates, MD, MPH

CAUSES AND WORLDWIDE TRENDS

Although uterine cancers may originate from any part of the uterus, the vast majority develop in the endometrium (the inner lining of the uterus). This type of malignancy, called endometrial cancer, is the most common cancer of the female reproductive system.

Endometrial cancers are uncommon before menopause. Any factor that increases chronic exposure of the uterus to the female hormone estrogen increases the risk for developing endometrial cancer. Chronic estrogen exposure may either occur naturally, through such factors as undergoing late menopause or having no or few pregnancies, or result from “unopposed” estrogen replacement therapy (meaning estrogen is given alone without progesterone) for treatment of menopausal symptoms. Use of unopposed estrogen therapy was largely discontinued in the late 1970s because of the high risk of developing endometrial cancer.

Obesity is also a major risk factor for endometrial cancer because fat cells produce estrogen, even after menopause. Diabetes and hypertension also increase the risk of developing endometrial cancer, although this may be related to the high rate of obesity among women with these conditions.

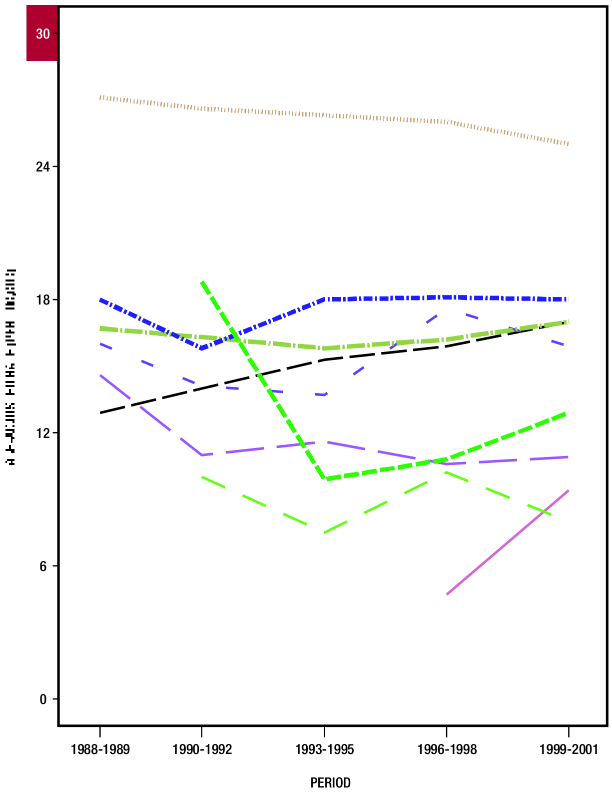
Worldwide, the highest incidence of uterine cancer is found in the U.S. and Canada and the lowest in Africa and Asia. Studies of Asian immigrants in the U.S. have found that rates of endometrial cancer are higher among Asian women in the U.S. than in their country of origin. The reasons for this are not established, but the greater prevalence of obesity among American women is thought to be a factor. The historical practice of combining endometrial and cervical cancers as a single disease limits the ability to examine worldwide trends over long periods.

TRENDS IN INCIDENCE AND MORTALITY IN CALIFORNIA

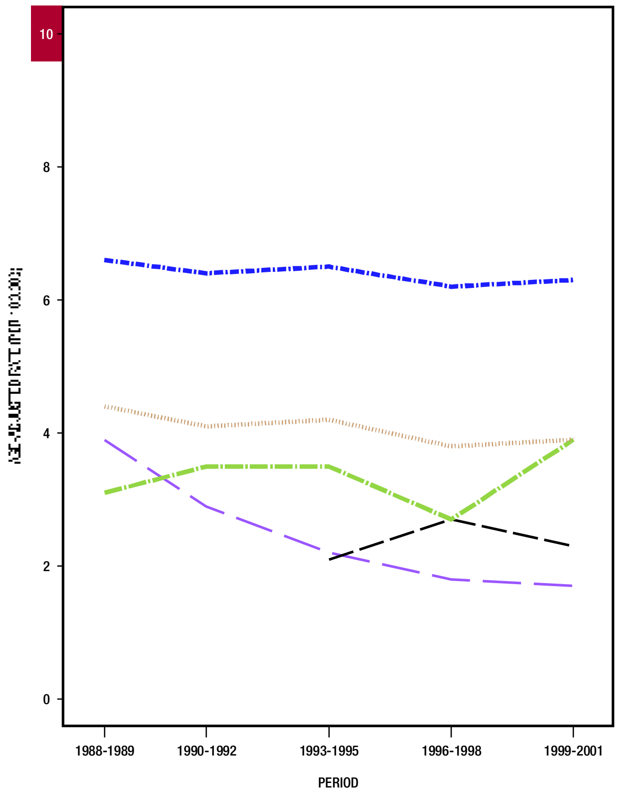
In California, as in the U.S. as a whole, uterine cancer incidence rates are highest among non-Latino white women. Non-Latino black women develop uterine cancer less often than non-Latino white women, but slightly more often than Latinas and Asian women. Incidence among Asian women varies by subgroup, with the highest rates found among Japanese women and the lowest among Chinese, Vietnamese and Korean women. While rates in most groups have been relatively stable between 1988 and 2001, there have been substantial increases in rates among Filipino and Korean women. The reasons for these changes are not known.

Although non-Latino blacks have a lower incidence of uterine cancer than non-Latino whites, their mortality rates are higher. This may reflect earlier stage at diagnosis due to better access to medical care among non-Latino whites. Mortality rates are lowest among Latinas and all Asian subgroups. Both non-Latino whites and non-Latino blacks have had slight declines in mortality between 1988 and 2001. Among Asian women, mortality rates declined substantially only among Chinese women. Mortality rates have fluctuated among Latinas, but did not change significantly over the entire period.

TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE
IN CALIFORNIA (1988-2001): FEMALE, CORPUS AND UTERUS NOS



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE
IN CALIFORNIA (1988-2001): FEMALE, CORPUS UTERI



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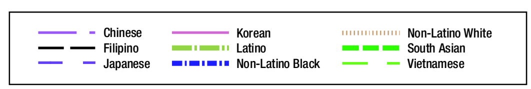


ESOPHAGUS

Sidney Saltzstein, MD

CAUSES AND WORLDWIDE TRENDS

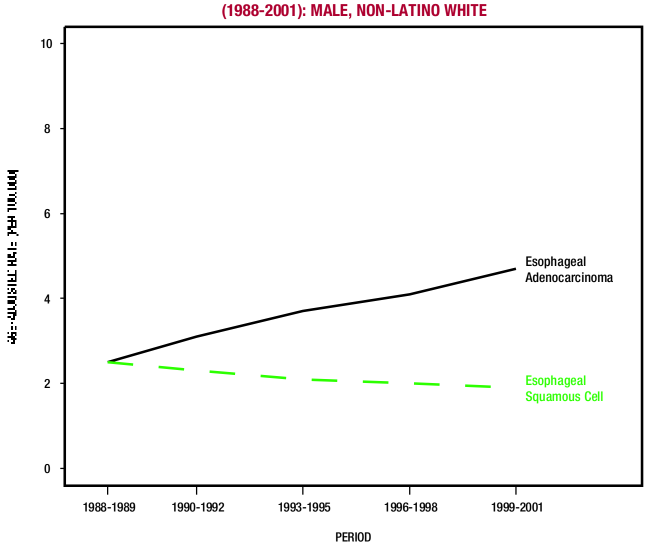
Esophageal cancer incidence trends should be examined by considering the cancer's two main subtypes: squamous cell carcinoma, which appears to be rapidly declining in most populations, and adenocarcinoma, which is either remaining stable over time or increasing.

Adenocarcinoma of the esophagus mostly affects white populations (including Latino whites), whereas observers have noted the highest rates of squamous cell carcinomas of the esophagus in parts of Asia (particularly China), Africa and Latin America, as well as among blacks in the U.S. Squamous cell carcinoma of the esophagus seems to be related to heavy use of tobacco and alcohol, or less common activities such as chewing betel nut. Nutritional deficiencies, particularly from insufficient fruit and vegetable consumption, and drinking extremely hot beverages also contribute to the risk of squamous cell cancers. Cigarette-smoking contributes more strongly to the risk of squamous cell tumors than to risk of adenocarcinoma. Alcohol consumption does not appear to play a role in adenocarcinoma of the esophagus. Obesity and reflux disease (heartburn) are the most likely contributors to esophageal adenocarcinoma.

TRENDS IN INCIDENCE AND MORTALITY IN CALIFORNIA

Non-Latino blacks had by far the highest rates of esophageal cancer in California from 1988 to 2001, followed by Japanese (among men, at least), while Filipinos had the lowest rates of any racial/ethnic group. During this time period, overall esophageal cancer incidence rates declined rapidly for non-Latino blacks and Chinese men, and slightly for Latino men. Conversely, rates among non-Latino white men increased. Esophageal cancer incidence stayed about the same among all other racial/ethnic groups.

TRENDS IN AGE-ADJUSTED INCIDENCE RATES IN CALIFORNIA (1988-2001): MALE, NON-LATINO WHITE

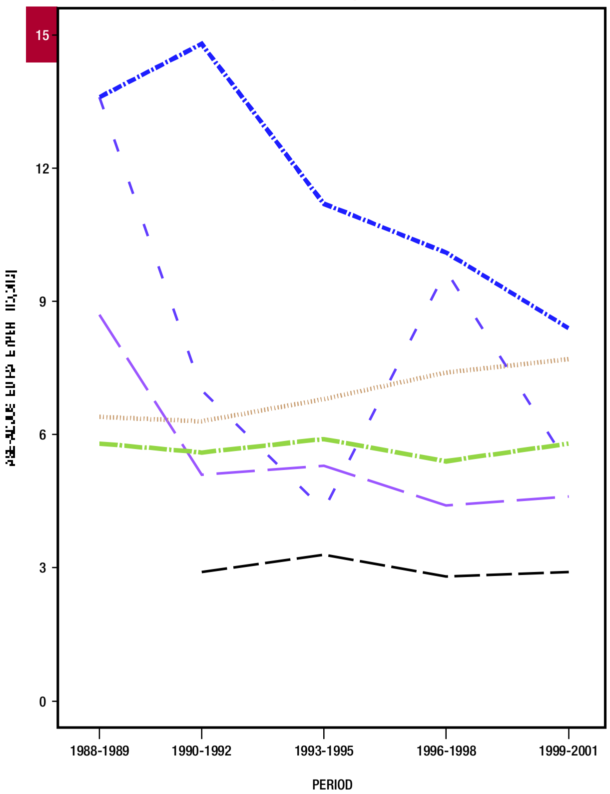


Most of the increase in non-Latino white male esophageal cancer was attributable to the increase in adenocarcinoma of the esophagus (see right). The slight decline in esophageal cancer incidence for Latino men masked an increase in adenocarcinoma that was more than offset by a decline in squamous cell cancers. For both Chinese and black men, most of the decline in overall esophageal cancer incidence was traced to a rapid decline in squamous cell cancers; adenocarcinoma is rare in both race/ethnic groups.

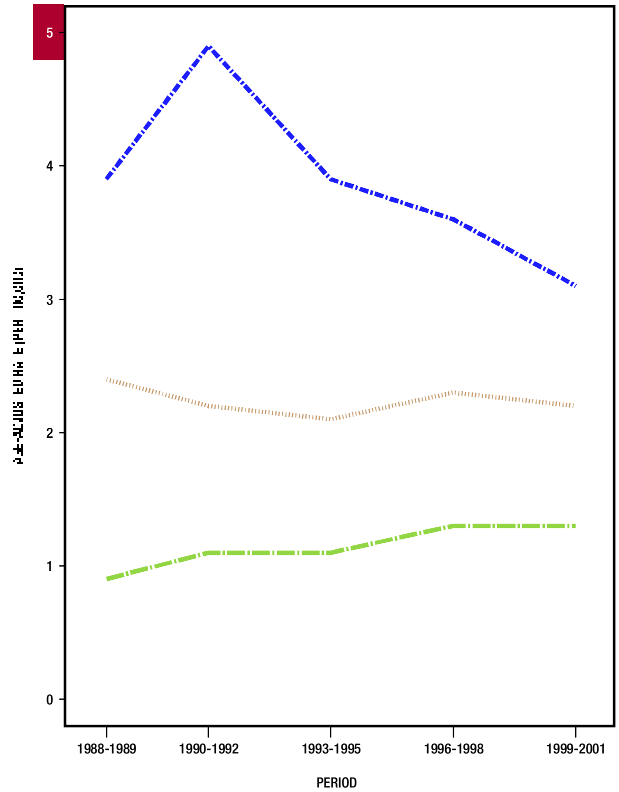
Mortality trends were strikingly similar to incidence trends, indicating that esophageal cancer is a disease with a poor prognosis, and that survival has not improved in recent decades.

Clearly the two main areas of future research for esophageal cancer are to try to better understand the different causes of the two main subtypes of the disease (to address the observed increases in adenocarcinoma, and continue the declines in incidence of squamous cell cancers), and to develop more effective early detection activities and improve treatments to reduce deaths from esophageal cancer.

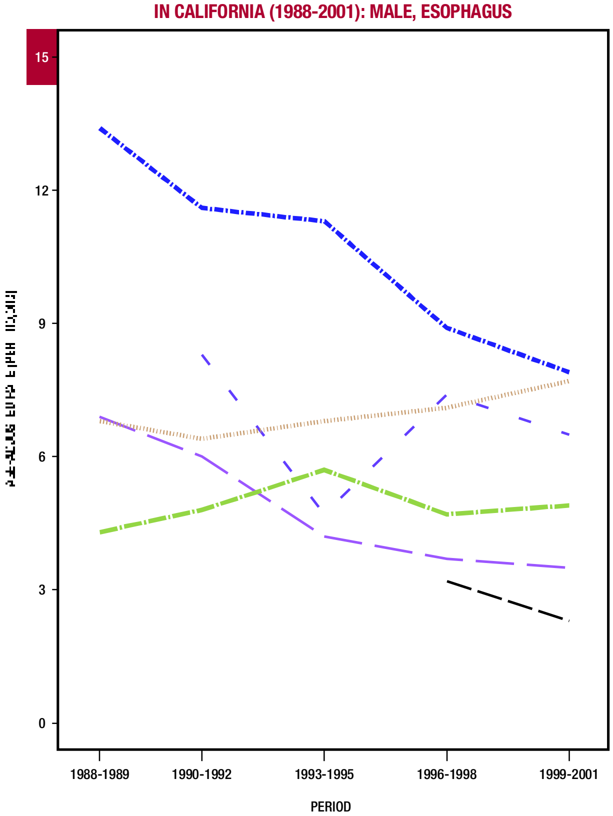
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE IN CALIFORNIA (1988-2001): MALE, ESOPHAGUS



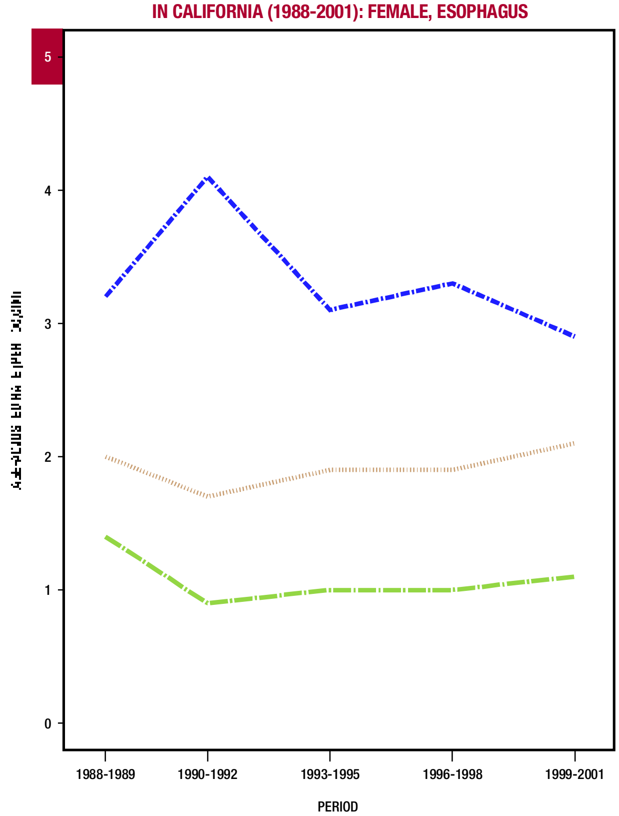
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE IN CALIFORNIA (1988-2001): FEMALE, ESOPHAGUS



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE IN CALIFORNIA (1988-2001): MALE, ESOPHAGUS



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE IN CALIFORNIA (1988-2001): FEMALE, ESOPHAGUS



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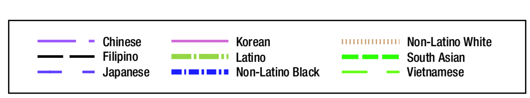


HODGKIN LYMPHOMA

Wendy Cozen, DO, MPH

CAUSES AND WORLDWIDE TRENDS

Hodgkin lymphoma is a type of lymphoma with symptoms resembling those of a chronic infectious disease. The occurrence varies by age and specific microscopic type.

In the U.S., this lymphoma is most common among adolescents and young adults. In this age group, the majority of patients develop the "nodular sclerosis" microscopic subtype. This subtype is most common among non-Latino whites, is strongly associated with higher socioeconomic status, occurs equally in men and women, and is the most common type in developed countries (but not developing nations).

Young children and older adults most often develop the "mixed cellularity" subtype, the second-most-common microscopic type. Mixed-cellularity Hodgkin lymphoma is twice as common in men than in women, is not associated with higher socioeconomic status, and is the dominant subtype in developing countries. Other microscopic subtypes are uncommon and show no definite demographic patterns.

People who grow up with fewer brothers and sisters and in less crowded conditions are at a higher risk of the Hodgkin lymphoma subtype more common in adolescents and young adults. These risk factors, combined with the occurrence pattern described above, suggest the young adult peak of Hodgkin lymphoma is caused by a common childhood infection acquired later than usual. Children growing up relatively isolated from other children may escape exposure to common childhood infections when they are young and instead contract the infection or infections later. Young adult nodular sclerosis Hodgkin lymphoma is thought to be an occasional consequence of an infection acquired relatively late in life.

Some scientists propose the Epstein-Barr virus as the infectious agent behind Hodgkin lymphoma, since people who have had infectious mononucleosis have a higher-than-average risk of the cancer and since antibodies to the Epstein-Barr virus are elevated in the years before diagnosis. However, examining cases carefully by age at diagnosis and microscopic subtype suggests that Epstein-Barr virus may be associated with only a subset of Hodgkin lymphoma tumors. It is relatively common in tumors (mostly the mixed cellularity subtype) of children and older adults, but it is relatively uncommon in tumors (mostly the nodular sclerosis subtype) of adolescents and young adults.

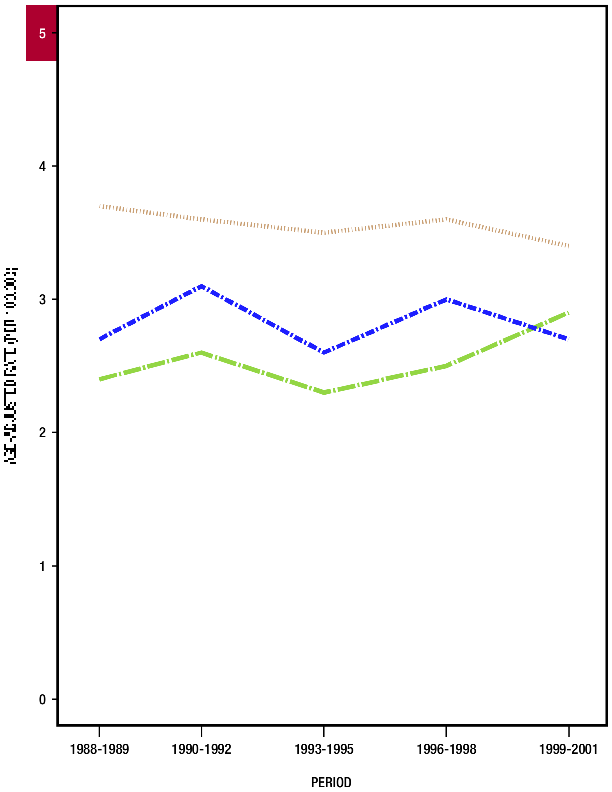
Immediate relatives of Hodgkin lymphoma patients and especially identical twins of patients are at increased risk of developing the tumor, suggesting that risk for the cancer is heritable.

TRENDS IN INCIDENCE AND MORTALITY IN CALIFORNIA

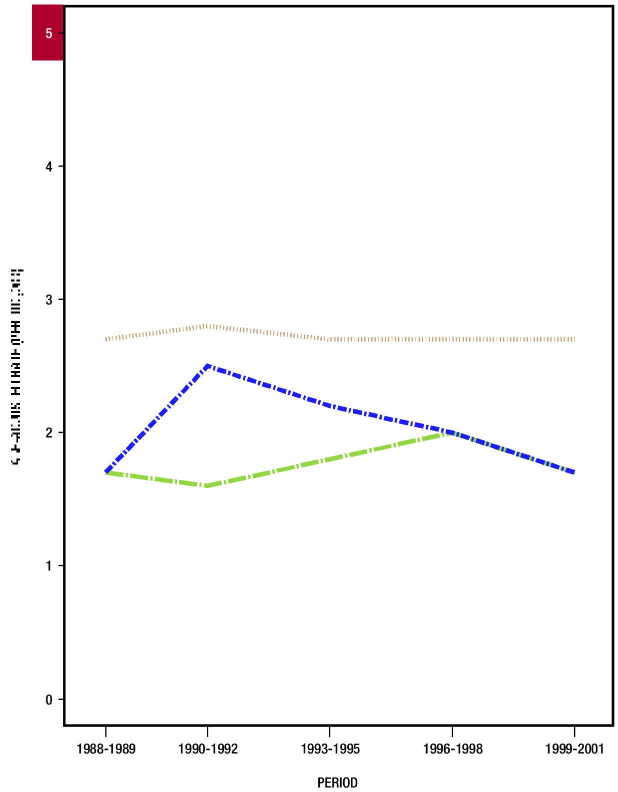
In California, overall Hodgkin lymphoma incidence rates are highest among non-Latino whites and lowest among Asians. Incidence rates among non-Latino white men and women have changed little over the last 12 years, except for a slight peak in the mid-1990s. Non-Latino black men experienced fluctuating incidence rates between 1988 and 2001, but rates changed little overall. Rates among Latino males appear to have increased slightly since 1988. In contrast, except for an initial small increase among non-Latino black females, Latinas and non-Latino black females experienced generally declining incidence rates. Time trends could not be evaluated for Asian patients since the number of cases was too few.

Continued on page 69

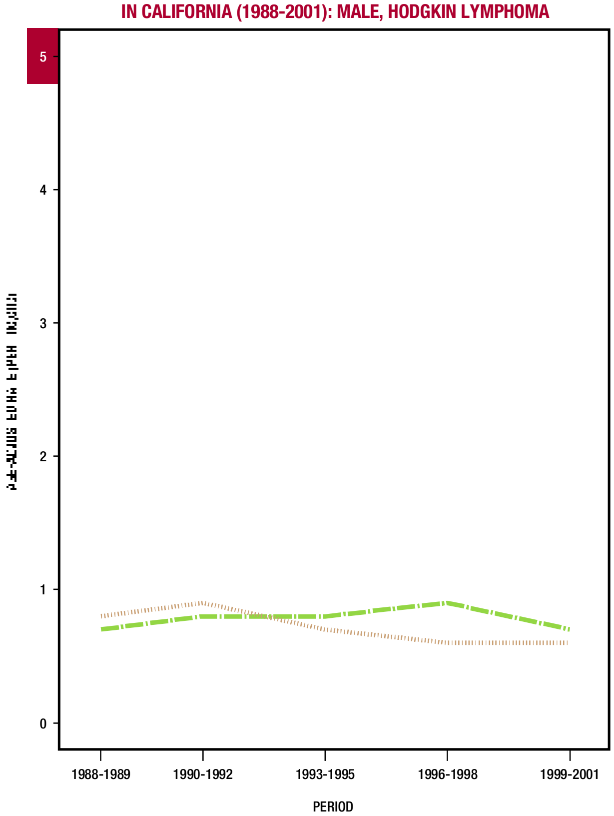
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE IN CALIFORNIA (1988-2001): MALE, HODGKIN LYMPHOMA



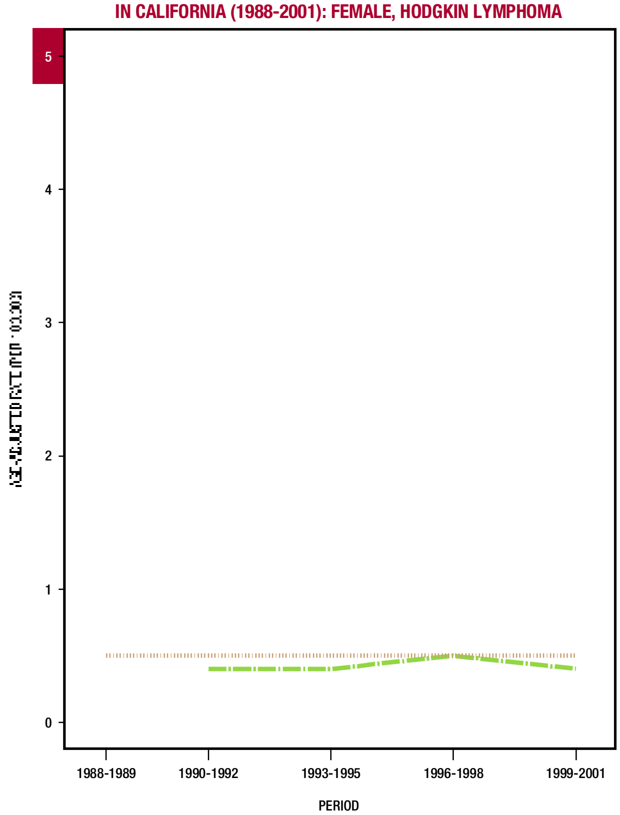
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE IN CALIFORNIA (1988-2001): FEMALE, HODGKIN LYMPHOMA



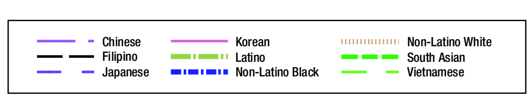
TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE IN CALIFORNIA (1988-2001): MALE, HODGKIN LYMPHOMA



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE IN CALIFORNIA (1988-2001): FEMALE, HODGKIN LYMPHOMA



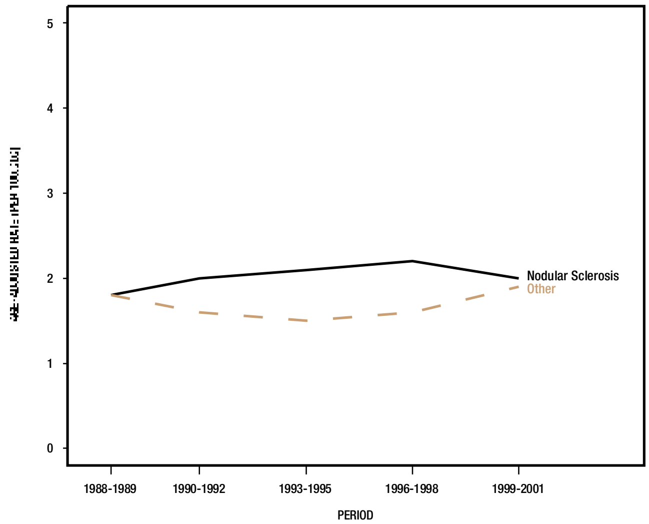
*Where a rate is based on fewer than 20 cases (or deaths), that rate, and the lines joining it to adjacent rates, are omitted.



Evidence suggests that Hodgkin lymphoma characteristics may vary by microscopic subtype, so we compared trends in incidence of nodular sclerosis and other types of Hodgkin lymphoma over time. Nodular sclerosis incidence rates increased very slightly among non-Latino men until the mid-1990s and then decreased in the late 1990s (see right).

Mortality rates were stable among men and slightly declined among women between 1988 and 2001. Due to modern therapy, the survival rate for Hodgkin lymphoma is among the highest of any cancer, although complications of therapy can occur later in life.

TRENDS IN AGE-ADJUSTED HODGKIN LYMPHOMA INCIDENCE RATES IN CALIFORNIA (1988-2001): MALE, NON-LATINO WHITE



KAPOSI SARCOMA

Sally Glaser, PhD

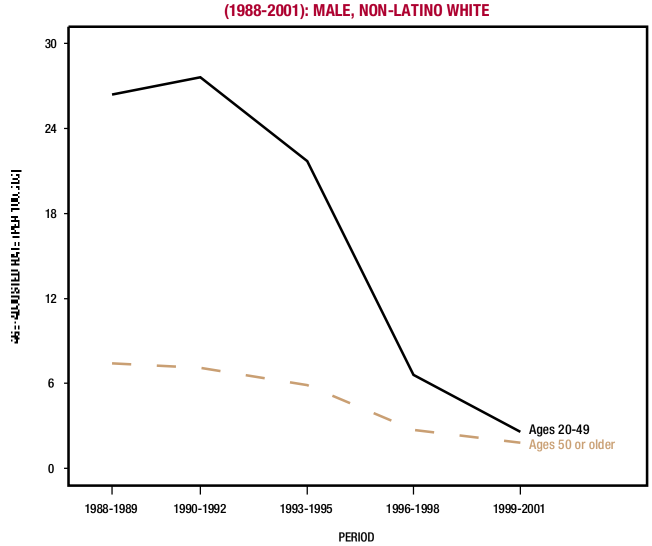
CAUSES AND WORLDWIDE TRENDS

Before the HIV epidemic, Kaposi sarcoma was known as a very rare, slow-developing cancer affecting the skin and was diagnosed mostly in older men of Mediterranean or Jewish heritage. In the early 1980s, the sudden appearance of Kaposi sarcoma in young gay men was one herald of the AIDS epidemic: the immunosuppression associated with HIV infection proved to greatly increase risk of the cancer. In addition, findings that Kaposi sarcoma was associated with sexual transmission led to the identification of a newly described virus, the Kaposi sarcoma-associated herpesvirus (KSHV), which is thought to play an important part in the development of Kaposi sarcoma.

Today, Kaposi sarcoma is primarily considered an HIV-related cancer. Therefore, the trend in its incidence rates, including the initial dramatic rise in the 1980s (one of the most striking changes in cancer occurrence ever noted), has closely mirrored the progress of the epidemic. Because the risk of Kaposi sarcoma is so elevated with HIV infection, the groups affected by Kaposi sarcoma are the same as those at risk for HIV. Thus, in California, Kaposi sarcoma predominantly has affected young non-Latino white men, with very high incidence rates in communities with large gay populations, and it is rare in women. In contrast, in parts of Africa, Kaposi sarcoma rates are high among both men and in women.

TRENDS IN INCIDENCE IN CALIFORNIA

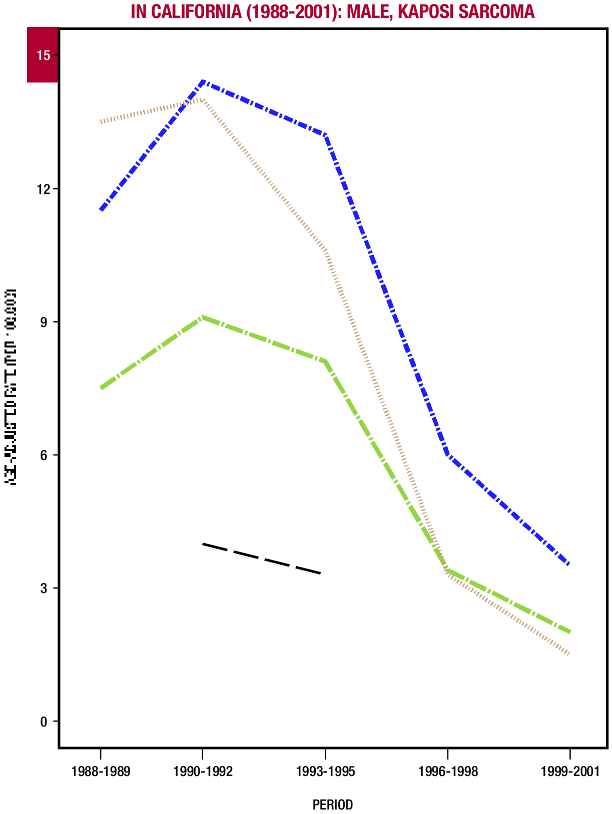
TRENDS IN AGE-ADJUSTED KAPOSI SARCOMA INCIDENCE RATES IN CALIFORNIA (1988-2001): MALE, NON-LATINO WHITE



Between 1988 and 2001, trends in Kaposi sarcoma incidence in California continued to illustrate the powerful association of this cancer with the HIV-AIDS epidemic. Rates were highest in population subgroups experiencing the most HIV infection, such as men (particularly those ages 20-49: see right) and non-Latino blacks. Prior to 1990, Kaposi sarcoma rates in men were still rising among non-Latino blacks, non-Latino whites, and Latinos, reflecting HIV-prevalence increases in these groups through the 1980s. However, in the first half of the 1990s, rates began to decline rapidly following public-health interventions that diminished the risk of spreading HIV and KSHV. Between 1993 and 1998, the use of anti-viral drug therapies dropped incidence rates even further. These therapies reduced the immunosuppressive impact of HIV and appear to be rendering Kaposi sarcoma a rare cancer once again. The more pronounced drop among non-Latino white men compared to black men likely reflects different exposure patterns to HIV and KSHV and better access to anti-viral treatments.

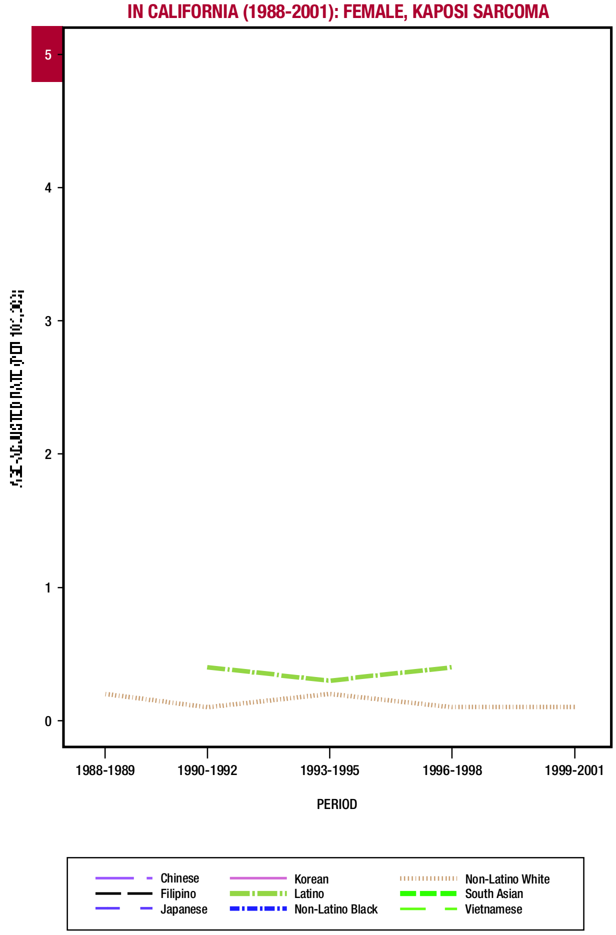
Throughout the HIV-AIDS epidemic in California, rates of Kaposi sarcoma in men have been markedly lower in Asian population groups, consistent with the lower prevalence of HIV infection in Asians. Among women, Kaposi sarcoma has been rare, and its incidence has remained about the same between 1998 and 2001.

TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE
IN CALIFORNIA (1988-2001): MALE, KAPOSI SARCOMA



*Where a rate is based on fewer than 20 cases (or deaths), that rate, and the lines joining it to adjacent rates, are omitted.

TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE
IN CALIFORNIA (1988-2001): FEMALE, KAPOSI SARCOMA



KIDNEY AND RENAL PELVIS

Thomas H. Taylor, PhD and Hoda Anton-Culver, PhD

CAUSES AND WORLDWIDE TRENDS

Kidney cancers include renal cell and renal pelvis cancers, which are cancer sites within the main and lower parts of the kidney. Kidney cancer incidence has been increasing at a rate of about 2 percent per year for the past 65 years, for reasons that remain unclear. Overall, the mortality rate has slightly increased over the past two decades, though not as rapidly as the incidence rate. Kidney cancer incidence and mortality rates are nearly twofold higher for men than for women. Significant racial/ethnic disparities are evident in kidney cancer incidence and mortality.

About 30 percent of kidney cancers are detected without prior symptoms because of the widespread and increasing use of computed tomography (CT) for other medical reasons. More than 40 percent of kidney cancers are not diagnosed until they have spread to other parts of the body. Only 9 percent of patients diagnosed with advanced and spreading kidney cancer survive more than five years. In contrast, nearly 90 percent of patients with cancer confined to the kidney survive for five years. Of particular interest to scientists is the fact that renal cell cancer is one of the few types of cancer in which there are well-documented cases of tumors spontaneously regressing without treatment.

Some 30,800 Americans are diagnosed with kidney cancer each year. Renal cell carcinoma accounts for 80 percent to 85 percent of all kidney cancers in the U.S. The remaining kidney cancers are mostly cancers of the renal pelvis (including the ureter).

The exact causes of kidney cancer are not well understood. Most studies indicate that cigarette smoking is likely to increase the risk of kidney cancer and that the risk declines with the years after stopping smoking. Several studies found no link between coffee consumption and kidney cancer risk. Similarly, studies found no association between alcohol intake and risk. Dietary factors also have been studied, and findings hint that high protein intake increases risk and eating fruits and vegetables has a protective effect. In addition, obesity has been linked to increased risk for kidney cancer, particularly in women.

The estimated lifetime risk of getting kidney cancer is about 1.5 percent for American men and just under 1 percent for American women. The lifetime risk of dying from kidney cancer is about 57 in 10,000 for American men and 34 in 10,000 for American women.

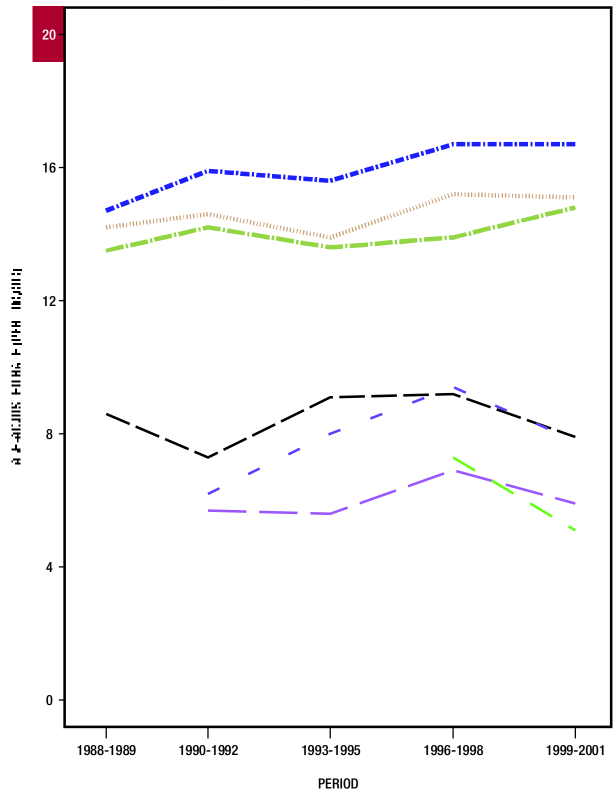
TRENDS IN INCIDENCE AND MORTALITY IN CALIFORNIA

In California, trends for kidney cancer incidence rates over the past two decades are similar to those nationwide. The rates in non-Latino black men are consistently higher than in all other racial/ethnic groups. However kidney cancer rates among Latinas are now higher than among non-Latino black females. Non-Latino whites have the next-highest rates. The rates in Asians are about half of those in other racial/ethnic groups.

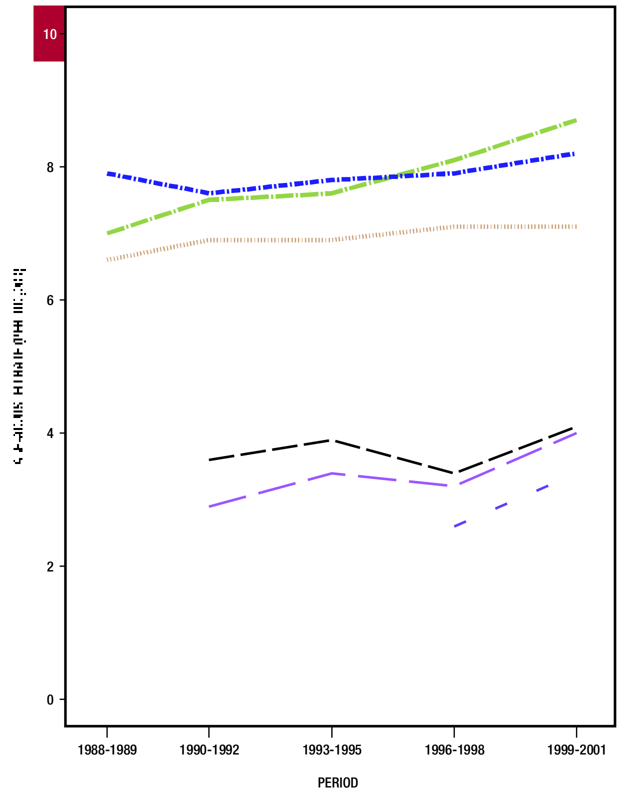
Incidence rates increased over time among non-Latino blacks and non-Latino whites.

Mortality rates also increased for non-Latino blacks, while mortality rates for Filipino and Chinese men were about half those of non-Latino black, Latino and non-Latino white men.

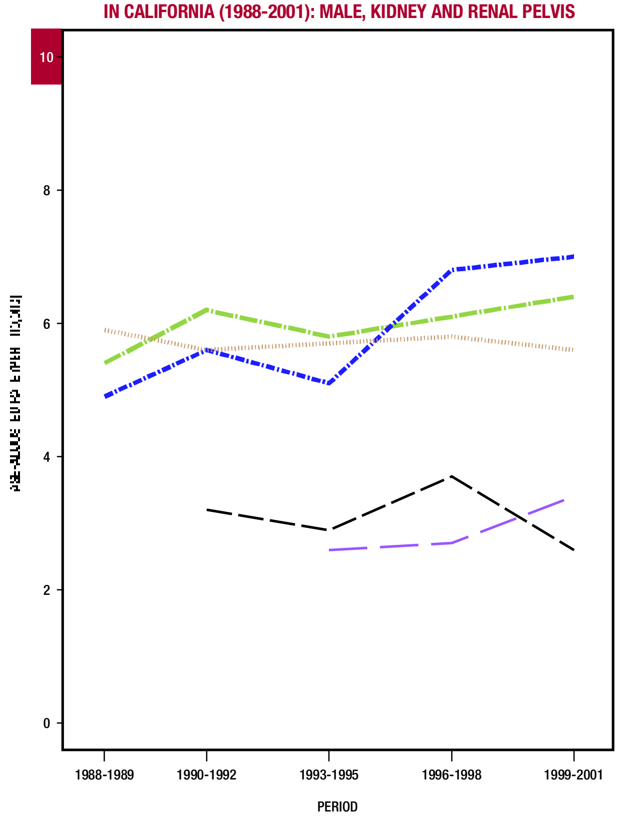
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE
IN CALIFORNIA (1988-2001): MALE, KIDNEY AND RENAL PELVIS



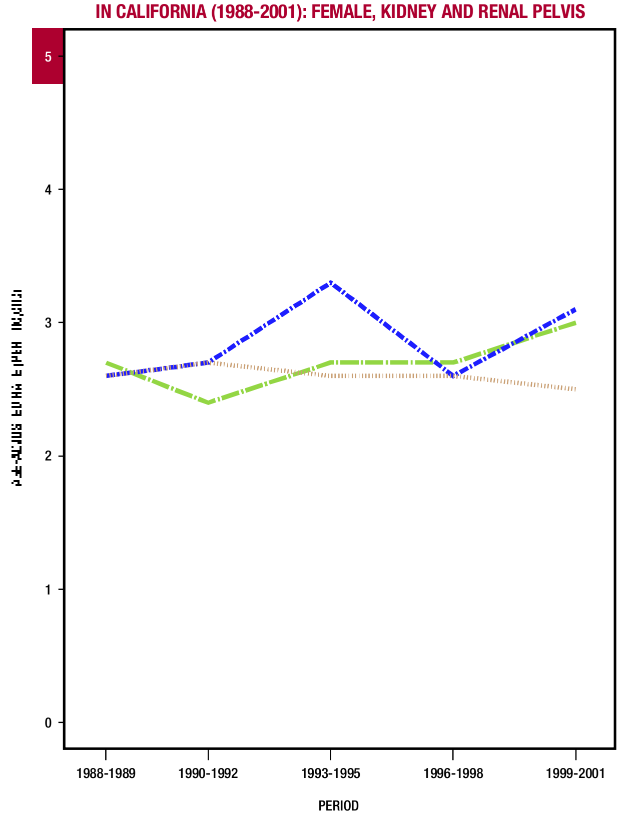
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE
IN CALIFORNIA (1988-2001): FEMALE, KIDNEY AND RENAL PELVIS



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE
IN CALIFORNIA (1988-2001): MALE, KIDNEY AND RENAL PELVIS



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE
IN CALIFORNIA (1988-2001): FEMALE, KIDNEY AND RENAL PELVIS



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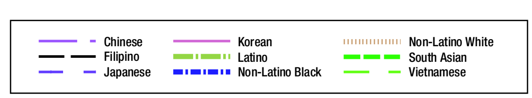


David Harris, MPH

CAUSES AND WORLDWIDE TRENDS

Laryngeal cancer may occur in any of the three regions of the larynx: the upper, middle, and lower portions. The various types of laryngeal cancer each have different characteristics, different treatment options and differences in survival rates. Tumors in the upper and middle thirds of the larynx comprise a majority of all laryngeal cancers, and are almost exclusively of the squamous cell variety. The two best-established risk factors for laryngeal cancer are tobacco and alcohol use, with even greater risk when the two are used together. Avoidance of tobacco and alcohol will reduce laryngeal cancer risk.

Although incidence rates vary considerably around the world, the disease is more common among men than women. In the U.S., non-Latino blacks have higher incidence rates than non-Latino whites. The overall incidence of laryngeal cancer has increased worldwide in the past several decades, which may be partially due to improved diagnosis. In the U.S., however, significant declines in incidence rates were observed throughout the 1990s among non-Latino white men and women, as well as non-Latino black men, possibly due to the decrease in tobacco use in the U.S.

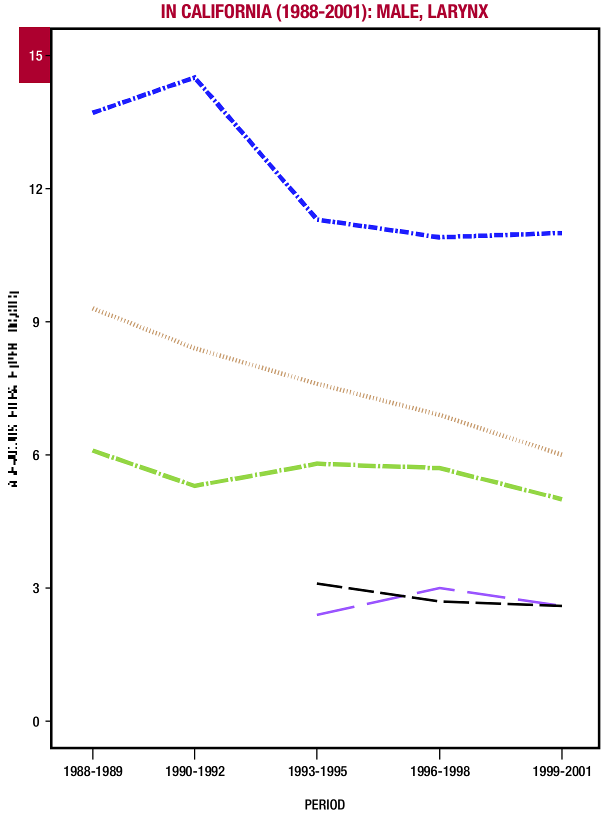
TRENDS IN INCIDENCE AND MORTALITY IN CALIFORNIA

In California, as in the rest of the nation, non-Latino blacks (both men and women) have the highest incidence rates among all racial/ethnic groups, followed by non-Latino whites and Latinos. Chinese and Filipinos have the lowest incidence of laryngeal cancer. Due to the small number of cases, incidence rates for Chinese and Filipino men are only available for the years 1993 to 2001; rates are unavailable for the other male Asian subgroups and for all female Asian subgroups.

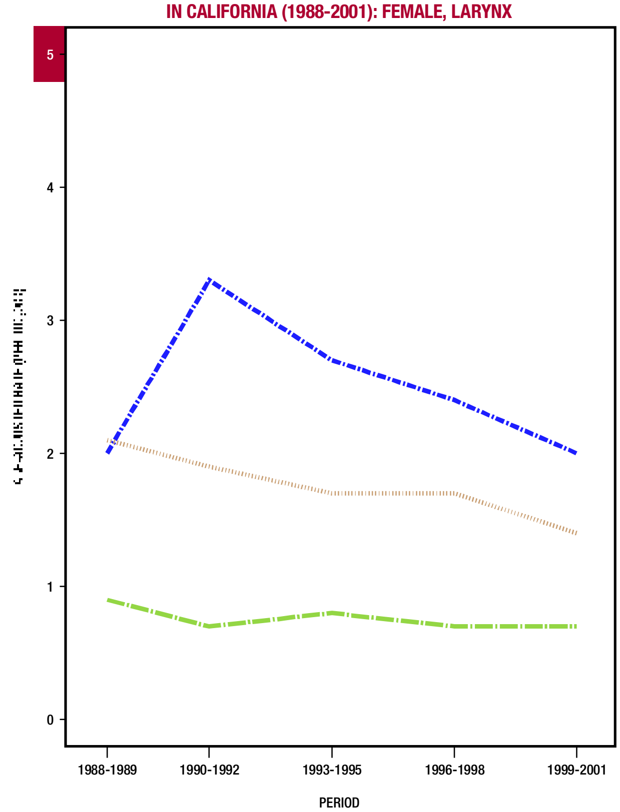
Laryngeal cancer incidence rates for non-Latino black, non-Latino white and Latino men dropped significantly between 1988 and 2001, while rates for Chinese and Filipino men stayed fairly steady. After a sharp increase around 1990, incidence rates in non-Latino black women declined steadily for the rest of the 1990s, with rates in 2001 similar to those in 1988. Incidence rates for non-Latino white women decreased significantly between 1988 and 2001, while incidence rates may have declined slightly among Latinas.

As with incidence rates, non-Latino black men have the highest laryngeal mortality rates among all racial/ethnic groups in California. Mortality rates for non-Latino white and Latino men are both similar to each other and lower than the rate for non-Latino blacks. Mortality data for black women were limited due to small numbers, but between 1990 and 1995, non-Latino black women had a higher mortality rate than non-Latino white women.

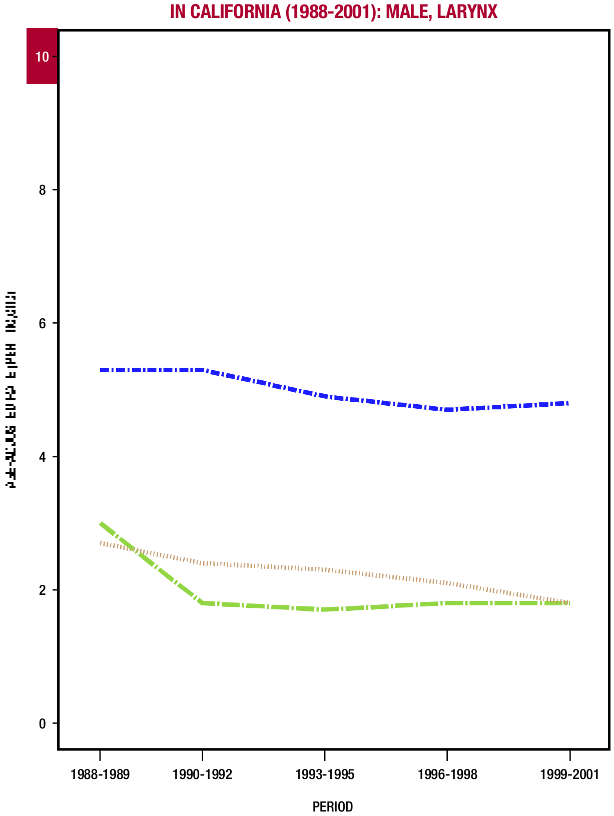
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE
IN CALIFORNIA (1988-2001): MALE, LARYNX



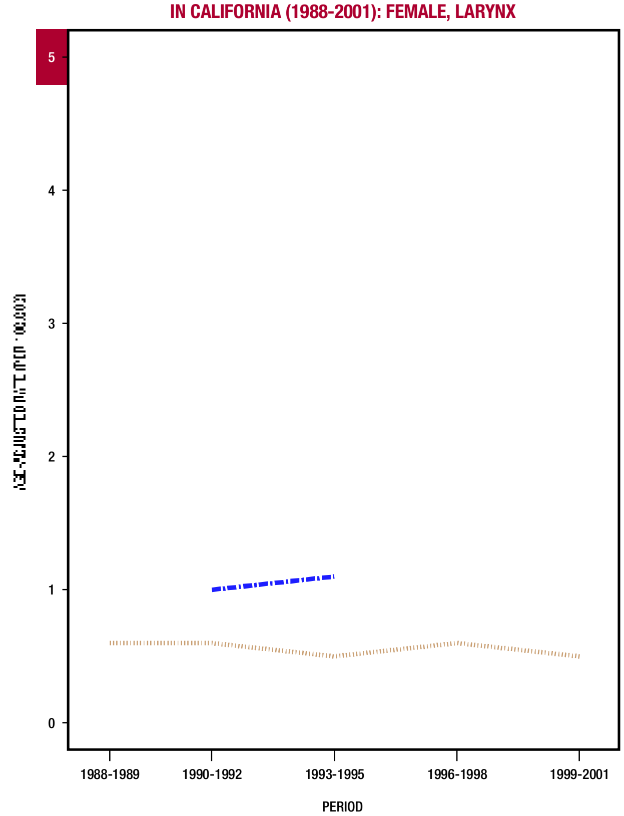
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE
IN CALIFORNIA (1988-2001): FEMALE, LARYNX



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE
IN CALIFORNIA (1988-2001): MALE, LARYNX



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE
IN CALIFORNIA (1988-2001): FEMALE, LARYNX



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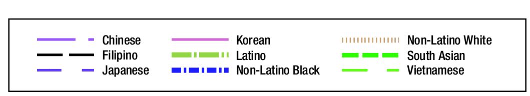


Thomas H. Taylor, PhD and Hoda Anton-Culver, PhD

CAUSES AND WORLDWIDE TRENDS

Leukemia includes several different, rare cancers. These cancers cause the body to make too many white blood cells, many of them abnormal. There are four major types of leukemia: acute lymphocytic, chronic lymphocytic, acute myeloid, and chronic myeloid.

Acute leukemia distorts blood cells early in their development so badly that they cannot function. Acute leukemia usually progresses more rapidly than chronic leukemia.

Chronic leukemia affects blood cells that are more fully developed, and, while not normal, these cells may be capable of some functions. In the early stages, chronic leukemia has no symptoms.

In lymphocytic leukemia, the body makes too many of the white blood cells called lymphocytes. In myeloid leukemia, the body makes too many of the other types of white blood cells.

The characteristics of each type of leukemia are important in choosing treatments. While more leukemia patients are cured than ever before, the complexity of the diseases makes it hard to say what causes leukemia. Known risk factors include very high levels of radiation exposure—including some medical treatments (but not routine dental or medical X-rays), industrial exposures to the chemicals benzene and formaldehyde, chemotherapy to treat some other cancers, and certain genetic abnormalities. Many leukemia patients have none of these risk factors, and many people exposed to these risk factors do not get leukemia.

Comparing statistics about incidence of leukemia from different countries or regions can be difficult, because of differences in access to medical care, sophistication of diagnosis, and quality of record-keeping. Comparing statistics on deaths from leukemia is complicated by differences in availability and effectiveness of treatments.

Acute lymphocytic leukemia occurs most often in children, accounting for only 5 percent of leukemia in people aged 40 and over, although the very elderly are also at increased risk. Rates of childhood acute lymphocytic leukemia vary considerably from place to place and group to group. High rates have been reported for Costa Rica, Spain, and among Latinos in Los Angeles, while low rates are seen among African Americans and in the Middle East and India.

Rates of chronic lymphocytic leukemia vary from place to place more than those of any other leukemia type, partly because of differences in medical care. Because chronic lymphocytic leukemia may exhibit few or no symptoms, physicians often make diagnoses when the patient is examined for something else. So people with good health care, or those seeing doctors more often (such as the elderly) may show higher rates of this disease than other people.

Overall, acute myeloid leukemia is the most common of the four major leukemia types. It seems to occur more frequently in the developed world than elsewhere and is generally more common in urban areas than in rural areas. Children, especially under age 5, can get this disease, but the greatest risk is to those older than 50. Among the very young and the elderly, risk may be greater for U.S. whites than for African Americans.

The risk of chronic myeloid leukemia does not differ much from one country to another, or from one area of

Continued on page 77

the U.S. to another. Risks are higher for men than for women, and are higher in African Americans than in whites. Chronic myeloid leukemia is quite rare in children, but risk increases steadily from young adulthood through old age. The lifetime risk for leukemia is about 1.5 percent for American men and about 1 percent for American women, while the lifetime risk of dying of leukemia is less than 1 percent for both sexes.

TRENDS IN INCIDENCE AND MORTALITY IN CALIFORNIA

Incidence rates for leukemia in California, including the separate types, are changing little for both men and women in most racial/ethnic groups. Non-Latino whites do show a slight increase in incidence of acute lymphocytic and acute myeloid leukemia.

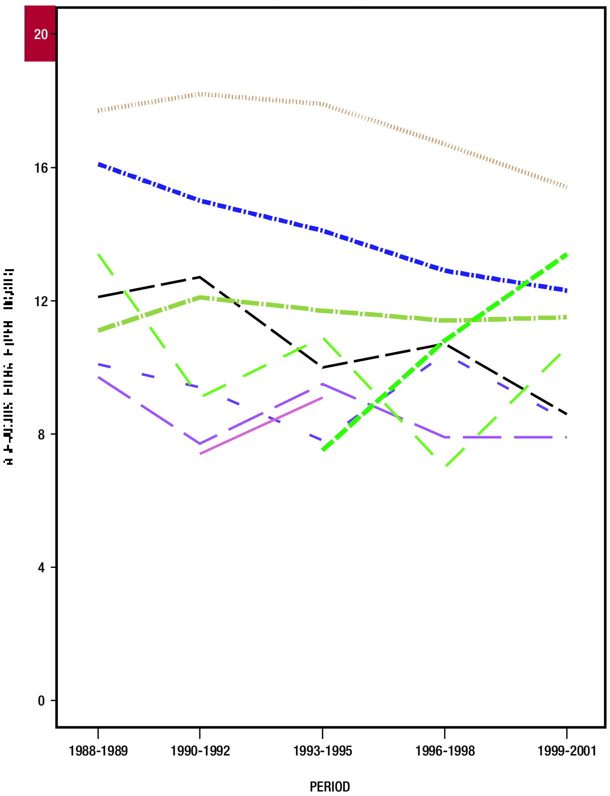
When all leukemia types are combined, incidence rates are declining modestly but significantly for Filipino, non-Latino black and non-Latino white men. A similar decline may be occurring for Filipino and non-Latino black women. South Asian men experienced a slight increase in incidence.

Incidence rates of acute lymphocytic leukemia are increasing slightly in non-Latino white women and may also be increasing in non-Latino white men. Filipino men show a significant decline in risk that is not matched by Filipino women. Incidence rates of acute myeloid leukemia are increasing slightly but significantly for both non-Latino white men and women, and are declining in Filipino men and Vietnamese women, but not for Filipino women or Vietnamese men.

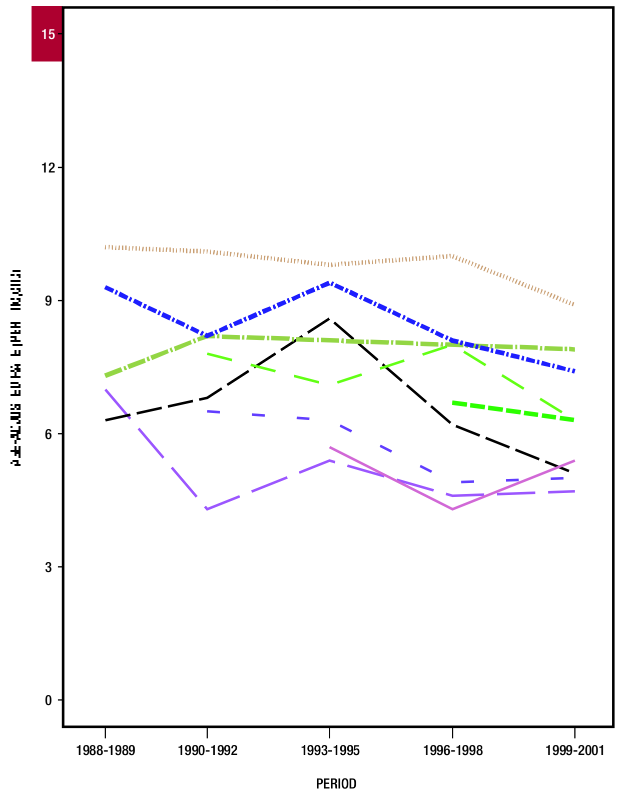
Incidence rates for chronic lymphocytic leukemia are declining significantly in both sexes among non-Latino blacks and non-Latino whites. For chronic myeloid leukemia, incidence rates for both male and female Latinos are in modest but significant decline, while the data hint of a decline for Japanese and non-Latino white men, and non-Latino blacks of both sexes.

With two exceptions, California mortality rates for leukemia types remain steady or are in modest decline. Latino men and women show a small but significant increase in mortality rates from acute myeloid leukemia. Non-Latino whites of both sexes show a slight but significant increase in mortality from acute myeloid leukemia, as they did for incidence of that illness. The small but significant increase in both incidence and mortality rates of acute myeloid leukemia in California non-Latino whites corresponds to trends reported by the U.S. government for whites, 1992 through 2001. At least some of the increases in incidence (as well as mortality) rates for acute myeloid leukemia may be due to an aging white population.

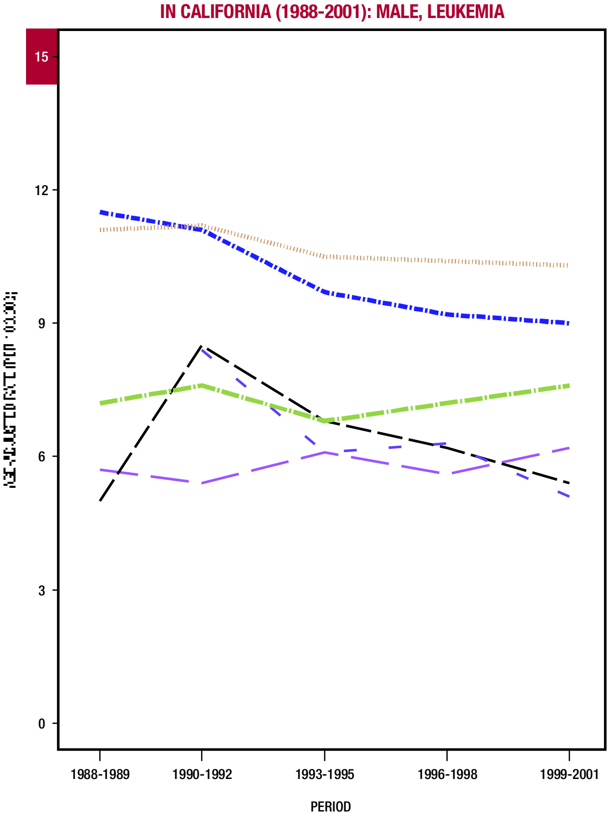
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE IN CALIFORNIA (1988-2001): MALE, LEUKEMIA



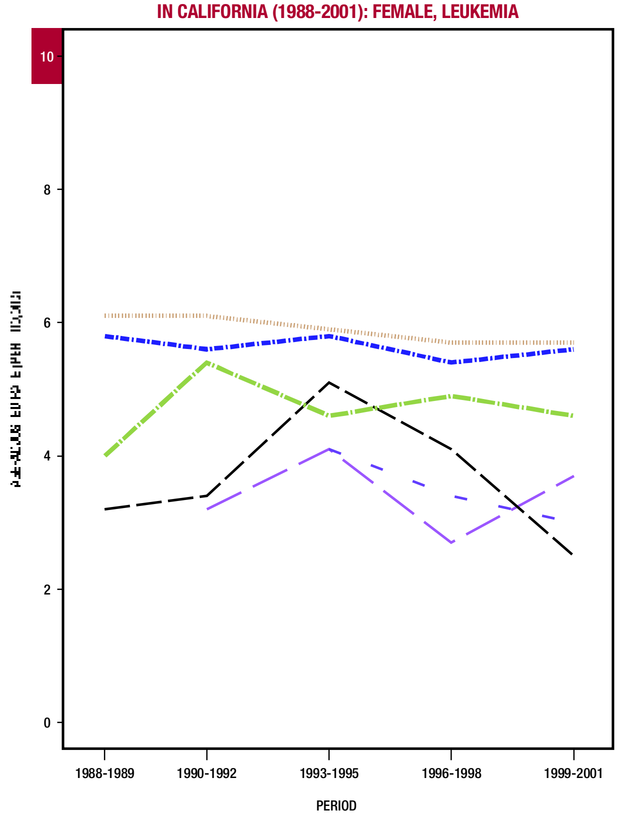
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE IN CALIFORNIA (1988-2001): FEMALE, LEUKEMIA



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE IN CALIFORNIA (1988-2001): MALE, LEUKEMIA



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE IN CALIFORNIA (1988-2001): FEMALE, LEUKEMIA



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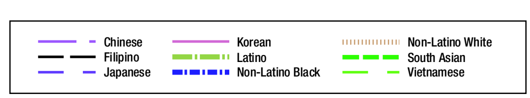
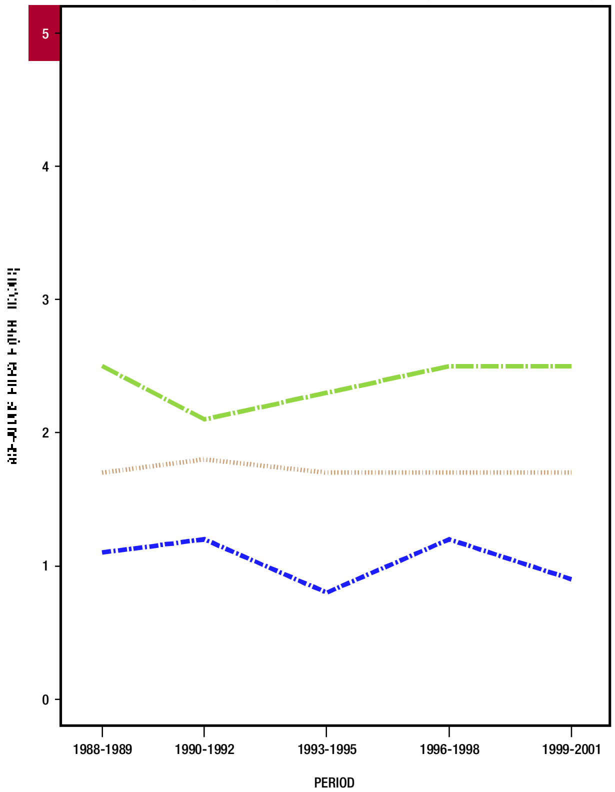
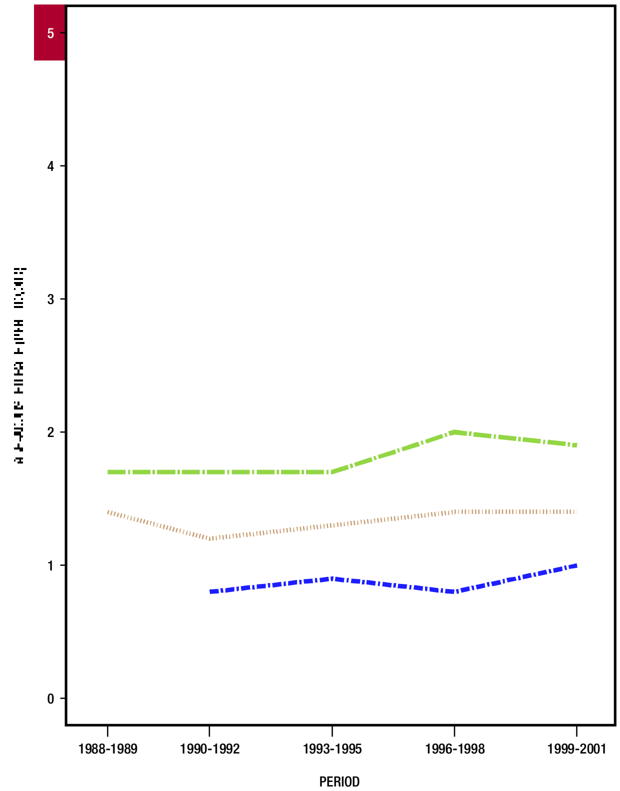


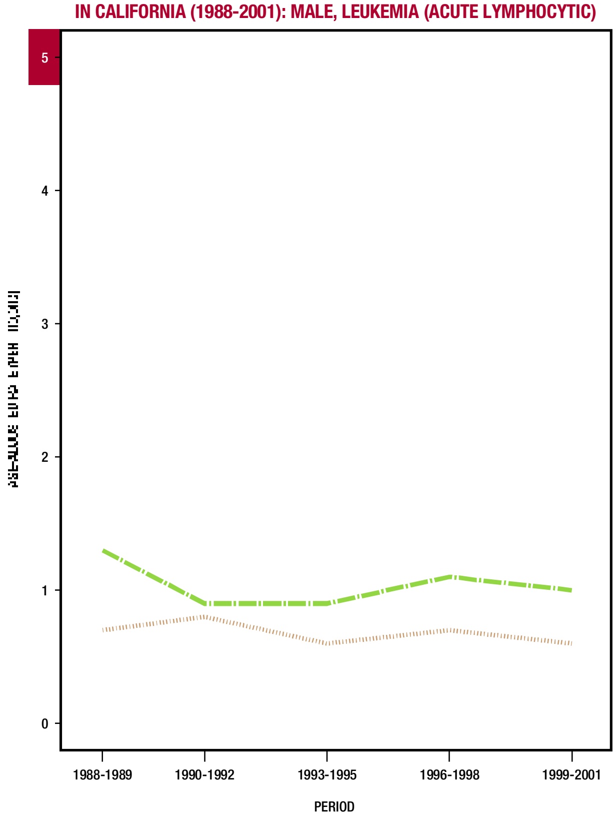
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE IN CALIFORNIA (1988-2001): MALE, LEUKEMIA (ACUTE LYMPHOCYTIC)



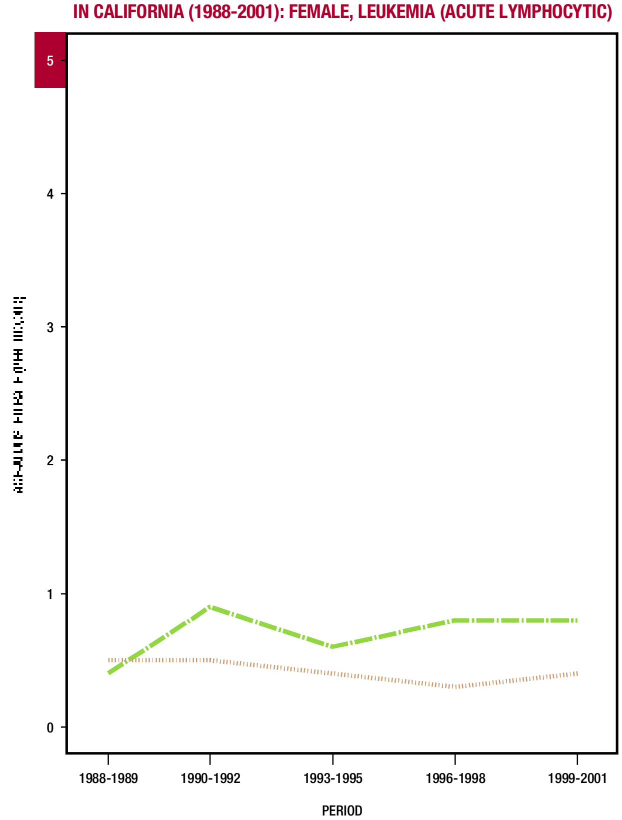
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE IN CALIFORNIA (1988-2001): FEMALE, LEUKEMIA (ACUTE LYMPHOCYTIC)



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE IN CALIFORNIA (1988-2001): MALE, LEUKEMIA (ACUTE LYMPHOCYTIC)



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE IN CALIFORNIA (1988-2001): FEMALE, LEUKEMIA (ACUTE LYMPHOCYTIC)



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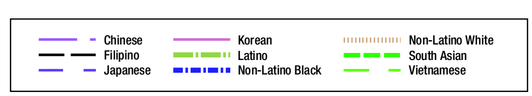
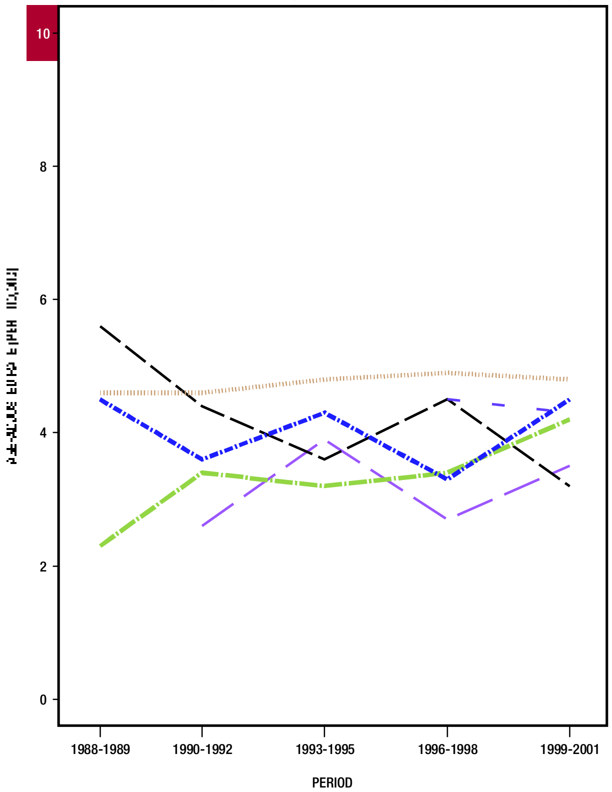
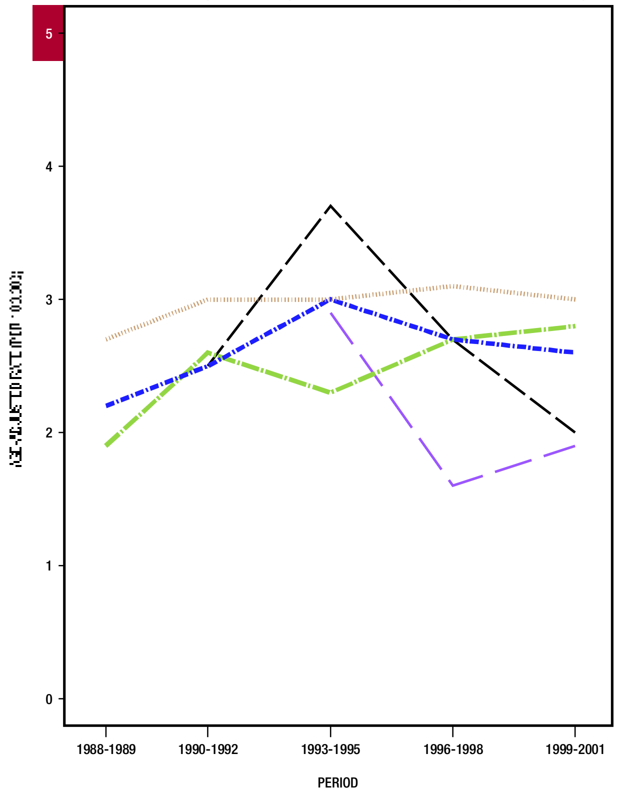


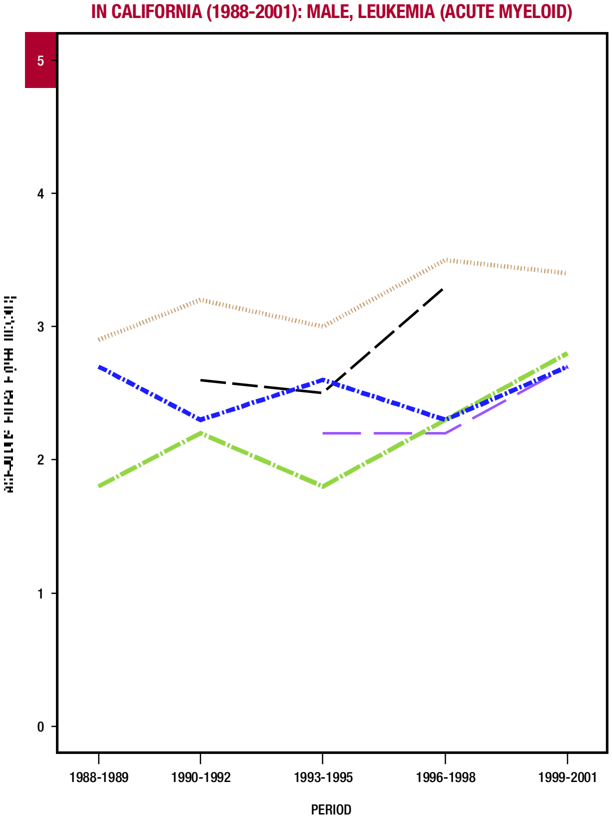
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE
IN CALIFORNIA (1988-2001): MALE, LEUKEMIA (ACUTE MYELOID)



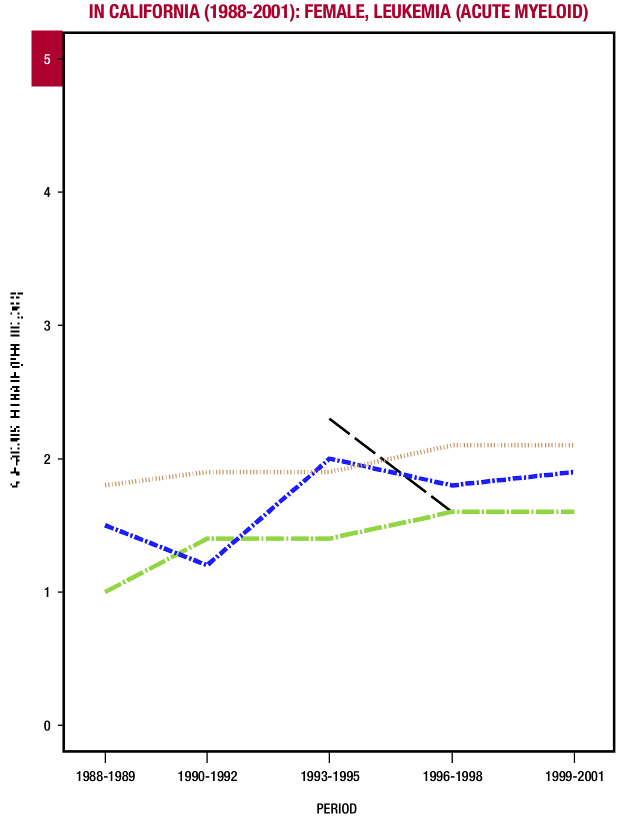
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE
IN CALIFORNIA (1988-2001): FEMALE, LEUKEMIA (ACUTE MYELOID)



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE
IN CALIFORNIA (1988-2001): MALE, LEUKEMIA (ACUTE MYELOID)



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE
IN CALIFORNIA (1988-2001): FEMALE, LEUKEMIA (ACUTE MYELOID)



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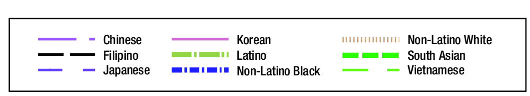
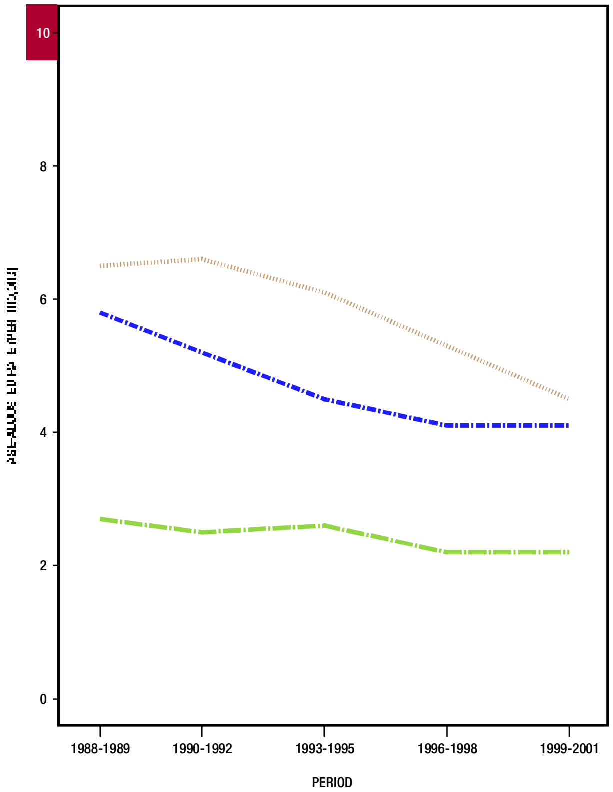
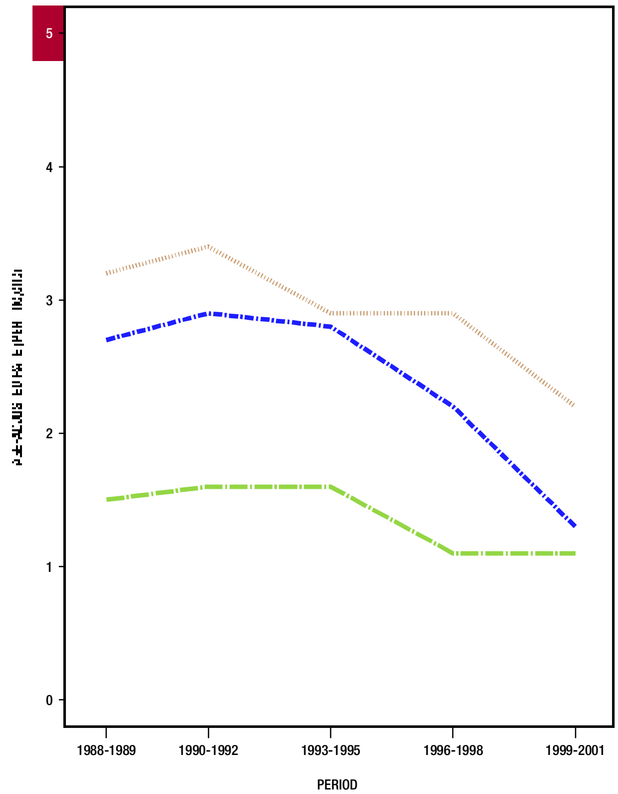


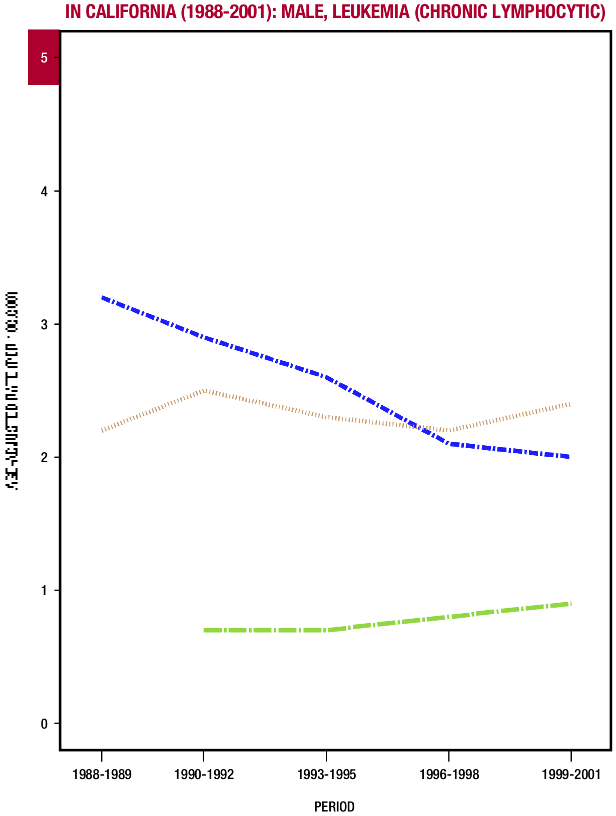
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE
IN CALIFORNIA (1988-2001): MALE, LEUKEMIA (CHRONIC LYMPHOCYTIC)



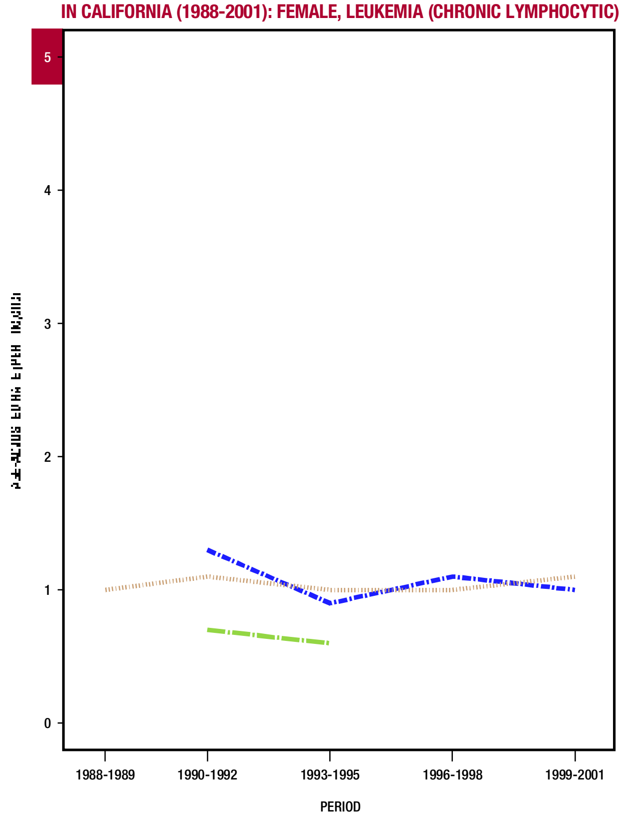
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE
IN CALIFORNIA (1988-2001): FEMALE, LEUKEMIA (CHRONIC LYMPHOCYTIC)



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE
IN CALIFORNIA (1988-2001): MALE, LEUKEMIA (CHRONIC LYMPHOCYTIC)



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE
IN CALIFORNIA (1988-2001): FEMALE, LEUKEMIA (CHRONIC LYMPHOCYTIC)



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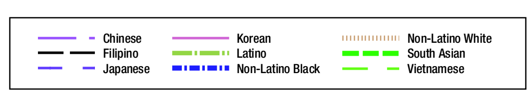
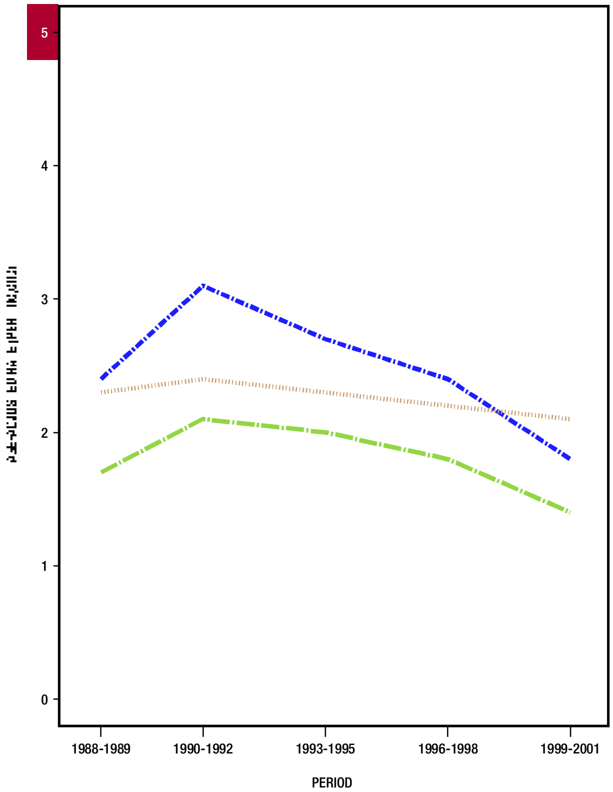


TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE IN CALIFORNIA (1988-2001): MALE, LEUKEMIA (CHRONIC MYELOID)



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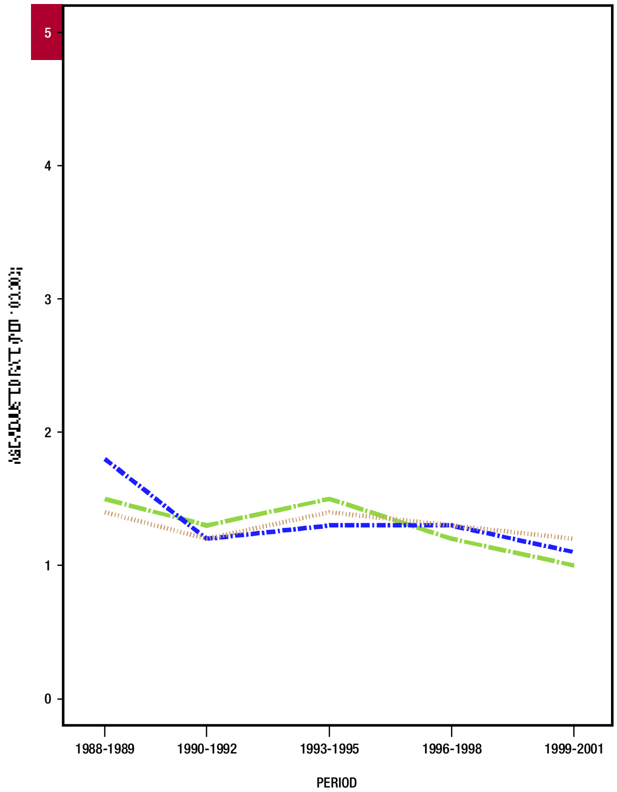

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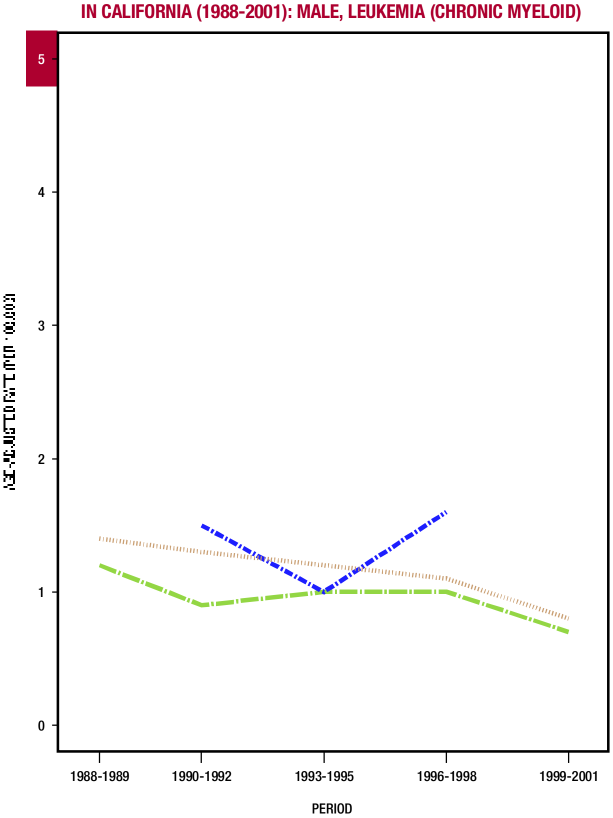
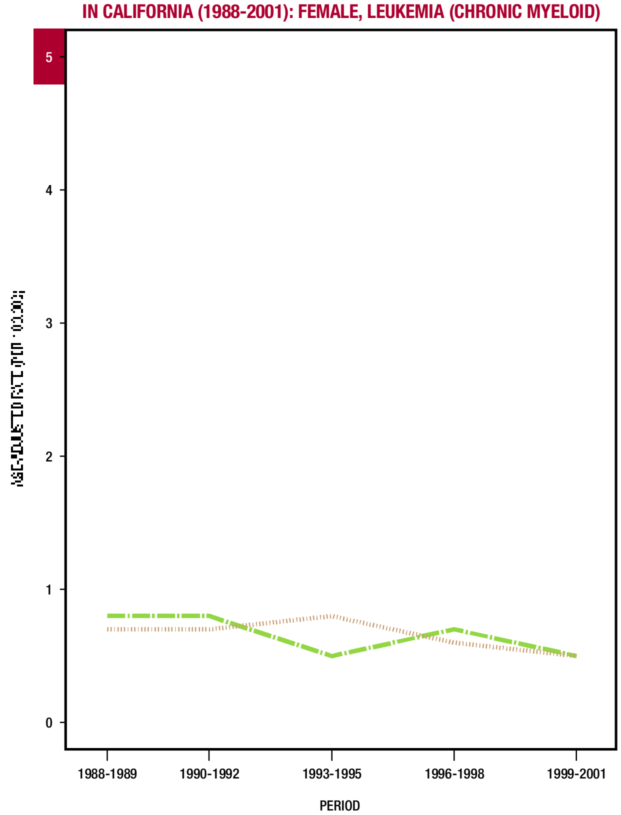


TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE IN CALIFORNIA (1988-2001): FEMALE, LEUKEMIA (CHRONIC MYELOID)



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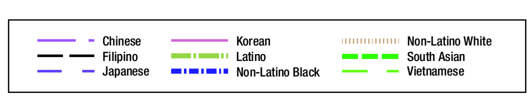


LIVER AND INTRAHEPATIC BILE DUCT

Sandy Kwong, MPH

CAUSES AND WORLDWIDE TRENDS

Chronic infection by the hepatitis B virus is the most important cause of liver cancer, and experts estimate that it accounts for about 80 percent of all cases worldwide. Chronic infection by hepatitis C is another important viral cause of liver cancer. Known non-viral causes of liver cancer include exposure to aflatoxins produced by certain molds on food, excessive alcohol consumption and exposure to chemicals such as throrotrast and vinyl chloride. Recent data also suggest that diabetes and obesity may contribute to a higher risk for liver cancer.

Liver cancer is one of the leading causes of cancer death in the world, particularly in eastern Asia and sub-Saharan Africa. It is much less common in western Europe and the U.S. In the U.S. overall, and in California, about 2 percent of all cancer deaths are due to liver cancer.

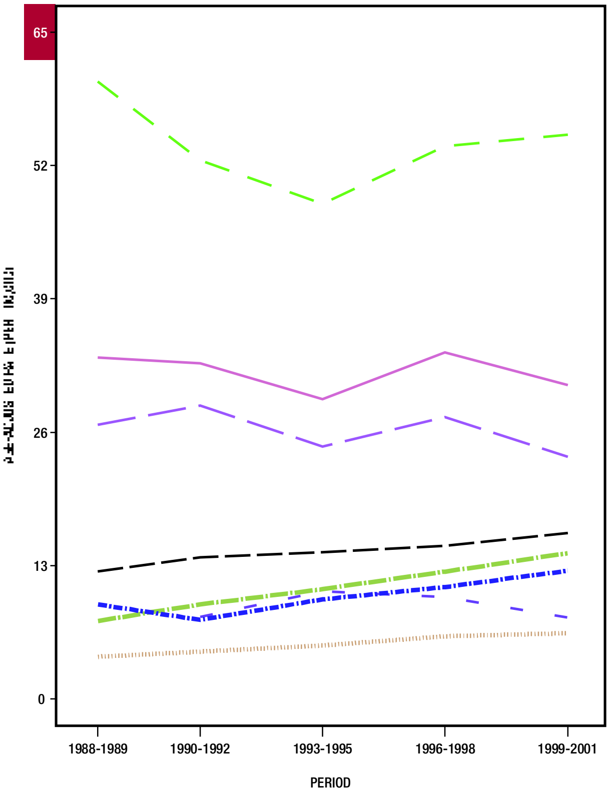
During the past 20 years, liver cancer rates have been dropping steadily in selected high-risk populations, including Chinese in Singapore and Shanghai. Reduced exposure to dietary aflatoxins in these newly affluent Asian populations probably explains the decline. In contrast, rates of liver cancer have been increasing in the U.S. during the last 25 years. The increase in incidence is possibly a consequence of hepatitis C virus acquired during the 1960s and 1970s or the increasing prevalence of diabetes and obesity in the general population.

TRENDS IN INCIDENCE AND MORTALITY IN CALIFORNIA

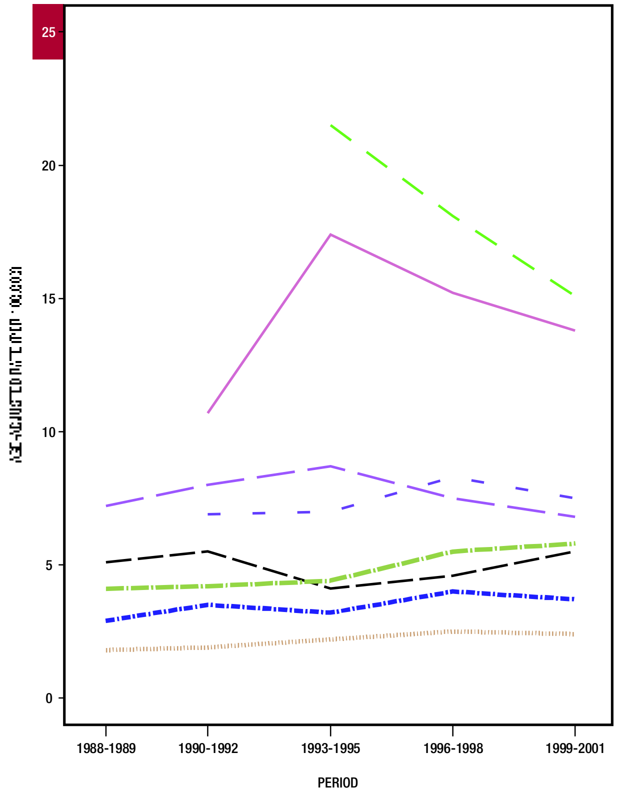
Asians have the highest liver cancer incidence rates among the four major racial/ethnic groups in California. However, incidence rates vary, even within the different Asian subgroups, with Vietnamese men and women having the highest rates and Japanese men and Filipino women having the lowest rates. Between 1988 and 2001, liver cancer incidence rates among Chinese men and women declined, whereas rates for the other groups were steady or on the rise. Rates increased significantly during this time period for non-Latino whites, Latinos and non-Latino black men.

Prognosis for patients with liver cancer is poor. Korean and Vietnamese have similar mortality rates—the highest for all race/ethnic groups. However, due to small numbers of deaths, mortality rates for Vietnamese women were not calculated for the entire time period. Mortality rates increased during this time period for non-Latino whites, Latinos, and non-Latino black men. Mortality rates remained steady for the other race/ethnic groups, except for Chinese and Korean men, who experienced a slight decline.

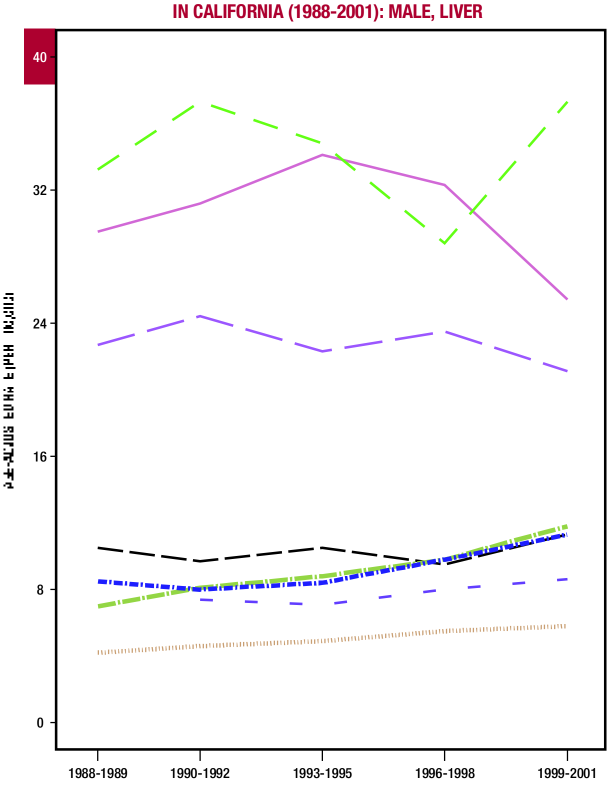
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE IN CALIFORNIA (1988-2001): MALE, LIVER AND INTRAHEPATIC BILE DUCT



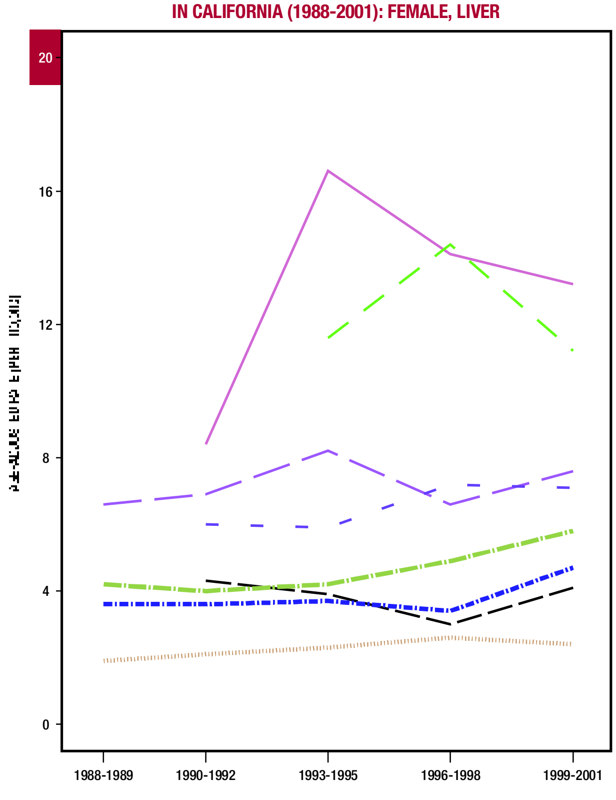
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE IN CALIFORNIA (1988-2001): FEMALE, LIVER AND INTRAHEPATIC BILE DUCT



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE IN CALIFORNIA (1988-2001): MALE, LIVER



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE IN CALIFORNIA (1988-2001): FEMALE, LIVER



*Where a rate is based on fewer than 20 cases (or deaths), that rate, and the lines joining it to adjacent rates, are omitted.

Chinese, Filipino, Japanese, Korean, Latino, Non-Latino Black, Non-Latino White, South Asian, Vietnamese

LUNG AND BRONCHUS

Holly A. Hodges, MPH

CAUSES AND WORLDWIDE TRENDS

Lung cancer is a leading cause of cancer death for both men and women worldwide. In the U.S., more people die of lung cancer than of colon, breast and prostate cancers combined. Smoking is the major cause of lung cancer, and the incidence and mortality rates of lung cancer vary according to the smoking habits of geographical regions and racial/ethnic groups.

Lung cancer used to primarily affect men, but as the number of female smokers rose, so did lung cancer incidence rates in women. Because the prognosis for lung cancer patients is poor, mortality rates tend to follow incidence rates.

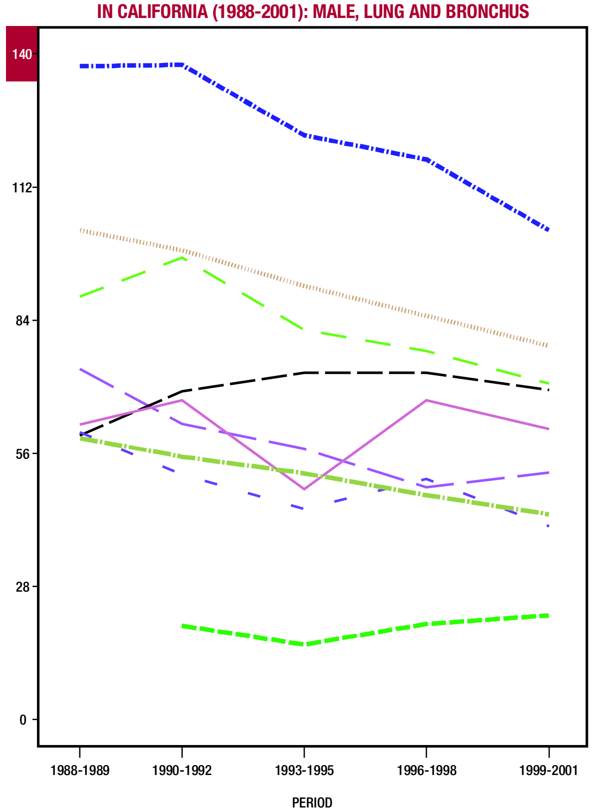
TRENDS IN INCIDENCE AND MORTALITY IN CALIFORNIA

For both sexes, lung cancer incidence rates are highest among non-Latino blacks and non-Latino whites. The incidence rates declined between 1988 and 2001 for both of these groups, with the changes in women's rates less dramatic than the men's. Among Latinos, lung cancer also dropped between 1988 and 2001, with decreases in men's cases also outpacing the slightly declining Latina rates. Among male Asian groups, lung cancer incidence steadily decreased between 1988 and 2001, but among female Asian groups, lung cancer incidence declined until 1993 and then began to rise. The general downward trend in lung cancer incidence rates in California may be influenced by the statewide anti-tobacco campaign.

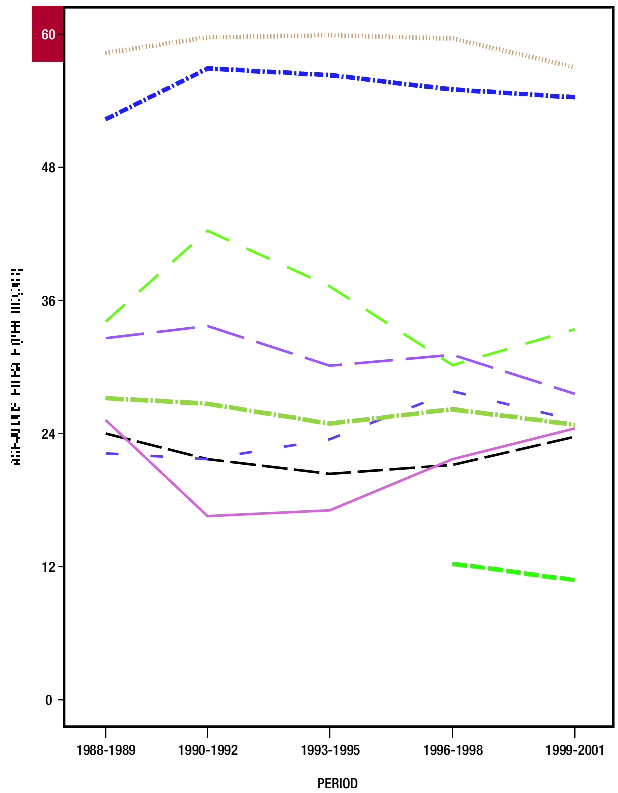
The incidence rates for each Asian population subgroup differed from each other. Vietnamese, Chinese, Korean and Japanese men all had fluctuating incidence rates, yet overall, their incidence rates declined between 1988 and 2001. New cases rose among Filipino and South Asian men during these years, while incidence in Chinese women decreased. Incidence rates for Vietnamese, Filipino, Japanese and Korean women fluctuated in this time period.

As with incidence, the mortality rates for lung cancer were highest for non-Latino black and non-Latino white men and women. The mortality rates for non-Latino black and non-Latino white men declined between 1988 and 2001, yet mortality for women in the same groups fluctuated somewhat but showed no significant downward trend. Among Latino men, lung cancer mortality decreased between 1988 and 2001, but the Latino women continued to die of lung cancer at about the same rate. The mortality rate for male Asian groups decreased until 1996, and then began to rise, while the mortality rate for female Asian groups fluctuated and showed no overall trend. The rates of Vietnamese, Chinese and Japanese men dying from lung cancer declined during this time period. Vietnamese, Chinese and Japanese females also showed an overall decrease in mortality rates, but it was less dramatic than the men's decrease. Lung cancer mortality rates increased among Filipino men and women and Korean women between 1988 and 2001.

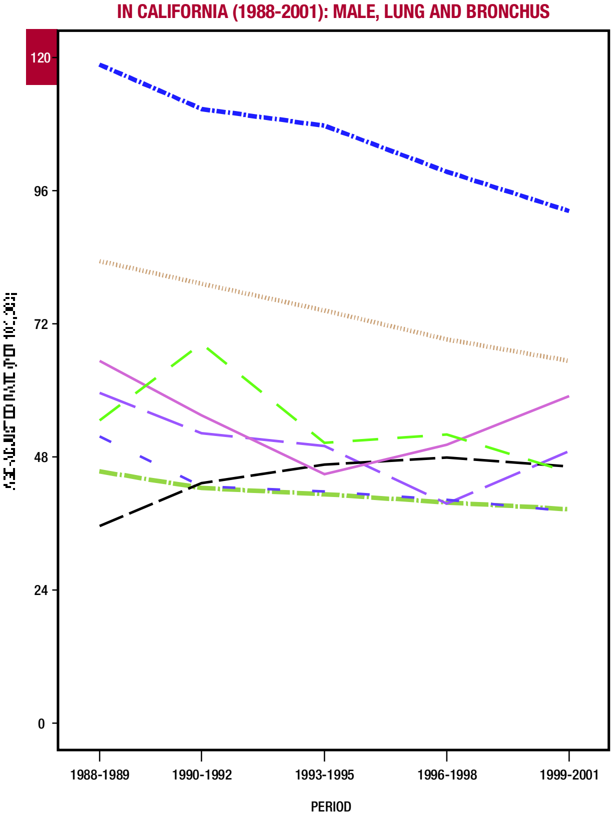
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE
IN CALIFORNIA (1988-2001): MALE, LUNG AND BRONCHUS



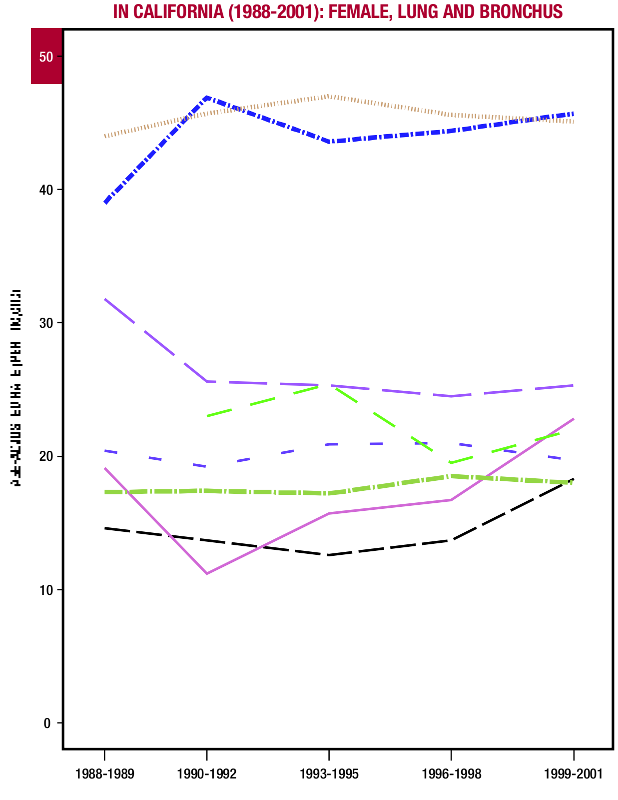
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE
IN CALIFORNIA (1988-2001): FEMALE, LUNG AND BRONCHUS



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE
IN CALIFORNIA (1988-2001): MALE, LUNG AND BRONCHUS



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE
IN CALIFORNIA (1988-2001): FEMALE, LUNG AND BRONCHUS



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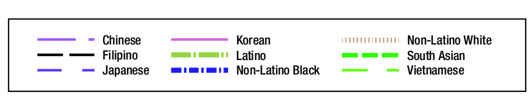


MELANOMA OF THE SKIN

Myles Cockburn, PhD

CAUSES AND WORLDWIDE TRENDS

Melanoma is probably caused by exposure to sunlight, combined with a genetic predisposition. Physicians can successfully treat melanoma when it is discovered early, making it an excellent candidate for screening. The highest rates of melanoma in the world occur in the white populations of Australia, New Zealand and California. Melanoma was the most rapidly increasing cancer in whites worldwide over the past two decades, and it is among the 10 most common cancers in most white populations.

While the incidence of melanoma has been increasing steadily in most white populations worldwide since the 1960s, recent data from Australia and New Zealand indicate that in recent years rates may have leveled off or are beginning to decline. Little is known about trends in melanoma in non-white populations because it is so rare in these groups. Most observed increases in the incidence of melanoma are probably because of a combination of earlier diagnosis and an increased frequency of unprotected sun exposure.

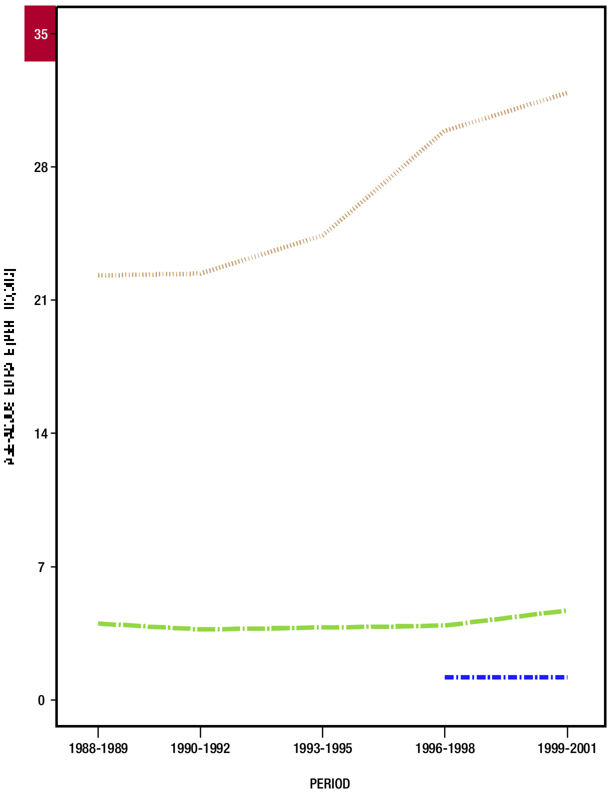
TRENDS IN INCIDENCE AND MORTALITY IN CALIFORNIA

Incidence rates of invasive melanomas increased rapidly for non-Latino whites from 1988 to 2001. This could be due to successful screening, or because of the aging of those born in the 1960s that are at high risk of melanoma brought on by sun exposure at young ages. From 1996 to 2001, the incidence rate among non-Latino whites may have increased slightly less than it increased between 1988 and 1996. Invasive melanomas were rare among Latinos and non-Latino blacks, but among Latinos, rates slightly increased among males, but remained steady in females. This is an important trend because most melanoma/skin cancer prevention programs are aimed at non-Latino white populations, not at Latinos. Further evaluation of changes in the depth of tumors and the level of invasion of melanomas over this period will reveal whether the increase is related to screening practices, or to increasing exposure to risk factors. Melanoma is a rare disease in all other racial/ethnic groups.

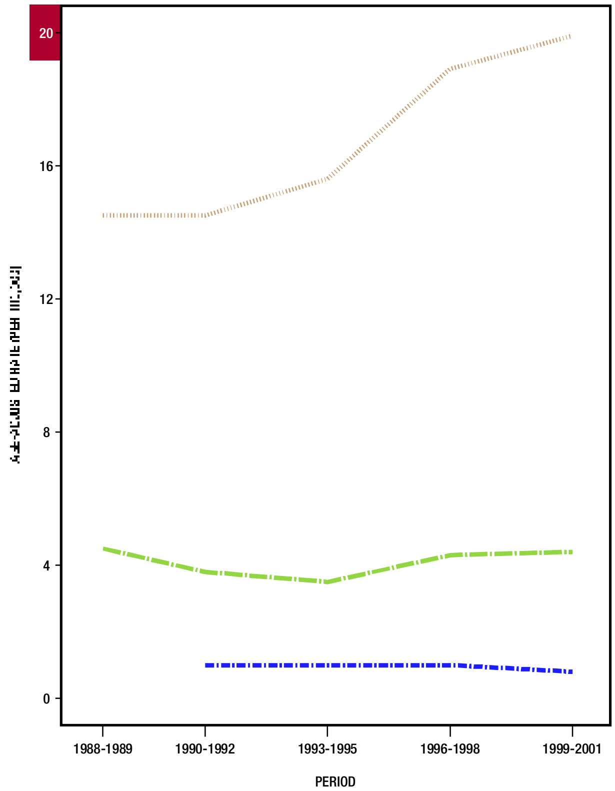
In situ melanomas among non-Latino whites increased rapidly between 1988 and 2001, more than doubling over this period. At the same time, *in situ* melanomas for Latino males remained steady, while rates increased among Latinas. This observation suggests a rapid increase in melanoma screening activities in non-Latino whites and perhaps Latinas between 1988 and 2001, as screening most often uncovers *in situ* melanomas, but also suggests that no such increase in screening activities has occurred for Latino males.

Melanoma mortality rates were unchanged for non-Latino white men between 1988 and 2001, but increased slightly for Latino men. Melanoma mortality rates declined slightly for non-Latino white women between 1988 and 2001. These trends indicate that melanoma prevention and screening gains made over this period have only resulted in meaningful declines in melanoma-related mortality for non-Latino white women.

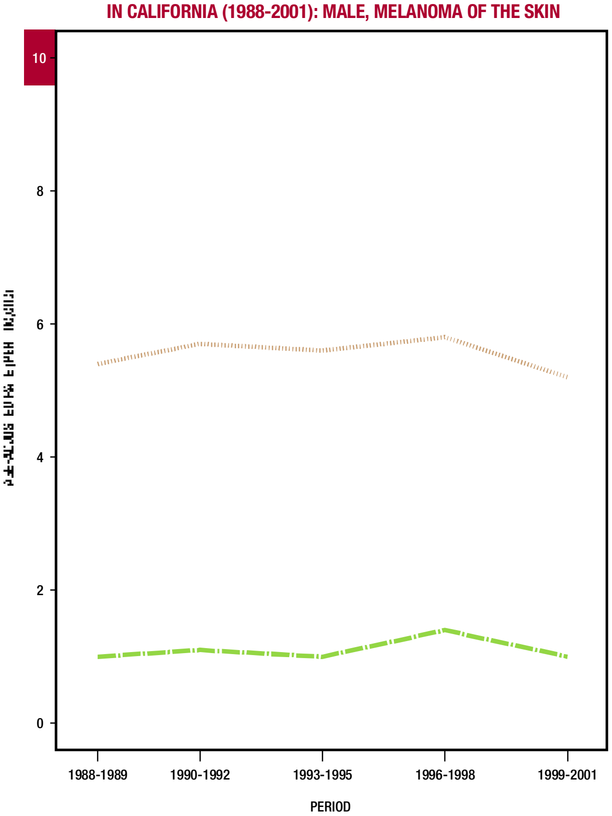
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE IN CALIFORNIA (1988-2001): MALE, MELANOMA OF THE SKIN



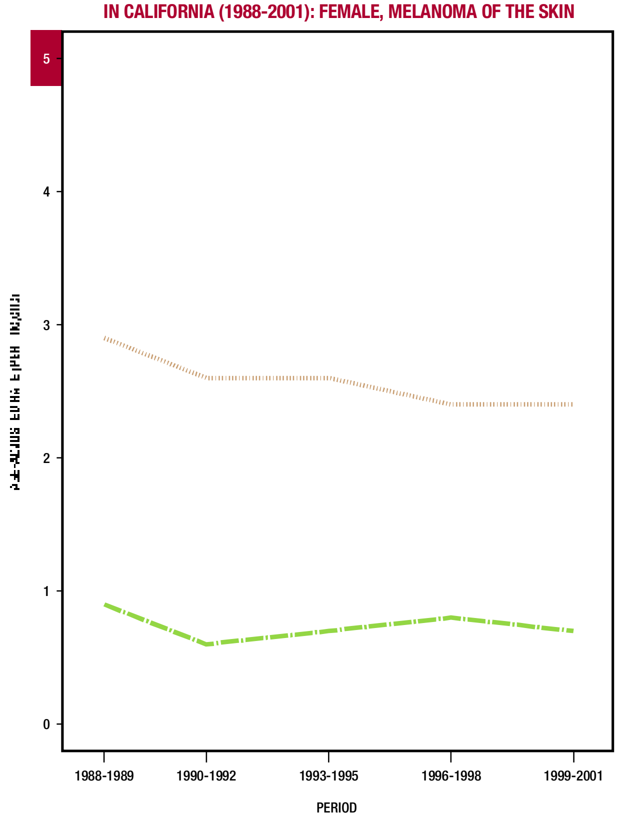
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE IN CALIFORNIA (1988-2001): FEMALE, MELANOMA OF THE SKIN



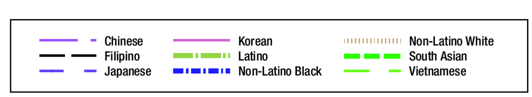
TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE IN CALIFORNIA (1988-2001): MALE, MELANOMA OF THE SKIN



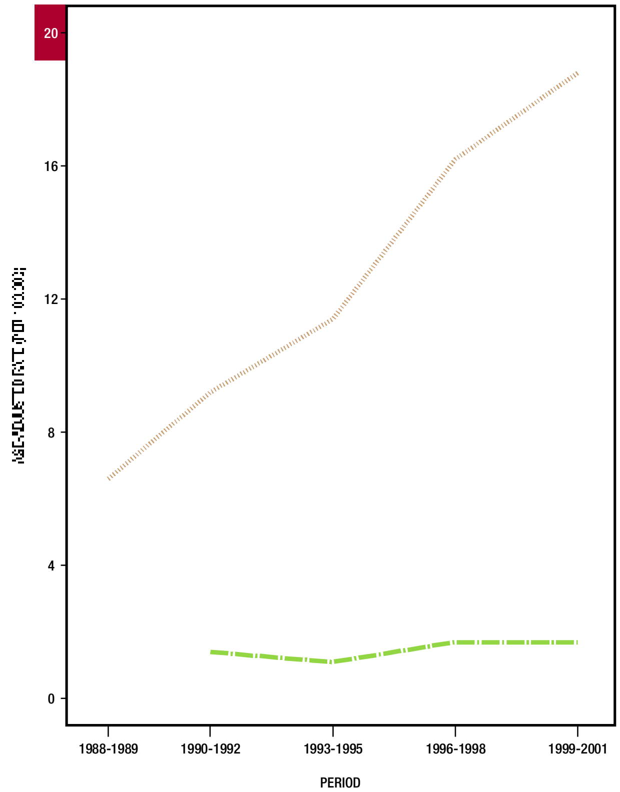
TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE IN CALIFORNIA (1988-2001): FEMALE, MELANOMA OF THE SKIN



*Where a rate is based on fewer than 20 cases (or deaths), that rate, and the lines joining it to adjacent rates, are omitted.

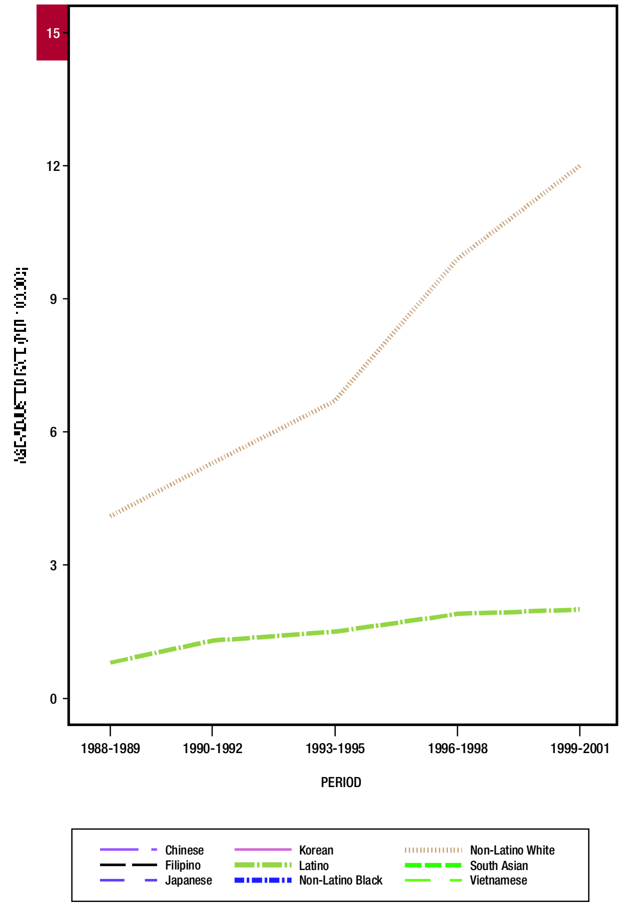


TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE IN CALIFORNIA (1988-2001): MALE, MELANOMA IN SITU



*Where a rate is based on fewer than 20 cases (or deaths), that rate, and the lines joining it to adjacent rates, are omitted.

TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE IN CALIFORNIA (1988-2001): FEMALE, MELANOMA IN SITU



CAUSES AND WORLDWIDE TRENDS

Myeloma is characterized by the accumulation of cancerous cells in the bone marrow and arises from a single plasma cell. It is a relatively uncommon cancer in the U.S. and represents about 1 percent of all cancers in whites and 2 percent among blacks, with about 15,000 new cases diagnosed each year.

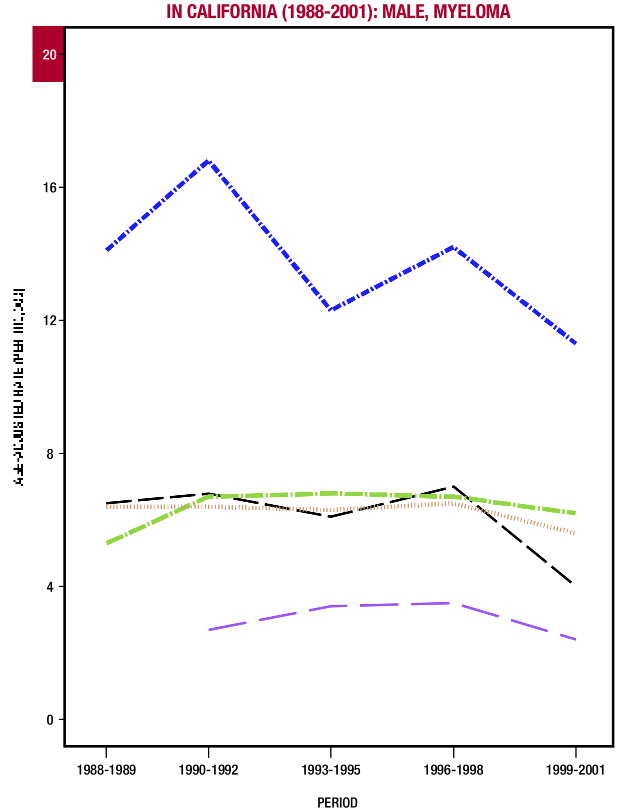
Most patients are diagnosed between ages 40 and 70, and rates among blacks are twice as high as those seen in whites in every age group. Incidence rates have been relatively stable in the U.S. since the 1980s, after climbing for about three decades. The increase may be due, at least partly, to newer tests to diagnose the disease. Different abilities to diagnosis the disease may also contribute to variability seen in international rates.

Nevertheless, rates are consistently higher among men than women. Although the cause of the disease is unknown, investigators have studied several risk factors, including autoimmune disorders, chronic immune stimulation, exposure to ionizing radiation, occupational exposures, exposures to hair dyes, and family history of myeloma. In addition, persons with a condition called monoclonal gammopathy of unknown significance (MGUS), which involves non-cancerous growth of plasma cells, are at higher risk.

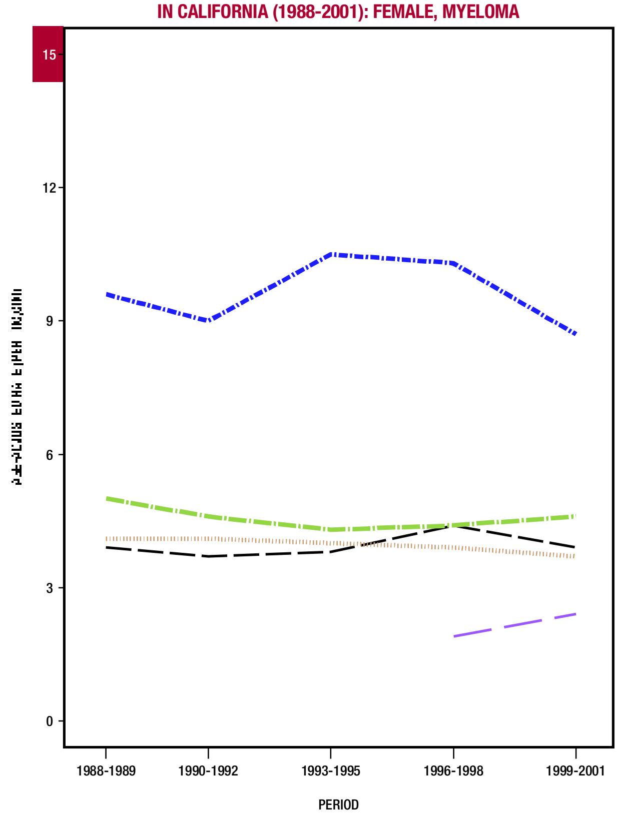
TRENDS IN INCIDENCE AND MORTALITY IN CALIFORNIA

Trends and rates in incidence of and mortality due to myeloma in California reflect trends in the nation as a whole. There were no significant changes in the incidence rates for non-Latino whites, Filipinos, Latinos or Chinese among both men and women between 1988 and 2001, with myeloma incidence rates among men an average of 1.5 times those of women. Among these racial/ethnic groups (with the exception of the Chinese) the incidence rates for women were lower than among men. Chinese rates as a whole were slightly lower than those of other race/ethnic groups. Non-Latino black incidence rates were consistently higher than the non-Latino white rates between 1998 and 2001. While the incidence rate in non-Latino black women remained steady between 1988 and 2001, the rate in non-Latino black men peaked around 1990 before declining. Similar trends and differences among racial/ethnic groups and sexes were seen for myeloma mortality rates from 1988 to 2001; the decline in mortality rates for black men was only slight.

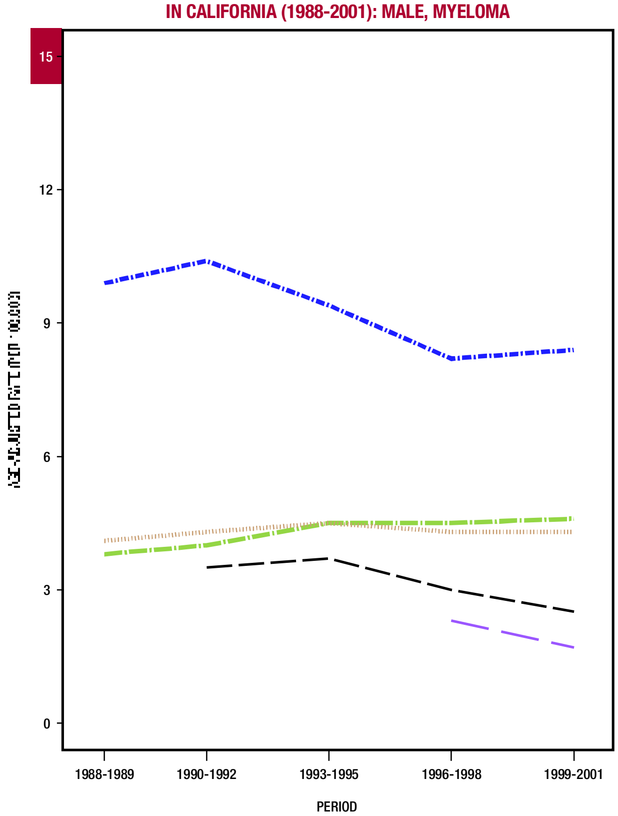
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE IN CALIFORNIA (1988-2001): MALE, MYELOMA



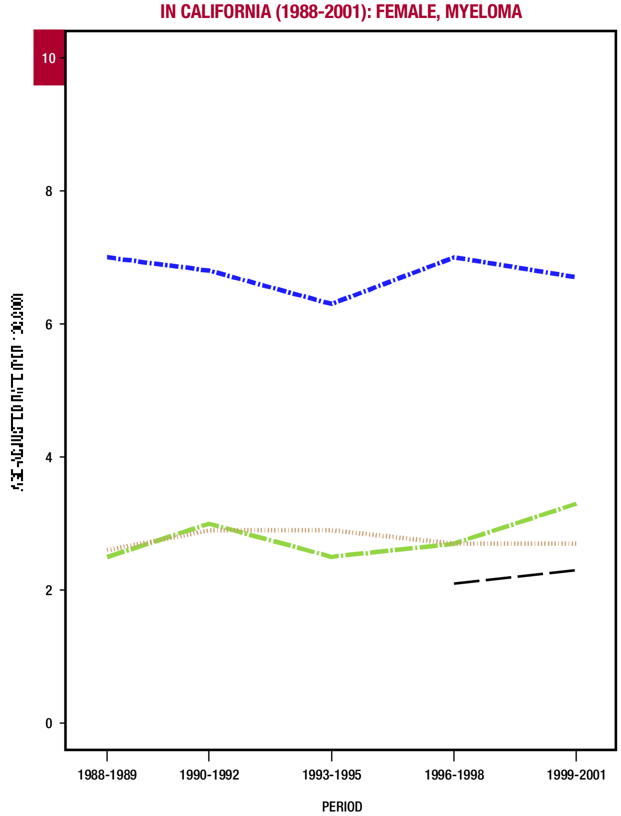
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE IN CALIFORNIA (1988-2001): FEMALE, MYELOMA



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE IN CALIFORNIA (1988-2001): MALE, MYELOMA



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE IN CALIFORNIA (1988-2001): FEMALE, MYELOMA



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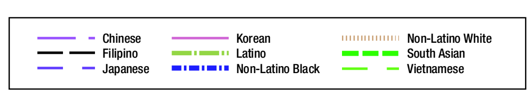


Christina Clarke, PhD

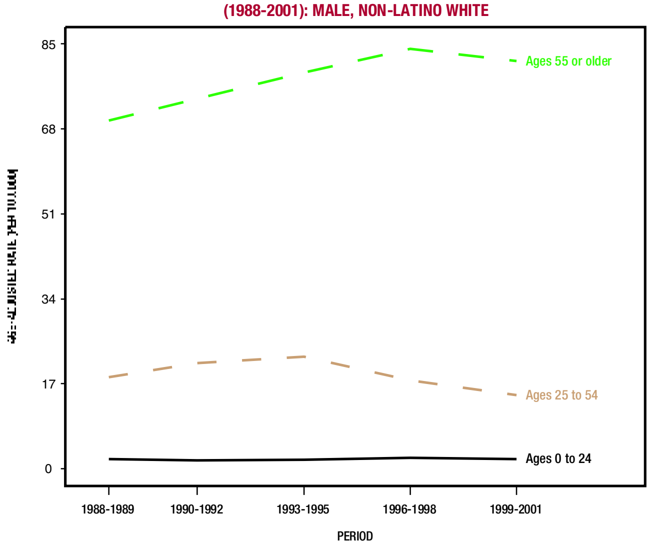
CAUSES AND WORLDWIDE TRENDS

Non-Hodgkin lymphomas (NHL) are a group of cancers of the white blood cells called lymphocytes. At least 30 distinct NHL subtypes have been described, but our understanding of these differences is still developing rapidly, especially with new information from molecular-level studies. Grouped together, NHL represents a major family of cancers for which the burden is growing worldwide, as incidence and mortality have been increasing rapidly. NHL incidence in the U.S. has doubled in the past four decades.

Reasons for the worldwide increase in NHL are unclear. Some of the change can be attributed to improvements in diagnosis and disease classifications over time, but causes of NHL are largely unknown. One of the only confirmed risk factors for some of the subtypes is immunosuppression, as dramatically elevated risk of some NHL has been shown in people with hereditary immunodeficiency disorders, organ transplant patients given immunosuppressive drugs, and persons with late-stage human immunodeficiency virus (HIV) infection. HIV explains some, but not all, of the worldwide increase in NHL. Rates were rising before the HIV epidemic and have been increasing among older populations relatively unaffected by HIV. Thus, we believe that the causes of NHL involve genetic and environmental factors that impact the immune system, but ongoing studies have not yet uncovered promising leads. Most recently, detailed NHL studies have examined the roles of common exposures including tobacco-smoking, blood transfusions, use of dark hair dye, exposure to solar radiation, and aspirin use, but associations remain inconsistent and more study is needed. Certainly, efforts to understand NHL causation will be aided by ongoing refinements in NHL classification that allow for a better understanding of the various subtypes.

TRENDS IN INCIDENCE AND MORTALITY IN CALIFORNIA

TRENDS IN AGE-ADJUSTED NON-HODGKIN LYMPHOMA INCIDENCE RATES IN CALIFORNIA (1988-2001): MALE, NON-LATINO WHITE



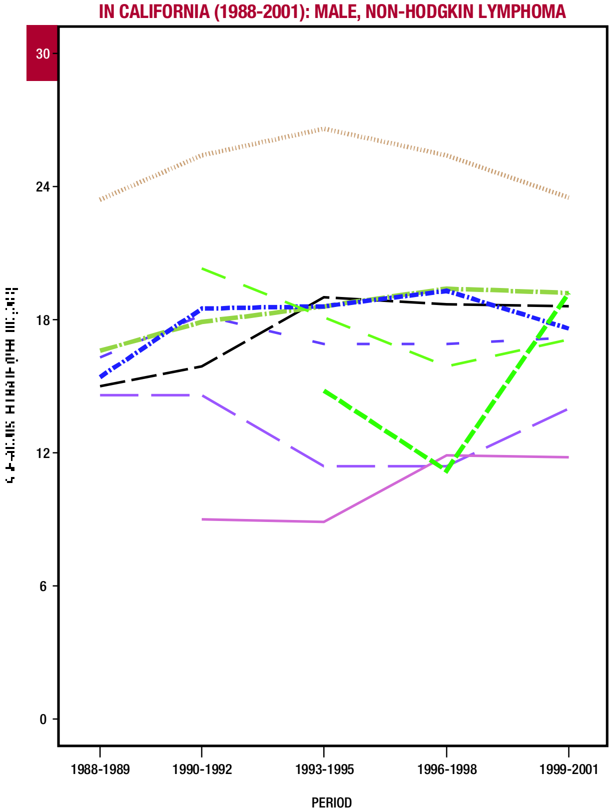
In California, NHL is one of the top five sources of cancer incidence and mortality for both men and women, but incidence patterns differ by sex. Rates in men are substantially higher than those in women and have been stable or declining since 1996, whereas incidence rates in women have generally increased unabated since 1988. Some of the sex differences in incidence rates and trends are likely due to the higher frequency of HIV in men. Widespread declines in NHL and other cancers among HIV-infected persons were reported after the introduction of new therapies in 1996, but the impact of these changes on NHL incidence and mortality trends in the general population remains unclear. The impact of HIV on NHL rates can be seen by examining NHL trends by age at diagnosis among non-Latino white men. In these men under age 25, incidence was stable; in these men ages 25 to 54, the group impacted most heavily by HIV, incidence increased between

Continued on page 93

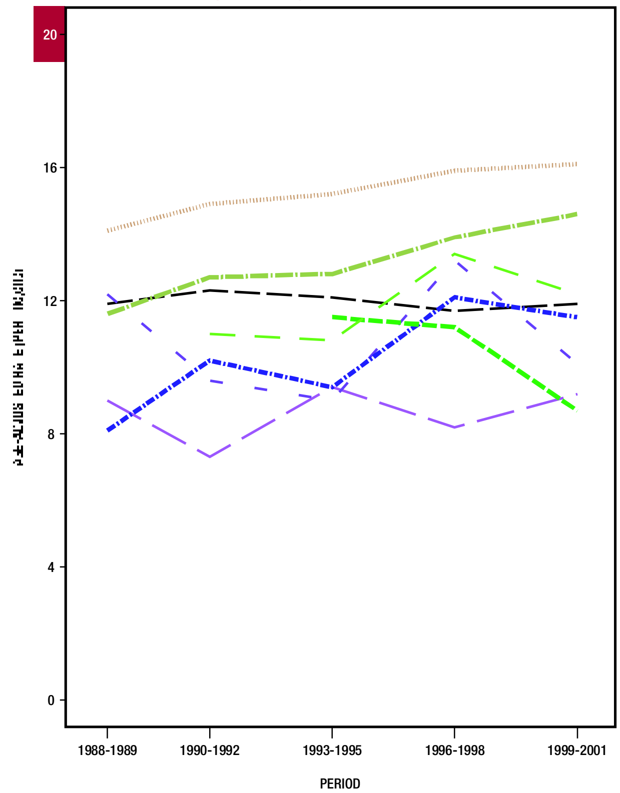
1988 and 1995 and then decreased between 1996 and 2001; and in those older men ages 55 and up, incidence increased more steadily (see previous page).

Among racial/ethnic groups, NHL incidence and mortality rates were substantially higher in non-Latino whites than in other groups, with intermediate rates in non-Latino blacks, Latinos, Filipinos, Vietnamese and South Asian groups, and lower rates in Chinese and Koreans. Trends of NHL incidence are generally comparable across racial/ethnic groups between 1988 and 2001, with increasing trends observed in women of most groups and stable or decreasing rates in men of most groups, with the exception of Korean and South Asian men, for whom rates were increasing. Mortality rates for Latinos are higher than incidence patterns would predict. More detailed assessments of trends by NHL subtype and trends by HIV status are needed to interpret racial/ethnic differences in NHL patterns, especially among men.

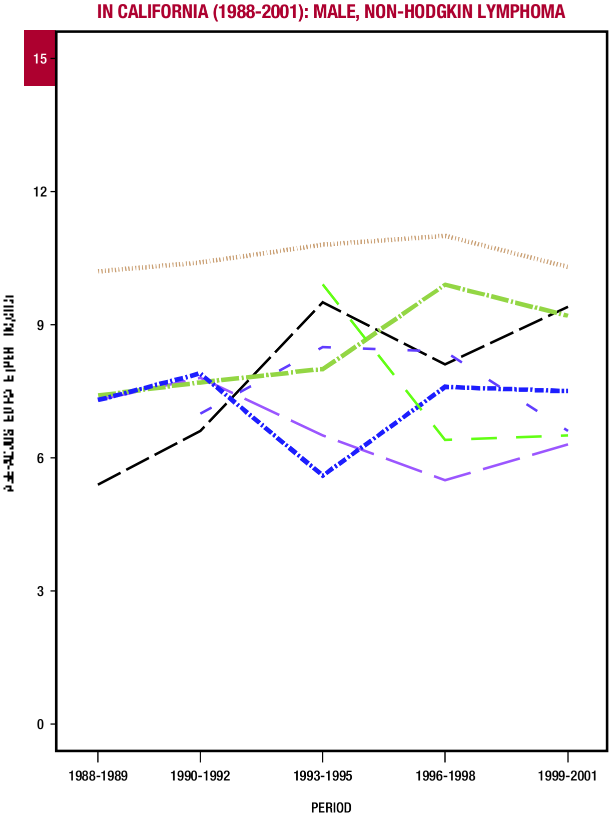
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE
IN CALIFORNIA (1988-2001): MALE, NON-HODGKIN LYMPHOMA



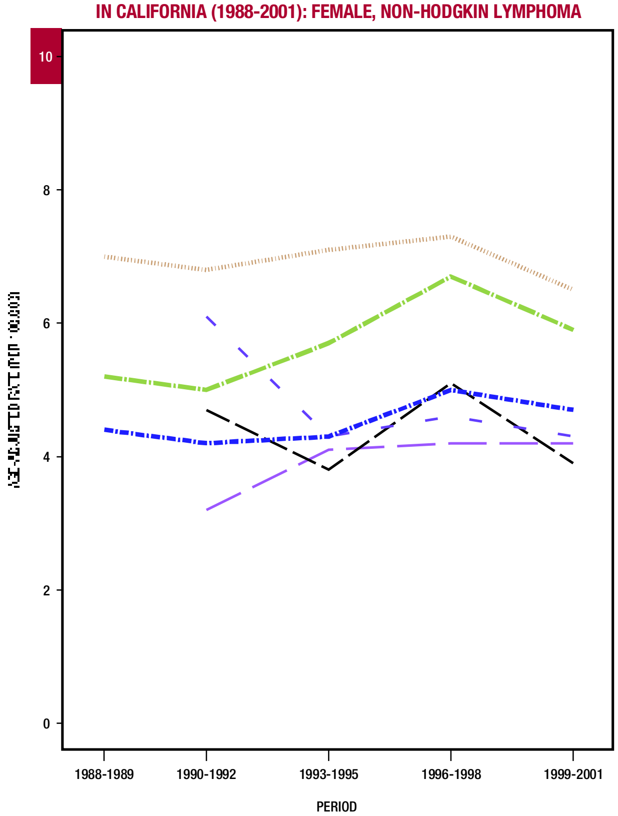
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE
IN CALIFORNIA (1988-2001): FEMALE, NON-HODGKIN LYMPHOMA



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE
IN CALIFORNIA (1988-2001): MALE, NON-HODGKIN LYMPHOMA



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE
IN CALIFORNIA (1988-2001): FEMALE, NON-HODGKIN LYMPHOMA



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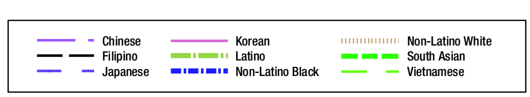


ORAL CAVITY AND PHARYNX

Lihua Liu, PhD

CAUSES AND WORLDWIDE TRENDS

Cancers of the oral cavity and pharynx include many cancers that occur within the mouth, tongue, lips, throat, parts of the nose and larynx, as well as the salivary glands. While the molecular and causal factors involved in the development of oral and pharyngeal cancers are largely unknown, tobacco and alcohol use are two major risk factors for these cancers. Poor oral hygiene and a diet low in fruits and vegetables also appear to be associated with these diseases.

Incidence of oral and pharyngeal cancer varies widely around the world, with rates high in developing countries and low in developed countries. Geographic variation of incidence for these cancers can also be found within countries. The distribution of tumors within the oral cavity and pharynx vary throughout the world by race/ethnicity and sex. Men are at much higher risk of developing these cancers than women. Incidence and mortality trends of oral and pharyngeal cancers outside the U.S. have generally been either stable for the past 40 years or are rising in some regions.

In the U.S., both incidence and mortality rates of oral and pharyngeal cancers have been declining since the 1980s, most noticeably among white men, probably reflecting a reduction in smoking.

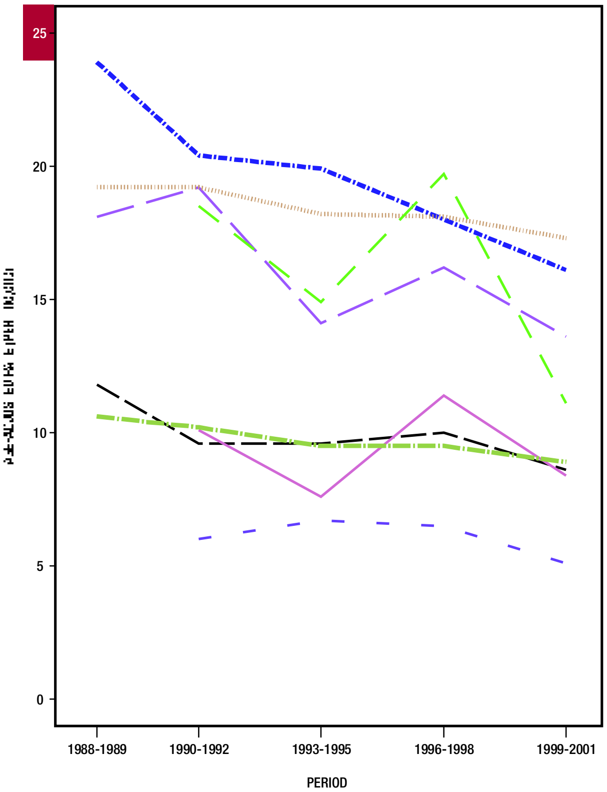
TRENDS IN INCIDENCE AND MORTALITY IN CALIFORNIA

In California, between 1988 and 2001, the incidence and mortality rates for cancers of the oral cavity and pharynx generally declined, more so in men than in women. There were obvious differences among racial/ethnic groups and sexes in risks for developing and dying from these cancers. Among men, non-Latino black, non-Latino white, Chinese and Vietnamese groups had higher incidence rates than Filipino, Latino, Korean and Japanese groups. After non-Latino black men recorded years of rapidly declining incidence rates, non-Latino white men became the group with the highest incidence rates in late 1990s. However, lower mortality rates of non-Latino white men demonstrate the significantly better prognosis for this cancer among non-Latino white men compared to others.

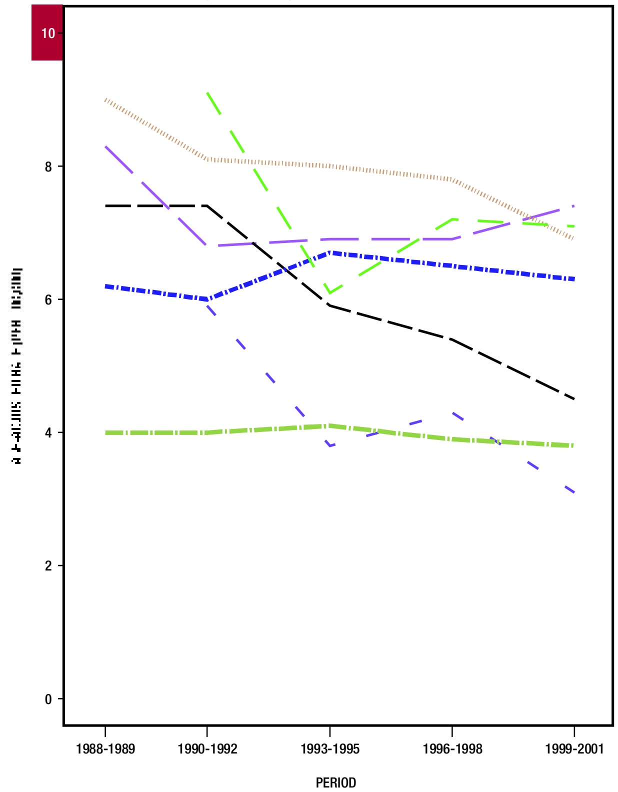
The declining incidence rates were also evident between 1988 and 2001 among non-Latino white, Filipino, Japanese and Latino women. Non-Latino white women also experienced decreasing rates of death due to these cancers. Differences in mortality rates between non-Latino white women and non-Latino black women were much smaller than the gaps observed between the equivalent groups of men. For most of the 1990s, the highest mortality rates were found among Chinese women. Latinas, meanwhile, had the lowest rates of both incidence and mortality of oral pharyngeal cancers.

The continued declines in the incidence and mortality of oral and pharyngeal cancer in California are likely associated with aggressive anti-smoking campaigns and continued decline of adult smoking in California. Eliminating tobacco and alcohol greatly lowers the risk of developing cancers of oral cavity and pharynx. Monitoring the incidence and mortality trends by race/ethnicity and detailed cancer type will help understanding of the disease and further improve education and prevention efforts.

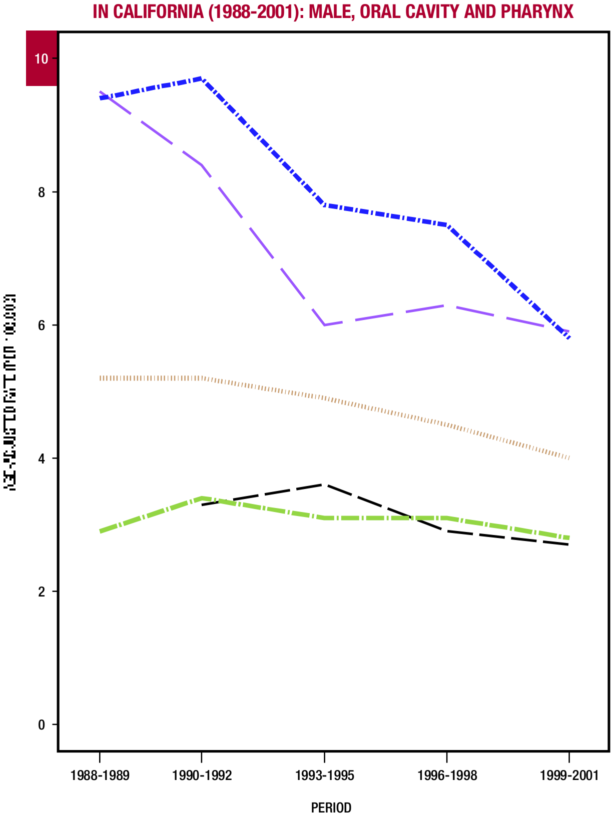
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE IN CALIFORNIA (1988-2001): MALE, ORAL CAVITY AND PHARYNX



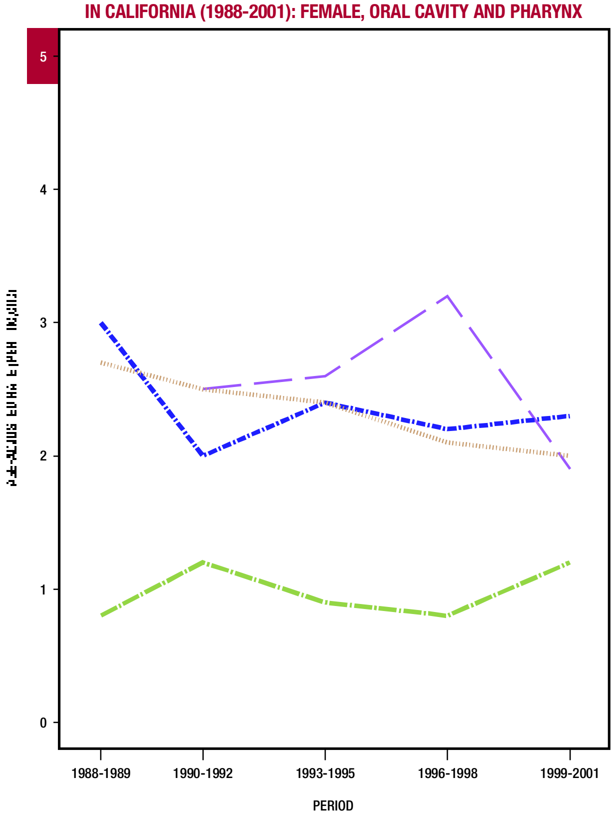
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE IN CALIFORNIA (1988-2001): FEMALE, ORAL CAVITY AND PHARYNX



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE IN CALIFORNIA (1988-2001): MALE, ORAL CAVITY AND PHARYNX



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE IN CALIFORNIA (1988-2001): FEMALE, ORAL CAVITY AND PHARYNX



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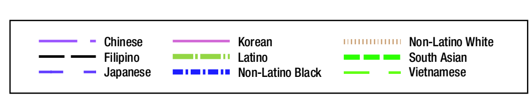


OVARY

Cynthia D. O'Malley, PhD

CAUSES AND WORLDWIDE TRENDS

In developed countries, 2 percent of women will develop ovarian cancer during their lifetime. There are three primary types of ovarian cancer: germ cell, sex chord-stromal, and epithelial tumors. Germ cell and sex chord-stromal tumors are rare and are more likely to occur in young women. In contrast, epithelial tumors account for about 90 percent of all ovarian cancers and strike women of all ages. Epithelial ovarian cancer is particularly lethal; only 50 percent of affected women in the United States survive 5 years after diagnosis. With no clearly definable symptoms and no effective screening methods, ovarian cancer often remains undetected until it reaches an advanced stage when prognosis is poor.

While the causes are unknown, increasing age, white race, and family history are risk factors for ovarian cancer. Oral contraceptive use, multiple pregnancies, and—to a lesser extent, hysterectomy and tubal ligation—appear to help protect a woman from ovarian cancer. The risk of using infertility drugs or talcum powder in the pelvic area is uncertain.

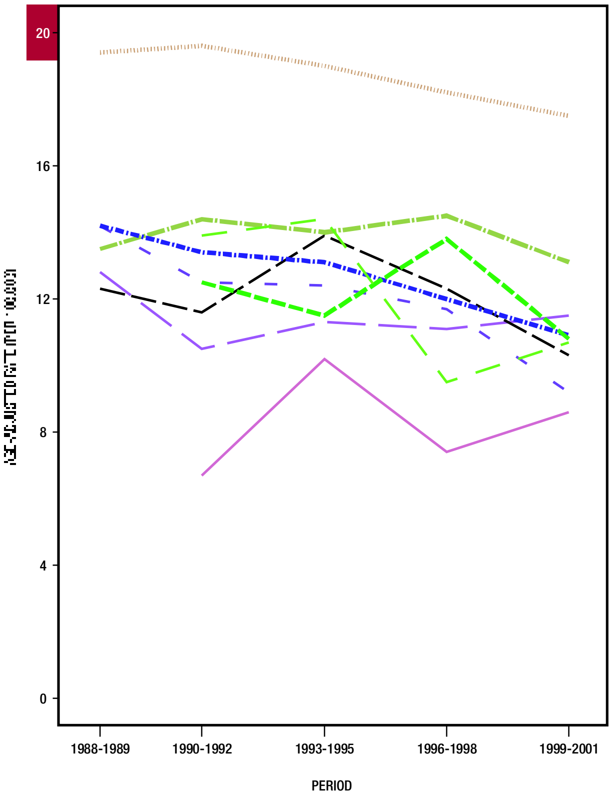
Worldwide, the incidence of ovarian cancer is highest in the Scandinavian countries, elevated in North America and northern and central Europe, and lower in Africa, Asia, and South America. Rates have been stable in North America and Europe for the past several decades but have increased in Asian countries such as China and Japan.

TRENDS IN INCIDENCE AND MORTALITY CALIFORNIA

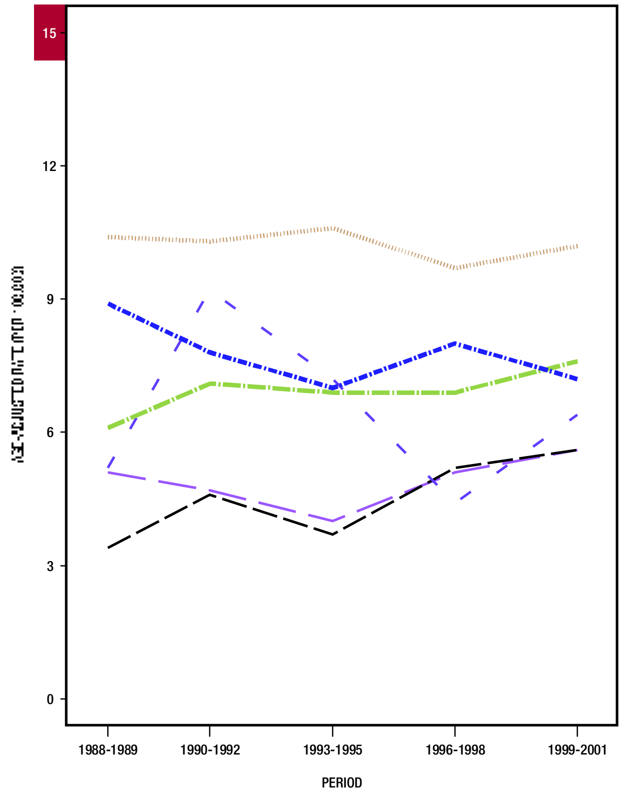
Ovarian cancer is most common among non-Latino whites, and incidence rates have been stable in these women since 1988. Rates for non-Latino blacks and Japanese declined steadily since 1988. Incidence increased slightly from 1988 to 2001 among Latinas. Incidence rates for Vietnamese women also declined, but rates for other Asian populations fluctuated, probably due to yearly variation in the small number of cases diagnosed.

Overall, survival is poor following ovarian cancer diagnosis. Mortality rates between 1988 and 2001 remained steady for non-Latino whites. Although it appears that mortality rates decreased for non-Latino blacks and increased for Latinas, these trends were based on small numbers of cases, so their significance is uncertain. For Filipinas, mortality rates increased 60 percent. However, this is also based on a small number of cases. Chinese and Japanese mortality trends were erratic, and data for other Asian populations are not presented because of the small number of cases. This pattern of highest mortality rates in non-Latino whites, intermediate in non-Latino blacks, and lower in other racial/ethnic groups mirrors national trends. Furthermore, the racial/ethnic variation in mortality rates is consistent with the incidence patterns of ovarian cancer in California and across the nation.

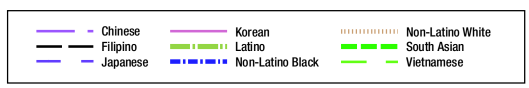
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE IN CALIFORNIA (1988-2001): FEMALE, OVARY



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE IN CALIFORNIA (1988-2001): FEMALE, OVARY



*Where a rate is based on fewer than 20 cases (or deaths), that rate, and the lines joining it to adjacent rates, are omitted.



John W. Morgan, DRPH

CAUSES AND WORLDWIDE TRENDS

The overwhelming majority of pancreatic cancers arise in the tissues of the organ that produce and carry digestive enzymes. Although pancreatic cancer can arise in the insulin-producing tissue of the pancreas, this represents only 1 percent to 2 percent of new pancreatic cancers.

Pancreatic cancer has sadly earned a tag as "the hopeless disease" because of the rarity of successful treatment—regardless of early diagnosis—and because of limited understanding of known, preventable causes. Pancreatic cancer is characterized by late diagnosis and poor survival. About half of all patients diagnosed with pancreatic cancer succumb within three months of the diagnosis date.

Known risk factors for pancreatic cancer include age greater than 50, male sex, non-Latino black race, family history of pancreatic cancer, and tobacco smoking. Among these characteristics, only tobacco use is modifiable. Internationally, incidence and mortality rates for pancreatic cancer vary less from nation to nation than those of other major cancer types.

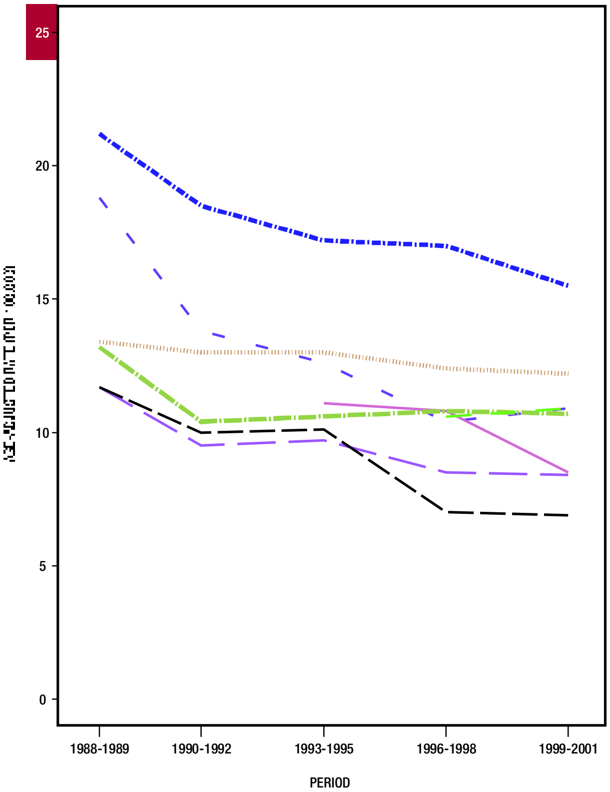
Complications of pancreatic cancer include pancreatitis (inflammation of the pancreas), which is frequently accompanied by nausea and jaundice and can be accompanied by diabetes. Frequently, pancreatic cancer has already spread to the liver and to other vital organs of the body by the time the disease is diagnosed.

TRENDS IN INCIDENCE AND MORTALITY IN CALIFORNIA

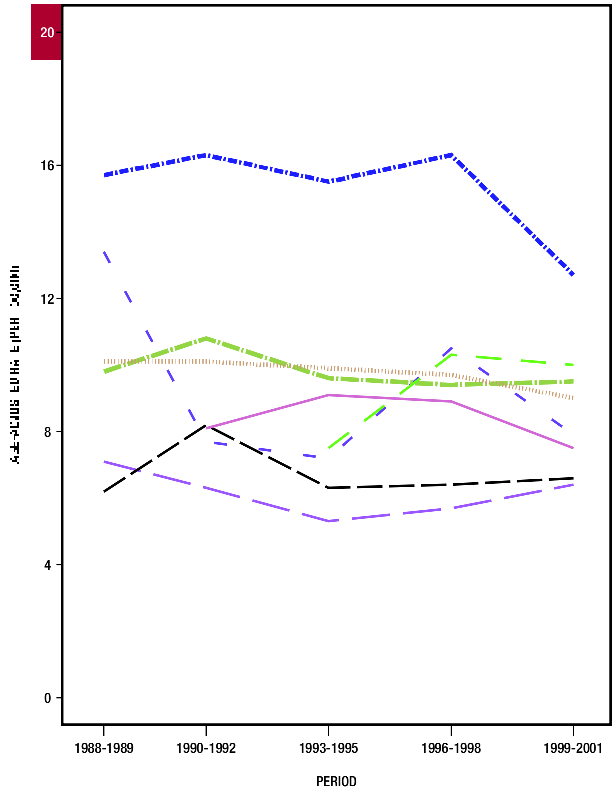
Incidence rates for pancreatic cancer in California have shown gradual declines among non-Latino black, Chinese, Filipino, Japanese, Latino and non-Latino white men since 1988, although the incidence rate trends have remained constant among Korean, South Asian and Vietnamese men during the same time period. Incidence rates for pancreatic cancer among California women have remained relatively constant from 1988 through 2001 for all racial/ethnic groups.

Pancreatic cancer is the fourth leading cause of cancer deaths in California. Mortality rates for pancreatic cancer in the state remained constant from 1988 through 2001 for both sexes among almost all racial/ethnic groups. The exceptions: mortality rates for pancreatic cancer among non-Latino black men and non-Latino white women showed significant declines from 1988 through 2001.

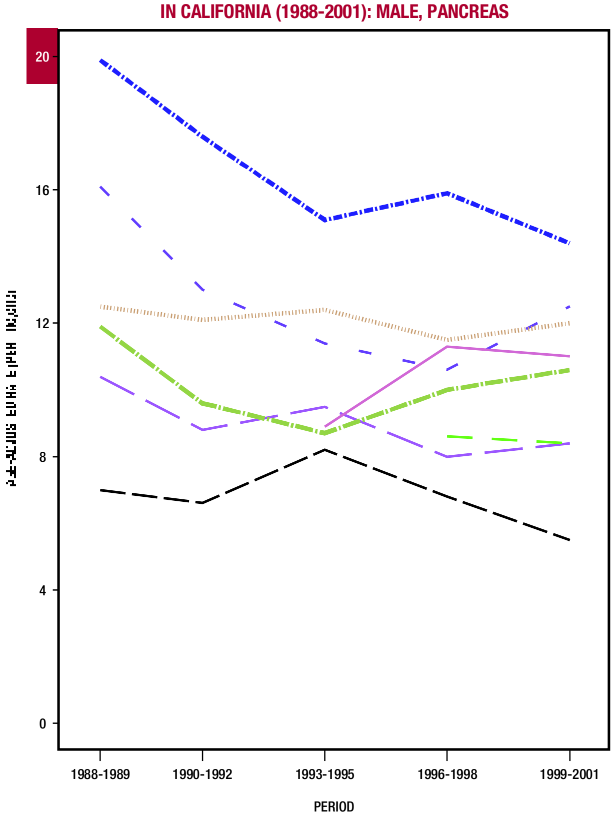
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE IN CALIFORNIA (1988-2001): MALE, PANCREAS



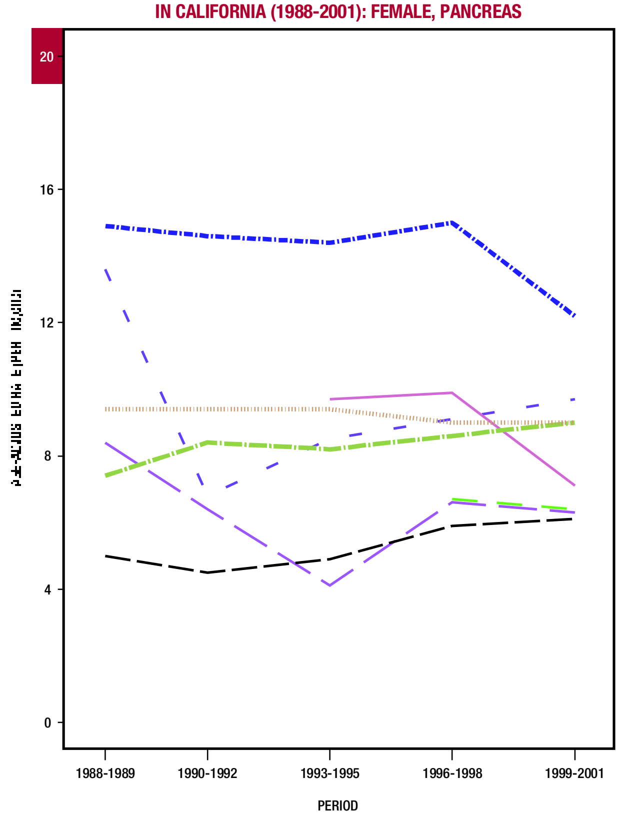
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE IN CALIFORNIA (1988-2001): FEMALE, PANCREAS



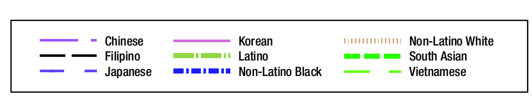
TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE IN CALIFORNIA (1988-2001): MALE, PANCREAS



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE IN CALIFORNIA (1988-2001): FEMALE, PANCREAS



*Where a rate is based on fewer than 20 cases (or deaths), that rate, and the lines joining it to adjacent rates, are omitted.



PROSTATE

Monica Brown, MPH, PhD

CAUSES AND WORLDWIDE TRENDS

Prostate cancer is the fourth most common cancer in men worldwide. Patterns and trends in prostate cancer incidence, survival and mortality vary widely from country to country. Incidence rates are highest in the U.S. and Canada, followed distantly by Sweden. Black men have the highest reported incidence in the world; Asians have the lowest.

Prostate cancer is primarily a disease of the elderly; the median age at diagnosis is 71. No one has yet determined the precise underlying causes of prostate cancer. Prostate cancer appears to be related to hormones and has a strong genetic component. Studies of immigrant populations show that their risk of prostate cancer is more similar to that of their new country rather than their country of origin. These results strongly suggest that lifestyle factors contribute to the large differences in incidence found between countries. Increased risk of prostate cancer may involve diet, tobacco use, lack of physical exercise, obesity and perhaps alcohol use, reproductive patterns and sexual practices.

As life expectancy increases, more men will be diagnosed with prostate cancer. This pending onslaught of cases worldwide has made prostate cancer prevention one of the most aggressively researched areas. Some of the most encouraging prevention research involves dietary chemoprevention: foods or supplements that prevent, inhibit or delay progression of prostate cancer. Vitamin E, plant estrogens such as those found in soy products, trace minerals such as selenium, and the pigment called lycopene (which is derived from tomato products) show promising results.

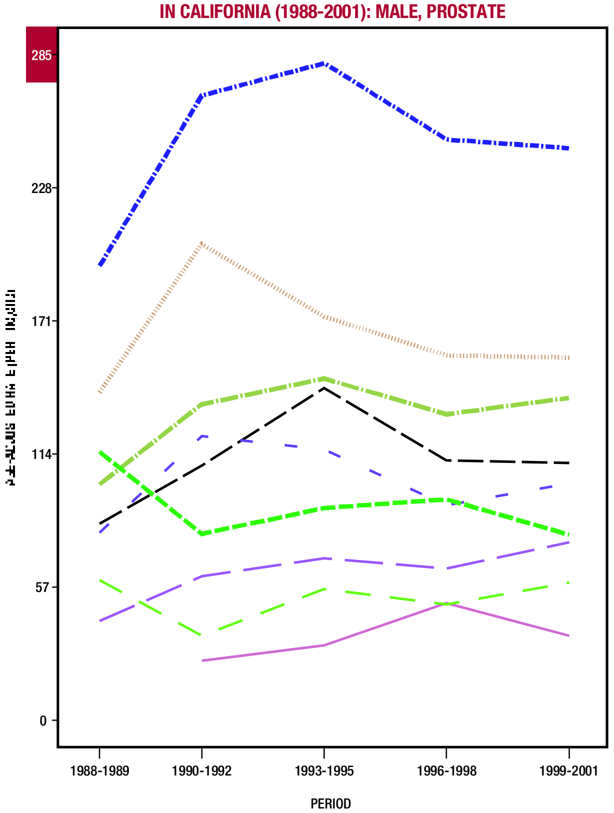
INCIDENCE AND MORTALITY TRENDS IN CALIFORNIA

Incidence rates for most racial/ethnic groups in California increased sharply in the early 1990s, probably due to the widespread use of the PSA (prostate specific antigen) test. Incidence then began to decrease around the mid-1990s, leveling off between 1998 and 2001, where most rates returned to their pre-PSA period levels.

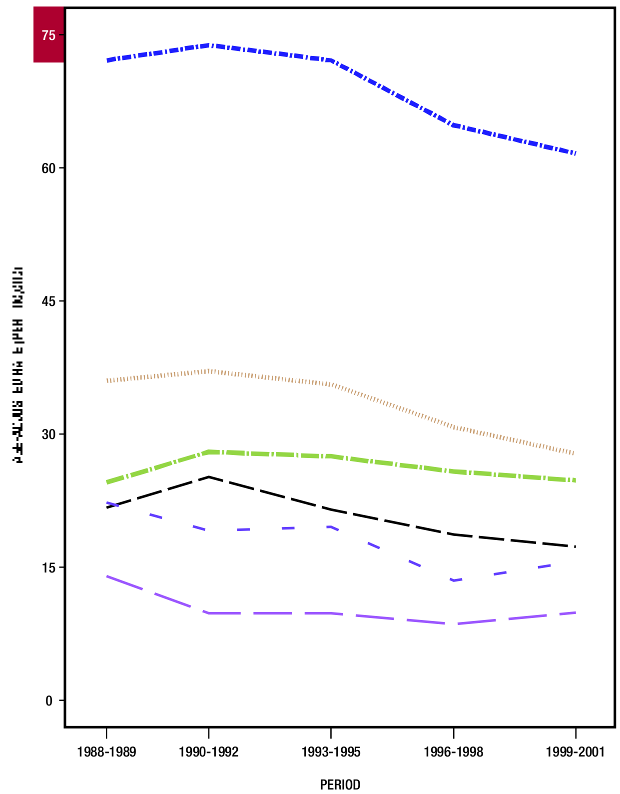
Non-Latino black men had the highest incidence of prostate cancer of any ethnic group in California; Koreans had the lowest. Historic trends in prostate cancer incidence for non-Latino whites, Latinos and Japanese followed a similar incidence pattern. Filipinos, South Asians and Vietnamese had a contrary pattern, with a dip in incidence in the early 1990s, increasing rates to 1996 then either a decrease or no change in the late 1990s. Chinese experienced a near steady increase in incidence from 1988 to the present.

Prostate cancer mortality rates have been declining among all racial/ethnic groups. This reduction in deaths has mostly been seen for advanced disease. The greatest decreases in mortality over time have been among Filipinos and non-Latino black men. The smallest decrease has been among Latinos and Vietnamese.

TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE
IN CALIFORNIA (1988-2001): MALE, PROSTATE



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE
IN CALIFORNIA (1988-2001): MALE, PROSTATE



*Where a rate is based on fewer than 20 cases (or deaths), that rate, and the lines joining it to adjacent rates, are omitted.

Chinese	Korean	Non-Latino White
Filipino	Latino	South Asian
Japanese	Non-Latino Black	Vietnamese

STOMACH

Lesley M. Butler, PhD

CAUSES AND WORLDWIDE TRENDS

Stomach cancer is the second-most common cancer and the second-leading cause of cancer death worldwide, probably due in part to the high prevalence of a bacterium (*H. pylori*) thought to be implicated in the disease, as well as the lack of early symptoms, typically advanced stage at diagnosis and lack of treatments available. Despite how common stomach cancer is, stomach cancer incidence and mortality have both been declining worldwide since record-keeping began. However, this trend has not been seen in all populations: in Japan and China rates of stomach cancer in the early and middle parts of last century were probably increasing, before they too began to decline. The worldwide prevalence of the bacterium *H. pylori* which probably increases the risk of certain types of stomach cancer seems to explain part of the worldwide distribution of stomach cancer, but not all of the differences noted between different racial/ethnic groups and in different geographical regions. *H. pylori* is most common in developing countries, such as Mexico and China, as well as more developed Asian countries, such as Japan. This mirrors the elevated stomach cancer rates in those countries compared to others. Presumably the remaining differences are accounted for by differences in diet, cigarette smoking and genetic factors, although the contribution of each of these to stomach cancer occurrence is not yet fully understood.

In the U.S., stomach cancer incidence is declining. The highest rates of stomach cancer are observed among Asians, particularly Koreans, Japanese and Vietnamese. Latinos and blacks have the second highest incidence, with the lowest observed among whites. Some have observed a possible increase in the incidence of tumors located in the upper stomach region, near the esophagus. This trend has been attributed to factors associated with a Western lifestyle, such as cigarette-smoking and obesity, as well as diets high in fat and low in fruit and vegetables.

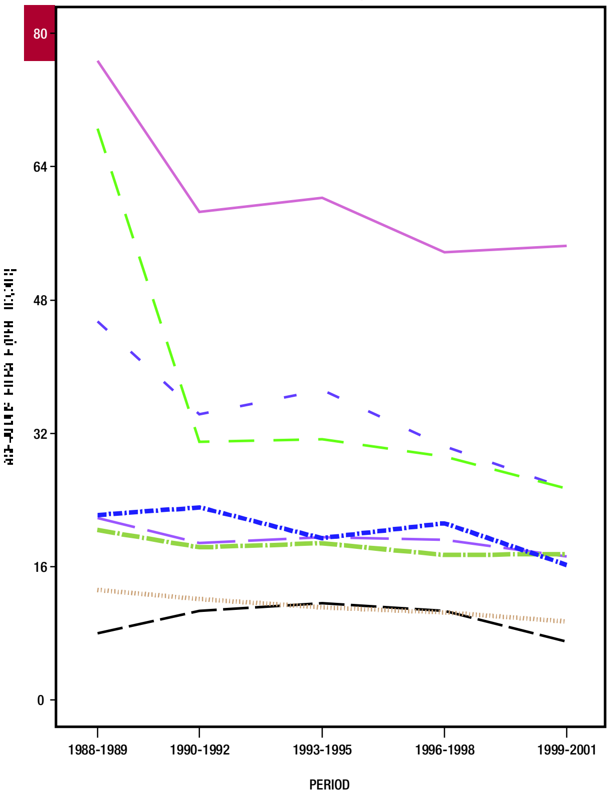
TRENDS IN INCIDENCE AND MORTALITY IN CALIFORNIA

Incidence and mortality trends in California are similar to those of the U.S. Overall, men had higher incidence than women.

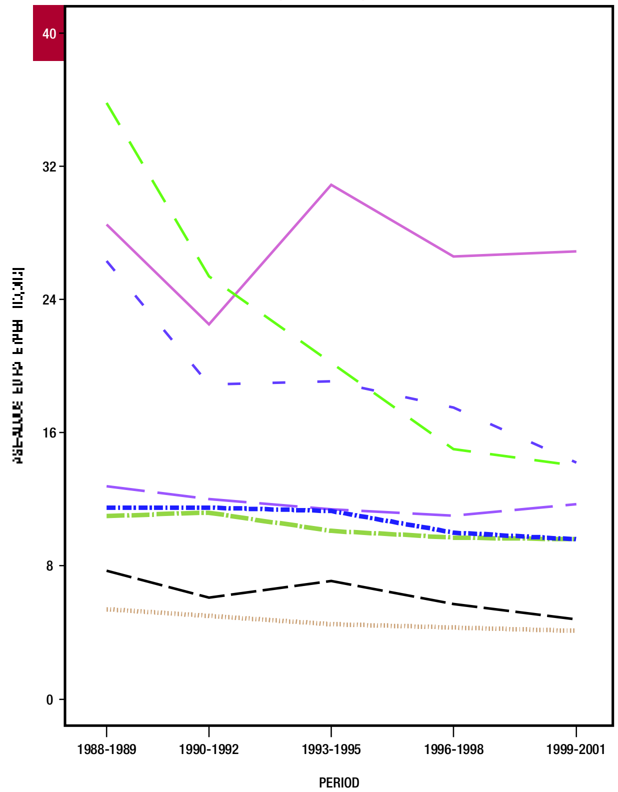
Asians had the highest incidence, followed by non-Latino blacks, Latinos and non-Latino whites. Among Asians, incidence rates differed strikingly among racial/ethnic sub-groups. For example, Koreans had markedly higher incidence, with rates more than 1.5-fold greater than Japanese and Vietnamese between 1993 and 2001 among women and between 1990 and 2001 among men. Filipinos consistently had the lowest rates compared to all other racial/ethnic groups, except non-Latino whites. Vietnamese and Japanese experienced the greatest declines in stomach cancer incidence. Korean women were the only group to experience a growing rate of cases: a steep decline in incidence between 1990 and 1992 was followed by an equally steep increase between 1993 and 1995.

Although mortality rates declined overall among men and women (with the exception of Chinese women) between 1998 and 2001, mortality rates appeared to fluctuate between every two-year interval. This fluctuation was most evident among Korean and Vietnamese women. In contrast, continual declines in mortality were observed among Chinese and non-Latino men during the entire period.

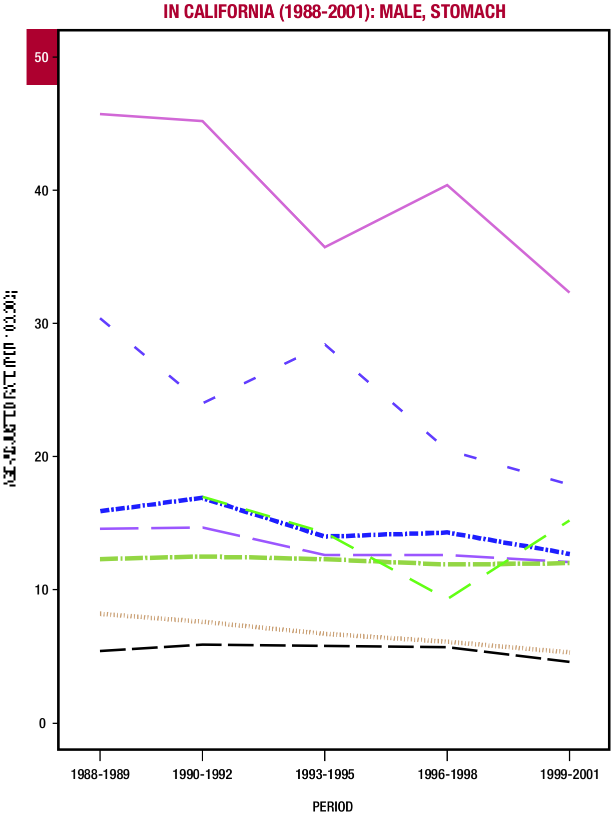
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE
IN CALIFORNIA (1988-2001): MALE, STOMACH



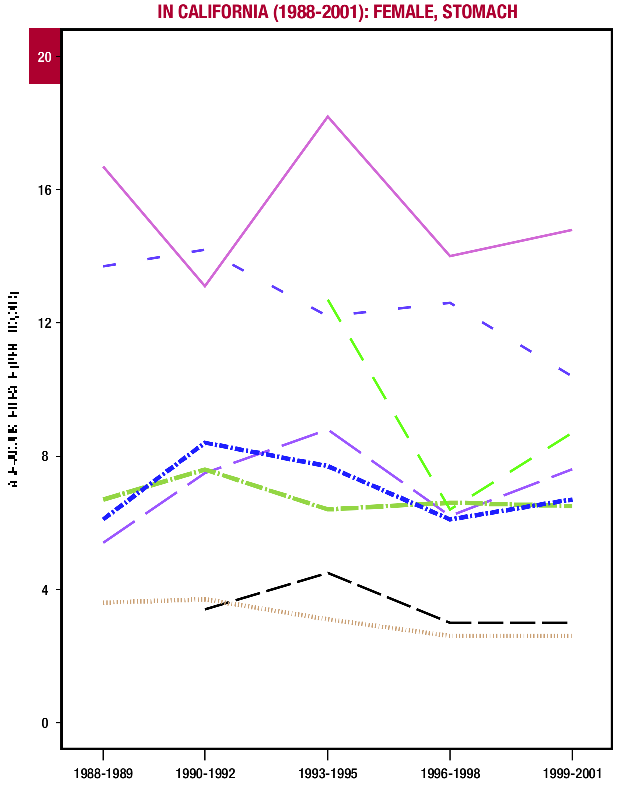
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE
IN CALIFORNIA (1988-2001): FEMALE, STOMACH



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE
IN CALIFORNIA (1988-2001): MALE, STOMACH



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE
IN CALIFORNIA (1988-2001): FEMALE, STOMACH



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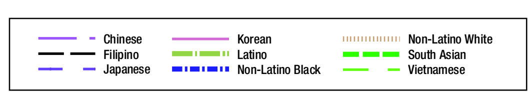


Paul K. Mills, PhD, MPH and Deborah Riordan, MPH

CAUSES AND WORLDWIDE TRENDS

Cancer of the testis is a relatively rare form of cancer, and rates are highest in western Europe and North America but lower throughout the rest of the world. In western nations, testis cancer is the most common form of cancer in males between the ages of 18 and 35. In this age group, testis cancer accounts for about one in four new cancer diagnoses. In addition to the peak in young men, there is another peak in testis cancer among older men. Risk is highest in non-Latino whites and is considerably lower in all other racial/ethnic groups.

The only established risk factor for testis cancer (besides age and race) is a history of cryptorchidism, or undescended testes, a condition in which baby boys are born with the testes still embedded inside the pelvis. The situation can be corrected surgically, but boys with such a history face an increased risk of the cancer later in life. A family history of this disease in a father or brother also increases the risk.

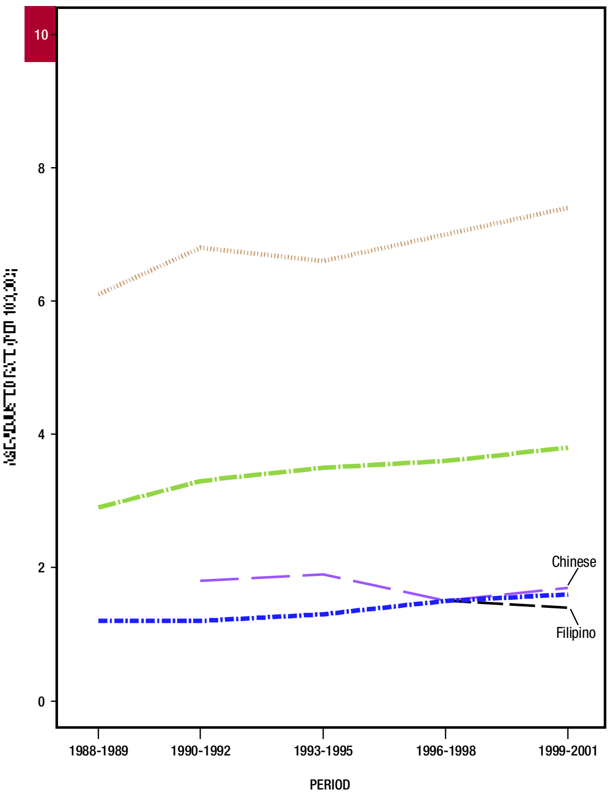
Treatment of testicular cancer has resulted in dramatic improvements in survival in the last quarter century. Today, 94 percent of patients with testis cancer survive five years.

TRENDS IN INCIDENCE AND MORTALITY IN CALIFORNIA

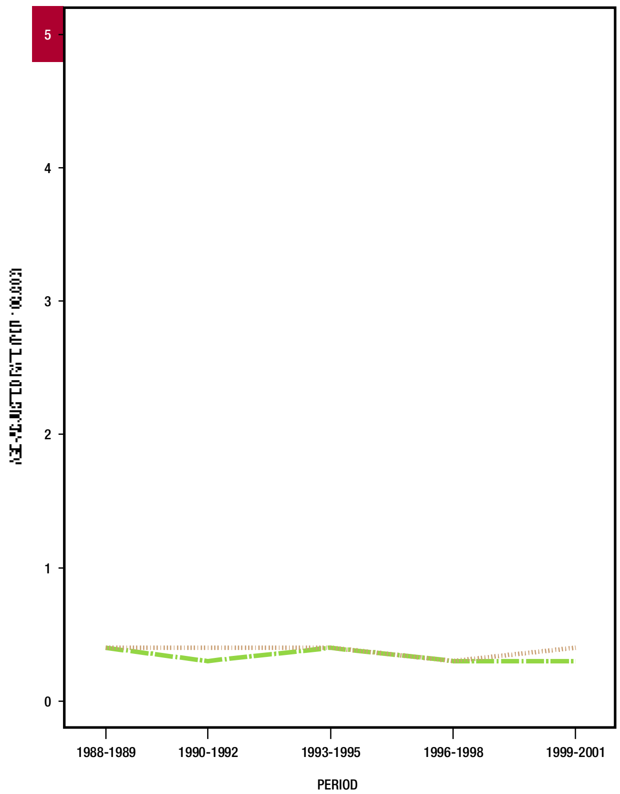
About 900 new cases of testis cancer are diagnosed each year in California. Between 1988 and 2001 the rate of testis cancer increased 2.2 percent per year among non-Latino white men and 3.4 percent per year in non-Latino black men. It is unclear why the rates are increasing so dramatically in these groups of young men. Rates also increased in Latino males between 1988 and 2001. For Asian groups, the rates also appeared largely stable, although Chinese and Filipino incidence rates appeared to decrease around 2001.

Because of tremendous strides in the successful treatment of this disease, testis cancer causes only about 50 deaths each year in California. Between 1988 and 2001, the mortality rates for testis cancer decreased in non-Latino whites and in Latinos, suggesting that early detection and improvements in treatment are effective. Despite good survival rates, treatment for the disease can have devastating consequences, however. Further research is warranted to determine risk factors and explain increases in testis cancer in certain ethnic groups.

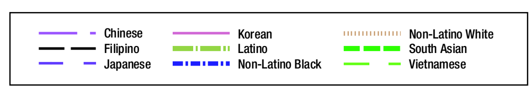
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE IN CALIFORNIA (1988-2001): MALE, TESTIS



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE IN CALIFORNIA (1988-2001): MALE, TESTIS



*Where a rate is based on fewer than 20 cases (or deaths), that rate, and the lines joining it to adjacent rates, are omitted.



THYROID *Kiumarss Nasseri, DVM, MPH, PhD*

CAUSES AND NATIONAL TRENDS

The thyroid gland is located under the Adam's apple in the front part of the neck. In most people, it cannot be seen nor felt. This gland takes up iodine from the diet and the blood and makes a thyroid hormone that is important for many body functions.

Cancer of the thyroid gland is uncommon in most countries, but its incidence varies widely around the world. It is diagnosed nearly twice as often in developed countries than in developing countries. The highest incidence rates are recorded for the U.S. and Canada, followed by Australia, New Zealand and islands in the Pacific. Three quarters of all thyroid cancers are diagnosed in women. In the U.S., thyroid cancer is the eighth most frequently diagnosed cancer in women, and its incidence has increased in recent years.

The most significant risk factor for thyroid cancer is exposure to ionizing radiation, either directly from therapeutic applications to the head and neck area of the body, or indirectly through radioactive fallout (such the Chernobyl disaster) or ingestion of radioactive material for therapeutic or diagnostic purposes. Other risk factors include genetic predisposition, nutritional imbalances (such as iodine deficiency), over consumption of certain vegetables that can harm the thyroid when eaten in large quantities (such as rutabaga, cassava and kale), and tobacco use.

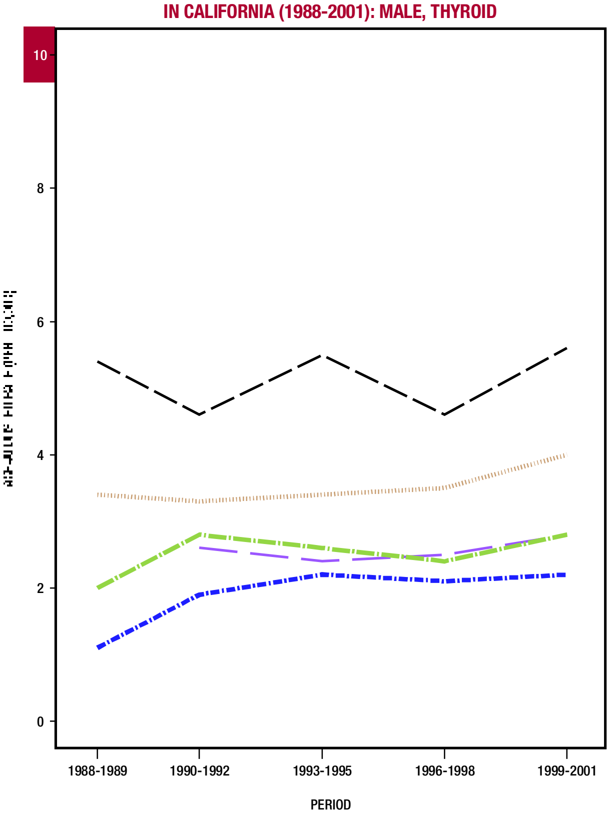
Although no screening exists for thyroid cancer, almost all thyroid cancers in the U.S. are diagnosed at early stages and receive effective treatment. About 96 percent of patients diagnosed with thyroid cancer in the U.S. are still alive five years after diagnosis, and more than 310,000 thyroid cancer survivors are living in the U.S.

TRENDS IN INCIDENCE AND MORTALITY IN CALIFORNIA

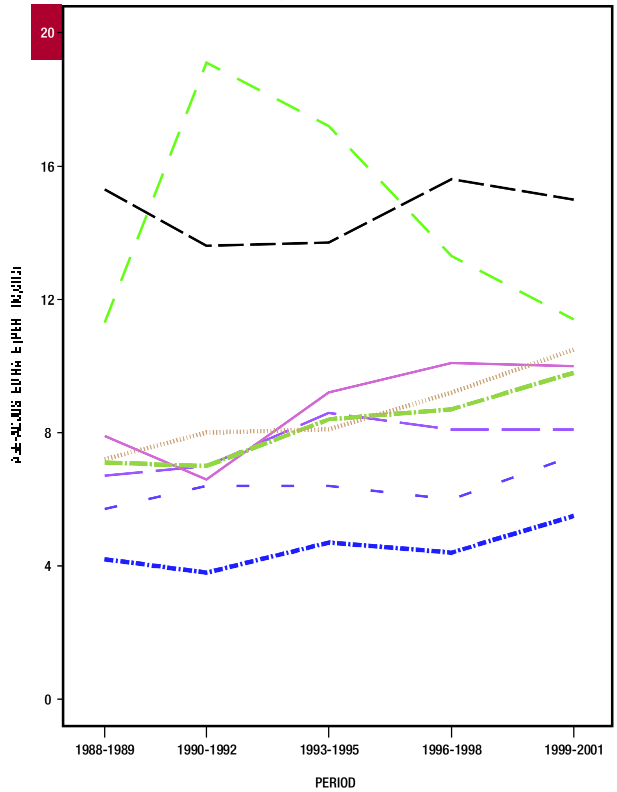
Non-Latino whites accounted for 68 percent of all thyroid cancer cases diagnosed between 1988 and 2000. Incidence rates in Filipinos and Vietnamese were higher than the incidence rates in non-Latino whites, while rates in non-Latino blacks, Latinos and Japanese were lower. Incidence rates of thyroid cancer in California rapidly increased in non-Latino white men and women and in non-Latino black and Latino women. Incidence rates in Vietnamese women, however, declined from 1992 onward, after an initial increase from 1988. For the other racial/ethnic groups, the changes during this period appear to be random fluctuations and represent a trend of overall stability. Reasons for the observed patterns are not known.

Deaths due to thyroid cancer were rare. Between 1988 and 2001, non-Latino whites and Latinos account for 85 percent of all thyroid cancer deaths in California. Mortality rates generally declined in non-Latino white men and women. In Latinos, however, mortality rates increased, particularly in women. Moreover, mortality rates in the Latinos were almost double the rates in the non-Latino white population. This probably reflects a lack of proper access to health-care services or hints at a more severe type of thyroid cancer in the Latino population.

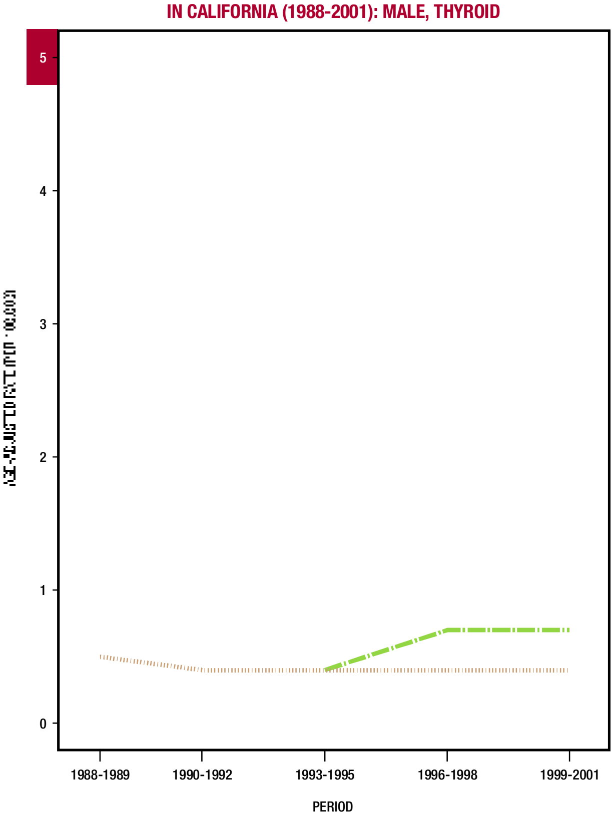
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE IN CALIFORNIA (1988-2001): MALE, THYROID



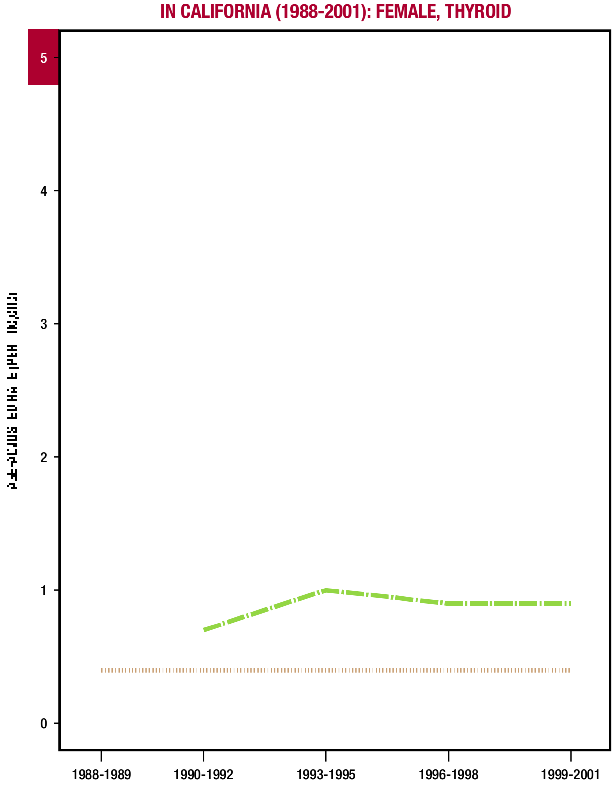
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE IN CALIFORNIA (1988-2001): FEMALE, THYROID



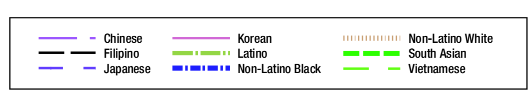
TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE IN CALIFORNIA (1988-2001): MALE, THYROID



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE IN CALIFORNIA (1988-2001): FEMALE, THYROID



*Where a rate is based on fewer than 20 cases (or deaths), that rate, and the lines joining it to adjacent rates, are omitted.



URINARY BLADDER

Arti Parikh-Patel, PhD, MPH

CAUSES AND WORLDWIDE TRENDS

Cigarette-smoking is estimated to account for half of all bladder cancer cases in the U.S. Cancer-causing chemicals contained in tobacco smoke, called arylamines, are likely responsible for the increased risk of bladder cancer seen in smokers. People working in certain industrial environments such as the dye, rubber, leather and paint-making industries also are at higher risk, since the chemicals used in these processes may contain arylamines. Regular use of non-steroidal anti-inflammatory drugs, such as aspirin and ibuprofen, has been shown to protect against bladder cancer.

Rates of bladder cancer vary roughly tenfold worldwide. High-risk regions include the U.S., Canada and countries in western Europe. Asians are at low risk for this cancer. Rates of bladder cancer in men are generally two to three times higher than those in women. The risk of bladder cancer increases with age; the highest rates are seen in people over 65.

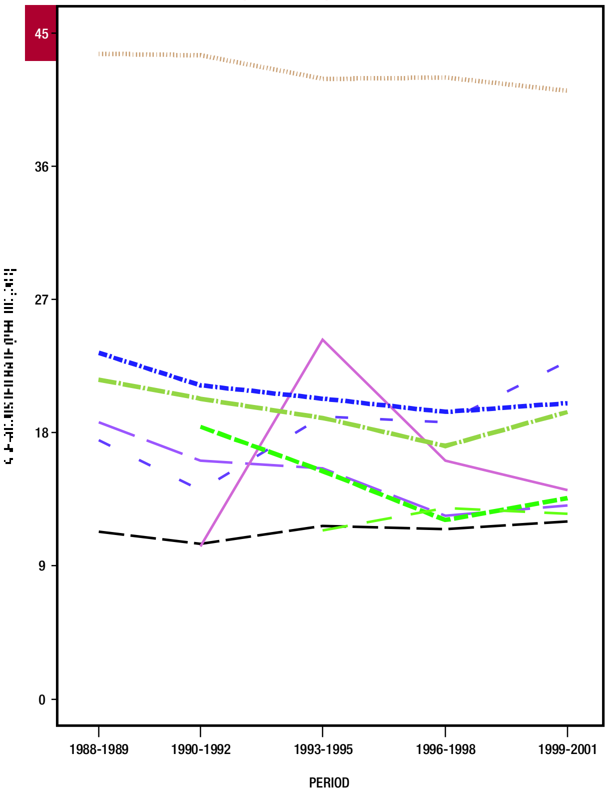
In the U.S., rates of bladder cancer in non-Asians of both sexes have been decreasing over the past 25 years. The decline is most prominent among non-Latino whites. Similar declines have been noted in western Europe. Trends such as a decrease in cigarette-smoking and increased use of non-steroidal anti-inflammatory agents are possible explanations.

TRENDS IN INCIDENCE AND MORTALITY IN CALIFORNIA

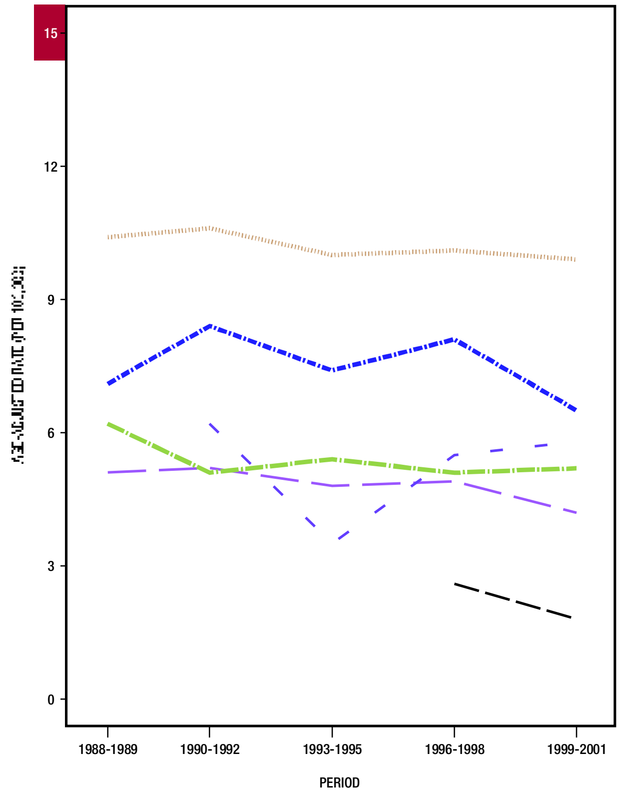
The rates of urinary bladder cancer among non-Latino whites far surpass those of other racial/ethnic groups. Rates among non-Latino whites of both sexes did not show considerable variation between 1988 and 2001. Among non-Latino whites, the incidence of bladder cancer was three to four times higher for men than women. Incidence of bladder cancer declined for Latino men. Although rates of bladder cancer declined in most Asian groups for both sexes, bladder cancer rates among Japanese men increased.

Mortality rates for men in California were two to three times higher than those of women. Among women, non-Latino blacks had the highest mortality rates, while non-Latino whites had the highest mortality rates among men. Bladder cancer mortality rates in men remained relatively stable across all racial/ethnic groups. Non-Latino black females showed the greatest variation in rates over the entire time period, although the change in the rates overall was not substantial.

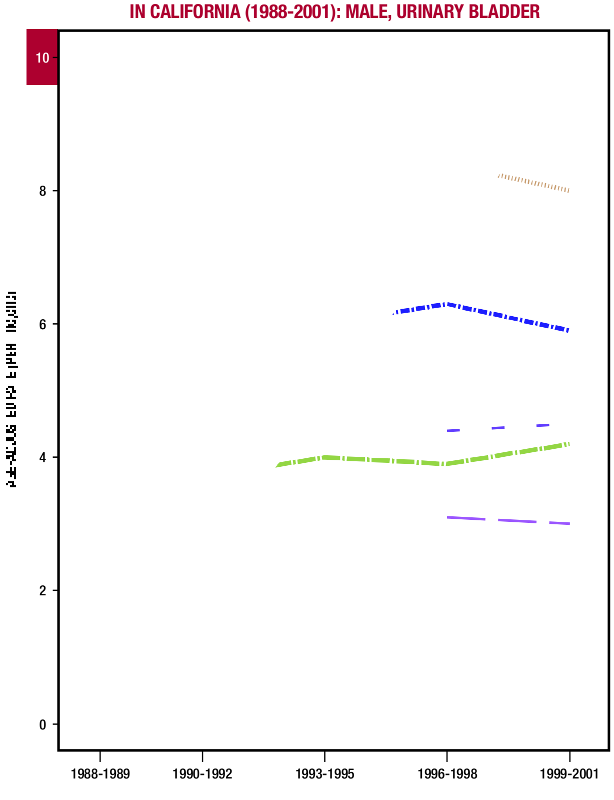
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE
IN CALIFORNIA (1988-2001): MALE, URINARY BLADDER



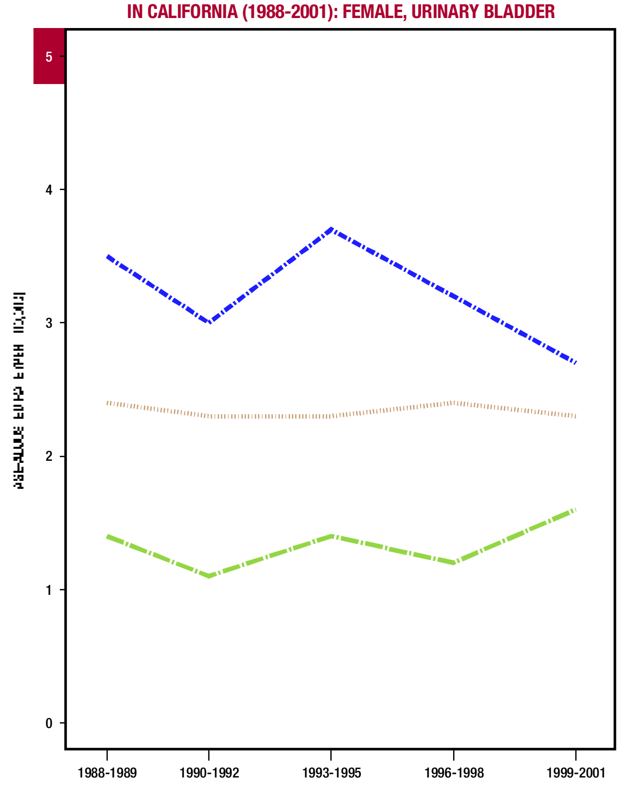
TRENDS IN AGE-ADJUSTED INCIDENCE RATES BY RACE
IN CALIFORNIA (1988-2001): FEMALE, URINARY BLADDER



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE
IN CALIFORNIA (1988-2001): MALE, URINARY BLADDER



TRENDS IN AGE-ADJUSTED MORTALITY RATES BY RACE
IN CALIFORNIA (1988-2001): FEMALE, URINARY BLADDER



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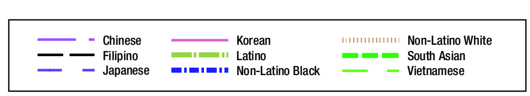


APPENDIX A: DETAILED METHODS

DETERMINATION OF RACE/ETHNICITY OF CANCER PATIENTS AND DECEDENTS

Race/ethnicity is grouped into the mutually exclusive categories of white, black, Latino, Chinese, Filipino, Korean, Japanese, South Asian and Vietnamese, according to the race/ethnicity reported in medical records. Persons in any of the above categories with a last name on the 1980 U.S. Census list of 12,497 Latino surnames, were also categorized as Latino for analyses in this report. Maiden name, when present, was used instead of last name to identify Latino women by surname. Similarly, persons in the above categories with a Vietnamese or Hmong surname were categorized as Vietnamese.

The use of surname to identify persons of Latino ethnicity was adopted by the CCR because of the recognized under-reporting of Latino ethnicity on the medical record and death certificate. A study conducted by the Northern California Cancer Center documented that the use of Latino surnames, in addition to information from the medical record, results in increased sensitivity and accuracy of cancer rates. Overall statewide cancer incidence and mortality rates for Latinos, based on this definition, are about 14 percent higher than those based on medical record and death certificate alone, and rates for non-Latino whites are about 1.4 percent lower.

POPULATION DENOMINATORS

Because of the racially and ethnically diverse populations in California, the CCR maintains strong interest and emphasis on studying the racial/ethnic differences in cancer risk. Variations in cancer incidence rates by race/ethnicity help to understand disease development, generate hypotheses, evaluate risk factors, monitor trends and target prevention programs. To calculate cancer incidence rates, annual population estimates of the state by age, sex, and race/ethnicity are needed as denominators. Because population counts of such detailed race/ethnicity data are available only for the years of the U.S. Census (1990 and 2000), the CCR developed its own estimates of the population for years between the censuses.

The CCR annual population estimates from 1988-2001 by age, sex and race/ethnicity were used for all incidence rates presented in this monograph. They were based on the data from the 1990 and 2000 U.S. population censuses, with linear interpolation, which assumes a fixed amount of population growth each year for the intercensal years and extrapolation for 1988-1989 and 2001. Seven mutually exclusive groups were included in the CCR population estimates: non-Latino white, Latino, non-Latino black, Chinese, Japanese, Filipino, Korean, South Asian and Vietnamese.

The 1990 Census counts were classified in mutually exclusive groups of non-Latino white, non-Latino black, and Latino. The 2000 National Center for Health Statistics (NCHS) bridged population counts also contained these same three mutually exclusive groups. Linear interpola-

tions estimated the population counts by race/ethnicity, sex, and age category for the years between the 1990 and 2000. For the years 1988-1989 and 2001, the same linear model was extrapolated to estimate the population counts by race/ethnicity, sex, and age category.

The non-Latino Asian/Pacific Islander counts were divided into six groups: Chinese, Japanese, Filipinos, Korean, South Asians and Vietnamese. To be as closely consistent with the coding of cancer data as possible, the South Asian category includes Asian Indians, Pakistani, Sri Lankan and Bangladeshi.

There are no population estimates of the 2000 population for the individual Asian ethnic subgroups. On the Census 2000 form, people can indicate any number of race/ethnic groups they like. Two extreme estimates (a minimum and a maximum value) of each Asian subgroup population are therefore arrived at by counting only those who self-identified as one race/ethnic group (minimum), and those who identified as many race/ethnic groups, one of which was an Asian subgroup (maximum). We took the simple average between the minimum and maximum estimate for each Asian subgroup. Linear interpolations between 1990 and 2000 and extrapolations of the 1990-2000 trends estimated the annual populations of these groups for 1988-1989 and 2001.

Unlike the 2000 Census, which had separate tabulations for Asian Indian, Bangladeshi, Pakistani, and Sri Lankan respectively, the 1990 Census listed the Asian Indian separately along with other specific Asian populations, but included the Bangladeshi, Pakistani, and Sri Lankan in the group of "other Asians". Therefore, the 1990 counts for Bangladeshi, Pakistani, and Sri Lankan were estimated from the age-sex-specific proportions of these populations in the "other Asians" contained in the 1990 Census PUMS file and the age-sex-specific totals of "other Asians" in the 1990 Census STF2 file.

Studies have shown that responses to the question of Hispanic/Latino origin by the same people vary over time or by circumstance. The inconsistency in self-identification of being Hispanic/Latino can result in a discrepancy of 7 percent to 11 percent of the counts. Therefore, there is no standard definition for the Hispanic/Latino population.

The CCR population estimates are tools used by the CCR for cancer research and surveillance purposes. Differences are likely to exist between different sets of population estimates produced by different government agencies at different times with different sources of data and different methodologies. Incidence rates calculated with different denominators are not directly comparable. In this publication we have used the same population estimates throughout.

TECHNICAL TERMS

Age-adjusted rate: The age-adjusted rate is a weighted average of the age-specific rates, where the weights represent the age distribution of a standard population. Rates in this report are age-adjusted by the direct method to the 2000 U.S. population, and are calculated per 100,000 persons. Age adjustment allows meaningful comparisons of cancer rates by controlling for differences in the age distribution of two populations, which can profoundly affect cancer rates. The age-adjusted rate is calculated as:

$$A.A.R. = \sum_{i=0-4}^{85+} (w_i r_i)$$

where A.A.R. represents the age-adjusted rate, w_i is the proportion of age group i in the standard population, and r_i is the California age-specific rate for the age group.

Age-specific rate: The age-specific rate is calculated by dividing the total number of cases in a specific age group by the total population in that age group. This rate is then multiplied by 100,000 to yield an age-specific rate per 100,000 people. Age at cancer diagnosis is categorized into five-year age categories, starting with birth to 4 years old and ending with age 85 and older. The age-specific rate is calculated as:

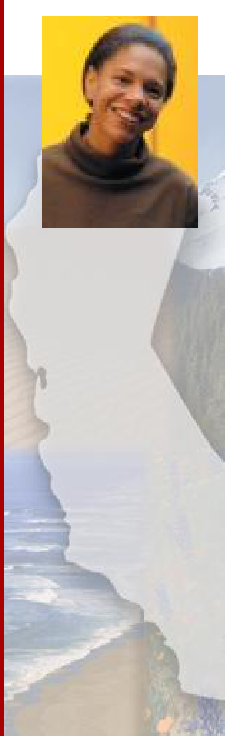
$$r_i = \left(\frac{c_i}{n_i}\right)$$

where r_i is the age-specific rate for age group i, c_i is the count of cases for that age group, and n_i is the count of persons at risk (i.e., the population) for that age group.

Estimated annual percent change (EAPC): The EAPC 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 rates (r), using calendar year as the predictor variables:

$$ln(r) = m(year) + b$$

From the slope of the regression line, m, the EAPC is calculated as EAPC = $100(e^{m-1})$. Testing the hypothesis that the EAPC is equal to zero is equivalent to testing the hypothesis that the slope of the line in the regression is equal to zero and there is no trend. The EAPC assumes that the cancer rate is changing at a constant rate over the interval examined. The EAPC was only calculated if there were 20 or more cases or deaths each year during the time period examined.



CALCULATION OF RATES AND TRENDS IN RATES

We collapsed data into five time periods (1988-1989, 1990-1992, 1993-1995, 1996-1998, 1999-2001) to obtain meaningful estimates for rare cancers, and calculated age-adjusted rates using the U.S. 2000 standard population for age standardization. We used SEER-Stat to calculate the age-adjusted rates, EAPC, and calculate the overall statistical significance of trends. The p-value for the EAPC represents the probability that the observed trends in age-adjusted rates occurred because of chance alone. A small p-value (e.g., 0.01) indicates a smaller likelihood that the trend occurred due to chance alone, while a large p-value (e.g., 0.75) indicates that chance is a reasonable explanation for the observed time trends. Traditionally, a p-value below 0.05 is considered statistically significant: that is, any p-value below 0.05 indicates that we are at least 95 percent certain that the observed trends did not occur by chance alone. The main determinant of this measure of certainty is the sample size (i.e., number of cases), so that when trends are based on a large number of cases, we are more certain that observed trends are not due to chance alone. However, for cancers such as prostate or breast cancer for which there is a large number of cases, almost any perceivable trend will turn out to be statistically significant. When that occurs, we need to then ask ourselves whether the trend is of sufficient magnitude to be of interest. A very small change in rates that is statistically significant because it was based on a large number of cases may not be as interesting as a large change in rates that has a lesser degree of certainty based on fewer cases. Appendix B provides the number of cases in each time period upon which rates are based, and the EAPC and p-values for the trend test described above, so that the reader can make up his or her own mind about the importance of observed trends. Authors of each section describing trends have taken these numbers and trend tests into account in their descriptions of the most important trends in cancer incidence.

APPENDIX B: NUMBER OF OBSERVED CASES BY SEX, RACE/ETHNICITY AND SITE, AND STATISTICAL TEST OF LINEAR TRENDS

ALL SITES

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value
Chinese	1,485	2,713	3,201	3,561	4,142	-0.92	<0.01	1,414	2,480	2,931	3,454	4,048	-0.5	0.03
Filipino	1,422	2,639	3,334	3,434	3,674	-0.08	0.90	1,415	2,635	3,106	3,684	4,198	0.03	0.86
Japanese	854	1,584	1,768	1,874	1,866	-0.94	0.09	994	1,674	1,833	2,180	2,201	0.21	0.65
Korean	322	638	807	1,024	1,091	0.28	0.68	384	619	856	1,016	1,239	1.34	0.02
Latino	10,006	18,437	21,446	22,709	26,003	-0.08	0.78	10,934	18,882	20,929	24,356	27,719	0.08	0.70
Non-Latino Black	7,203	12,830	13,577	13,550	13,702	-1.16	0.01	6,239	9,956	10,535	11,201	11,437	-0.51	0.01
Non-Latino White	89,583	153,782	146,790	144,199	143,209	-1.13	<0.01	87,427	134,550	134,966	140,902	140,356	-0.03	0.85
South Asian	174	310	428	540	666	-1.61	0.22	175	290	405	570	709	0.76	0.39
Vietnamese	312	663	1,007	1,244	1,426	-1.20	0.11	312	725	1,006	1,193	1,302	-2.03	<0.01

BRAIN AND OTHER NERVOUS SYSTEM

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value
Chinese	*	32	44	41	62	2.39	0.08	*	30	37	34	41	-2.06	0.30
Filipino	*	51	42	44	35	-4.83	0.05	20	42	51	33	31	-5.94	0.04
Japanese	*	*	*	*	*	3.10	0.39	*	*	*	*	*	0.14	0.97
Korean	*	*	*	*	*	0.86	0.86	*	*	*	*	*	1.31	0.71
Latino	270	453	518	489	617	-1.26	0.10	203	387	405	494	544	0.80	0.16
Non-Latino Black	99	127	140	144	129	-1.62	0.21	69	121	105	137	103	-1.18	0.39
Non-Latino White	1,509	2,342	2,290	2,334	2,272	-0.55	0.07	1,206	1,840	1,808	1,799	1,701	-0.81	0.02
South Asian	*	*	*	21	28	—	—	*	*	*	*	*	-1.13	0.79
Vietnamese	*	*	28	24	23	-1.21	0.78	*	*	21	*	*	-8.84	0.01

* When fewer than 20 cases are reported, an asterisk was used to avoid identifying individuals with rare diseases

BREAST

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value
Chinese	*	*	*	*	*	—	—	364	646	784	979	1,202	0.92	0.05
Filipino	*	*	*	*	*	—	—	461	932	1,039	1,357	1,603	1.49	0.01
Japanese	*	*	*	*	*	—	—	290	552	575	716	742	1.63	0.06
Korean	*	*	*	*	*	—	—	72	110	157	234	289	5.06	<0.01
Latino	*	23	26	30	40	0.88	0.67	3,056	5,204	5,809	7,006	8,209	0.51	0.09
Non-Latino Black	*	*	26	29	46	2.32	0.32	1,846	2,971	3,143	3,396	3,682	0.11	0.63
Non-Latino White	172	284	293	303	344	0.90	0.26	27,043	42,220	42,483	45,438	47,077	0.58	<0.01
South Asian	*	*	*	*	*	—	—	58	88	138	216	253	2.52	0.09
Vietnamese	*	*	*	*	*	—	—	57	123	237	306	304	0.49	0.72

BREAST IN SITU

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value
Chinese	*	*	*	*	*	—	—	45	118	153	253	351	7.44	<0.01
Filipino	*	*	*	*	*	—	—	46	118	173	258	389	8.88	<0.01
Japanese	*	*	*	*	*	—	—	43	79	101	158	211	9.40	<0.01
Korean	*	*	*	*	*	—	—	*	*	23	34	53	9.85	0.01
Latino	*	*	*	*	*	—	—	262	613	705	1,057	1,453	6.72	<0.01
Non-Latino Black	*	*	*	*	*	—	—	183	363	459	566	670	4.96	<0.01
Non-Latino White	*	20	28	30	54	9.33	0.01	3,313	6,023	6,403	7,964	9,282	4.38	<0.01
South Asian	*	*	*	*	*	—	—	*	*	*	30	50	4.47	0.11
Vietnamese	*	*	*	*	*	—	—	*	*	39	39	76	7.14	0.04

* When fewer than 20 cases are reported, an asterisk was used to avoid identifying individuals with rare diseases

CERVIX UTERI

	FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value
Chinese	55	92	111	112	83	-4.77	0.02
Filipino	99	129	173	170	115	-5.03	<0.01
Japanese	*	46	48	31	35	-2.60	0.25
Korean	35	59	72	83	67	-4.36	0.02
Latino	902	1,665	1,712	1,711	1,854	-2.41	<0.01
Non-Latino Black	282	390	376	365	307	-4.31	<0.01
Non-Latino White	1,667	2,600	2,311	2,342	2,035	-1.82	<0.01
South Asian	*	*	*	24	24	-1.70	0.47
Vietnamese	49	104	113	92	87	-10.05	<0.01

COLON

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value
Chinese	151	274	350	387	444	-0.55	0.25	137	273	286	376	450	-0.29	0.60
Filipino	114	191	220	254	251	-0.33	0.61	67	123	191	233	276	2.40	0.08
Japanese	111	174	189	228	203	-1.00	0.24	121	191	209	249	273	-0.26	0.79
Korean	*	43	62	76	98	5.86	0.03	21	41	51	103	84	3.71	0.18
Latino	677	1,143	1,206	1,503	1,727	0.37	0.49	640	1,113	1,262	1,463	1,686	0.34	0.46
Non-Latino Black	595	947	963	997	1,005	-1.66	<0.01	678	1,001	1,051	1,162	1,204	-0.67	0.07
Non-Latino White	7,480	11,390	10,963	11,178	10,716	-1.85	<0.01	7,993	11,642	11,261	11,748	11,277	-1.33	<0.01
South Asian	*	23	24	30	40	-2.80	0.40	*	*	*	24	41	7.54	<0.01
Vietnamese	22	36	75	74	96	-1.49	0.51	*	36	52	70	103	0.46	0.81

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COLON AND RECTUM

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value
Chinese	221	430	516	569	647	-0.92	0.10	199	390	398	483	619	-0.64	0.32
Filipino	187	306	355	426	438	-0.01	0.99	108	224	276	359	393	1.11	0.26
Japanese	179	285	312	356	338	-0.88	0.16	170	275	310	344	383	-0.24	0.73
Korean	32	77	108	150	164	4.39	0.02	36	67	103	148	149	3.22	0.06
Latino	1,076	1,794	1,937	2,366	2,725	0.26	0.58	952	1,583	1,733	2,045	2,378	-0.05	0.92
Non-Latino Black	785	1,292	1,318	1,382	1,343	-1.64	0.01	892	1,317	1,352	1,460	1,519	-1.17	<0.01
Non-Latino White	10,839	16,261	15,566	15,890	15,437	-1.79	<0.01	10,717	15,629	14,965	15,573	14,878	-1.41	<0.01
South Asian	*	35	46	50	62	-2.48	0.40	*	23	27	33	51	1.81	0.38
Vietnamese	31	56	112	118	152	-0.89	0.62	28	63	82	109	159	0.09	0.96

COLON AND RECTUM IN SITU

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value
Chinese	*	22	32	39	37	-1.06	0.58	*	24	20	25	27	-4.03	0.10
Filipino	*	*	20	22	*	-0.86	0.79	*	*	*	*	24	2.59	0.47
Japanese	*	29	30	*	23	-4.81	0.03	*	21	*	*	*	-8.04	0.03
Korean	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Latino	83	131	119	147	163	-1.10	0.34	72	97	117	89	123	-2.92	0.05
Non-Latino Black	66	122	101	90	112	-3.07	0.02	61	73	96	113	99	-0.52	0.75
Non-Latino White	1,045	1,474	1,202	1,041	923	-5.68	<0.01	759	1,082	893	767	738	-4.75	<0.01
South Asian	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Vietnamese	*	*	*	*	*	—	—	*	*	*	*	*	—	—

* When fewer than 20 cases are reported, an asterisk was used to avoid identifying individuals with rare diseases

CORPUS AND UTERUS

	FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value
Chinese	77	113	143	149	180	-1.37	0.09
Filipino	76	147	189	225	278	2.33	<0.01
Japanese	61	82	92	123	113	1.01	0.42
Korean	*	*	*	24	56	9.45	0.01
Latino	571	965	1,079	1,272	1,491	0.26	0.46
Non-Latino Black	267	375	462	492	524	0.66	0.29
Non-Latino White	5,391	8,066	8,081	8,104	7,845	-0.63	<0.01
South Asian	*	20	24	26	45	0.46	0.88
Vietnamese	*	22	29	44	46	-1.88	0.38

ESOPHAGUS

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value
Chinese	33	39	51	51	60	-4.53	0.06	*	*	*	24	*	-2.02	0.51
Filipino	*	21	25	24	30	0.36	0.80	*	*	*	*	*	—	—
Japanese	25	32	21	46	27	-3.37	0.28	*	*	*	*	*	—	—
Korean	*	*	*	*	*	-8.97	0.05	*	*	*	*	*	—	—
Latino	131	212	263	278	319	-0.21	0.65	26	53	56	79	83	2.83	0.10
Non-Latino Black	159	266	220	209	180	-4.84	<0.01	58	116	102	98	87	-3.24	<0.01
Non-Latino White	993	1,515	1,691	1,880	2,028	1.84	<0.01	493	720	680	757	735	-0.40	0.44
South Asian	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Vietnamese	*	*	*	*	*	—	—	*	*	*	*	*	—	—

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HODGKIN LYMPHOMA

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value
Chinese	*	*	*	*	*	0.58	0.87	*	*	*	*	*	—	—
Filipino	*	*	*	*	*	-5.36	<0.01	*	*	*	*	25	6.97	0.04
Japanese	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Korean	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Latino	141	243	244	299	329	0.96	0.33	89	154	198	232	231	0.22	0.84
Non-Latino Black	50	98	81	92	89	-0.57	0.72	35	80	72	66	58	-2.39	0.24
Non-Latino White	658	941	902	906	846	-0.39	0.21	500	778	724	710	677	-0.18	0.66
South Asian	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Vietnamese	*	*	*	*	*	-6.95	0.16	*	*	*	*	*	—	—

KAPOSI SARCOMA

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value
Chinese	*	*	*	*	*	-9.86	<0.01	*	*	*	*	*	—	—
Filipino	*	42	40	*	*	-9.45	0.02	*	*	*	*	*	—	—
Japanese	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Korean	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Latino	478	997	958	444	231	-10.88	<0.01	*	23	23	26	*	-5.82	0.06
Non-Latino Black	237	448	425	190	118	-9.56	<0.01	*	*	*	*	*	—	—
Non-Latino White	2,525	3,841	2,866	884	402	-13.97	<0.01	38	49	63	43	32	-4.74	0.01
South Asian	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Vietnamese	*	*	*	*	*	—	—	*	*	*	*	*	—	—

* When fewer than 20 cases are reported, an asterisk was used to avoid identifying individuals with rare diseases

KIDNEY AND RENAL PELVIS

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value
Chinese	*	48	55	79	76	2.04	0.31	*	28	39	41	63	1.00	0.64
Filipino	36	56	81	86	90	-0.26	0.85	*	33	40	47	61	0.61	0.61
Japanese	*	28	34	44	42	1.81	0.25	*	*	*	20	28	4.03	0.17
Korean	*	*	*	28	*	0.87	0.81	*	*	*	*	21	1.04	0.77
Latino	356	647	725	810	1,025	0.73	0.25	238	434	511	599	738	1.66	<0.01
Non-Latino Black	171	295	323	359	387	1.04	0.12	127	184	199	219	244	0.39	0.54
Non-Latino White	2,175	3,497	3,453	3,893	3,971	0.55	0.02	1,280	2,083	2,105	2,224	2,270	0.52	0.03
South Asian	*	*	*	*	24	2.37	0.49	*	*	*	*	*	—	—
Vietnamese	*	*	*	24	21	2.14	0.64	*	*	*	*	*	—	—

LARYNX

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value
Chinese	25	*	22	31	34	-5.31	0.10	*	*	*	*	*	—	—
Filipino	*	*	26	25	26	-0.83	0.75	*	*	*	*	*	—	—
Japanese	*	*	*	*	*	-4.42	0.26	*	*	*	*	*	—	—
Korean	*	*	*	*	*	-8.01	<0.01	*	*	*	*	*	—	—
Latino	156	236	277	300	295	-1.02	0.08	27	43	53	53	55	-1.38	0.36
Non-Latino Black	165	262	227	233	242	-2.67	0.01	31	78	70	67	59	-3.04	0.07
Non-Latino White	1,478	2,093	1,922	1,776	1,593	-3.62	<0.01	404	562	518	532	426	-2.92	<0.01
South Asian	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Vietnamese	*	*	*	*	*	-9.19	0.04	*	*	*	*	*	—	—

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LEUKEMIA

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value
Chinese	50	69	98	94	99	-0.87	0.49	33	42	63	62	72	-1.89	0.29
Filipino	60	105	93	108	95	-3.08	<0.01	38	73	91	80	75	-2.98	0.09
Japanese	24	33	34	49	43	-0.76	0.72	*	35	37	30	35	-1.05	0.75
Korean	*	23	25	*	23	-1.14	0.70	*	*	22	20	28	0.83	0.77
Latino	447	869	953	1,095	1,146	-0.16	0.80	361	636	740	834	909	0.06	0.90
Non-Latino Black	191	296	289	284	284	-2.36	<0.01	148	207	251	233	221	-2.02	0.06
Non-Latino White	2,663	4,208	4,269	4,097	3,894	-1.40	<0.01	1,995	3,058	2,988	3,088	2,758	-1.00	0.01
South Asian	*	*	22	38	38	3.15	0.44	*	*	*	20	25	-1.41	0.78
Vietnamese	22	31	38	33	43	-1.61	0.56	*	21	26	38	34	-3.66	0.15

LEUKEMIA (ACUTE LYMPHOCYTIC)

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value
Chinese	*	*	*	*	*	-1.67	0.42	*	*	*	*	*	1.83	0.57
Filipino	*	24	*	22	*	-5.84	0.04	*	*	*	*	*	-3.95	0.11
Japanese	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Korean	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Latino	189	314	391	468	477	1.26	0.09	129	229	272	334	353	1.69	0.01
Non-Latino Black	24	35	31	41	32	-1.51	0.48	*	28	30	31	34	1.40	0.57
Non-Latino White	276	430	397	393	364	-0.56	0.37	230	304	309	310	300	0.22	0.76
South Asian	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Vietnamese	*	*	*	*	*	—	—	*	*	*	*	*	—	—

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LEUKEMIA (ACUTE MYELOID)

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value
Chinese	*	24	39	32	45	1.21	0.60	*	*	33	23	29	-0.38	0.89
Filipino	27	36	34	42	35	-3.61	0.04	*	26	39	34	30	-3.93	0.13
Japanese	*	*	*	22	22	2.06	0.53	*	*	24	*	*	2.17	0.64
Korean	*	*	*	*	*	-1.26	0.69	*	*	*	*	*	—	—
Latino	95	210	231	282	324	3.31	0.01	93	183	198	255	298	2.66	0.01
Non-Latino Black	47	74	89	68	105	0.37	0.77	37	64	81	79	79	0.96	0.60
Non-Latino White	690	1,073	1,175	1,215	1,237	0.64	0.14	531	887	888	975	935	0.75	0.06
South Asian	*	*	*	*	*	4.39	0.33	*	*	*	*	*	—	—
Vietnamese	*	*	*	*	*	-1.29	0.77	*	*	*	*	*	-9.48	0.02

LEUKEMIA (CHRONIC LYMPHOCYTIC)

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value
Chinese	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Filipino	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Japanese	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Korean	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Latino	58	104	108	112	121	-1.94	0.22	42	77	87	72	78	-4.35	0.03
Non-Latino Black	64	86	83	82	84	-3.01	0.03	37	65	69	57	36	-5.93	<0.01
Non-Latino White	955	1,512	1,462	1,328	1,158	-3.42	<0.01	665	1,083	967	948	768	-3.33	<0.01
South Asian	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Vietnamese	*	*	*	*	*	—	—	*	*	*	*	*	—	—

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LEUKEMIA (CHRONIC MYELOID)

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value
Chinese	*	*	*	*	*	0.10	0.97	*	*	*	*	*	—	—
Filipino	*	*	*	*	21	0.93	0.66	*	*	*	*	*	-3.95	0.33
Japanese	*	*	*	*	*	-6.47	0.08	*	*	*	*	*	—	—
Korean	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Latino	59	140	140	150	140	-2.29	0.12	62	86	115	108	94	-2.82	0.10
Non-Latino Black	32	63	53	57	42	-3.05	0.07	30	29	37	39	32	-3.57	0.09
Non-Latino White	349	576	554	538	530	-1.37	0.02	283	382	424	421	373	-0.80	0.24
South Asian	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Vietnamese	*	*	*	*	*	—	—	*	*	*	*	*	—	—

LIVER AND INTRAHEPATIC BILE DUCT

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value
Chinese	120	234	254	323	315	-1.26	0.08	34	72	97	99	103	-1.66	0.15
Filipino	54	103	119	143	171	1.82	0.04	20	39	43	51	71	1.70	0.45
Japanese	*	34	44	48	39	0.77	0.76	*	49	50	65	62	2.51	0.16
Korean	41	80	84	112	114	-0.15	0.91	*	31	61	62	65	0.76	0.74
Latino	204	398	531	709	915	5.08	<0.01	119	219	259	367	435	3.63	<0.01
Non-Latino Black	107	145	203	235	294	3.94	<0.01	42	83	80	110	105	1.69	0.15
Non-Latino White	603	1,097	1,281	1,547	1,679	3.93	<0.01	355	602	692	816	776	2.65	<0.01
South Asian	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Vietnamese	42	98	130	193	235	0.85	0.62	*	*	53	63	65	2.47	0.47

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LUNG AND BRONCHUS

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value
Chinese	295	476	518	530	633	-2.76	<0.01	148	301	326	400	414	-1.26	0.09
Filipino	253	493	591	660	698	0.58	0.36	102	188	206	255	332	0.63	0.55
Japanese	129	204	196	247	216	-2.09	0.04	77	126	163	206	206	1.50	0.10
Korean	55	115	103	175	175	-0.57	0.71	32	46	60	83	108	2.95	0.10
Latino	1,296	2,030	2,189	2,204	2,257	-2.66	<0.01	808	1,360	1,442	1,694	1,802	-0.65	0.13
Non-Latino Black	1,529	2,454	2,307	2,336	2,157	-2.62	<0.01	784	1,355	1,424	1,471	1,527	-0.16	0.69
Non-Latino White	15,949	23,763	22,601	21,606	20,559	-2.39	<0.01	11,683	18,452	19,004	19,347	18,754	-0.28	0.19
South Asian	*	26	25	34	58	-0.70	0.81	*	*	*	21	29	0.50	0.85
Vietnamese	49	144	190	230	270	-2.86	0.09	25	73	87	100	138	-1.56	0.33

MELANOMA IN SITU

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value
Chinese	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Filipino	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Japanese	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Korean	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Latino	*	52	58	100	115	4.67	0.06	33	95	119	163	200	5.72	<0.01
Non-Latino Black	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Non-Latino White	1,042	2,246	2,839	4,152	4,945	9.01	<0.01	779	1,538	1,967	2,915	3,522	9.65	<0.01
South Asian	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Vietnamese	*	*	*	*	*	—	—	*	*	*	*	*	—	—

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MELANOMA OF THE SKIN

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value
Chinese	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Filipino	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Japanese	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Korean	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Latino	121	211	232	264	350	1.75	0.04	194	277	300	406	448	0.62	0.48
Non-Latino Black	*	*	*	26	31	0.63	0.76	*	21	27	27	24	-1.59	0.50
Non-Latino White	3,612	5,525	6,148	7,662	8,392	3.72	<0.01	2,705	4,084	4,410	5,374	5,731	3.31	<0.01
South Asian	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Vietnamese	*	*	*	*	*	—	—	*	*	*	*	*	—	—

MYELOMA

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value
Chinese	*	21	33	36	31	-1.34	0.66	*	20	*	24	35	-2.23	0.37
Filipino	26	51	47	62	41	-3.34	0.07	20	30	36	51	55	0.32	0.84
Japanese	*	*	*	*	*	—	—	*	*	*	*	*	7.66	0.05
Korean	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Latino	130	268	312	360	369	0.03	0.97	146	231	254	294	346	-0.21	0.74
Non-Latino Black	141	280	225	276	241	-2.49	0.02	137	208	261	268	245	-0.47	0.65
Non-Latino White	951	1,475	1,527	1,632	1,476	-0.93	0.06	852	1,294	1,301	1,304	1,232	-1.02	<0.01
South Asian	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Vietnamese	*	*	*	*	*	—	—	*	*	*	*	*	—	—

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NON-HODGKIN LYMPHOMA

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value
Chinese	65	123	116	130	183	-0.61	0.58	46	71	107	110	143	0.97	0.33
Filipino	67	121	162	176	196	1.46	0.14	53	102	127	142	166	-0.15	0.89
Japanese	37	73	74	85	85	-0.18	0.86	42	54	60	90	78	0.76	0.68
Korean	*	22	23	35	42	4.84	0.01	*	*	*	*	31	0.09	0.97
Latino	535	1,060	1,302	1,338	1,453	1.15	0.01	381	717	853	1,015	1,211	1.73	<0.01
Non-Latino Black	203	398	462	479	433	0.56	0.45	128	252	253	342	342	2.62	0.01
Non-Latino White	3,684	6,199	6,619	6,447	6,131	-0.28	0.52	2,819	4,552	4,727	5,041	5,184	1.06	<0.01
South Asian	*	*	32	33	58	5.40	0.08	*	*	22	26	28	0.82	0.82
Vietnamese	*	37	54	64	75	-1.06	0.73	*	24	36	60	53	0.95	0.60

ORAL CAVITY AND PHARYNX

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value
Chinese	94	181	153	208	190	-2.67	0.01	50	69	84	100	122	-0.57	0.65
Filipino	58	77	88	103	103	-1.81	0.12	36	89	64	72	69	-4.55	<0.01
Japanese	*	27	32	32	27	-0.53	0.77	*	32	23	30	21	-4.78	0.04
Korean	*	20	24	31	31	2.26	0.45	*	*	*	*	*	4.83	0.06
Latino	293	452	500	588	631	-1.33	<0.01	138	227	278	291	311	-0.53	0.33
Non-Latino Black	288	405	424	412	391	-3.17	<0.01	98	152	177	183	190	0.19	0.79
Non-Latino White	3,030	4,671	4,558	4,659	4,601	-0.96	<0.01	1,774	2,457	2,486	2,442	2,195	-1.94	<0.01
South Asian	*	*	*	22	*	-5.33	0.23	*	*	*	*	*	-4.85	0.07
Vietnamese	*	47	51	79	54	-1.66	0.41	*	24	23	32	31	0.28	0.92

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OVARY

	FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value
Chinese	72	109	142	160	193	-0.47	0.67
Filipino	74	120	172	168	168	-1.79	0.11
Japanese	54	74	79	81	61	-3.40	0.02
Korean	*	28	42	37	46	0.69	0.79
Latino	507	972	1,072	1,228	1,240	-0.48	0.32
Non-Latino Black	225	336	354	342	329	-2.33	0.01
Non-Latino White	3,711	5,708	5,652	5,494	5,356	-1.05	0.01
South Asian	*	25	29	41	36	-1.29	0.57
Vietnamese	*	41	56	46	60	-4.41	0.03

PANCREAS

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value
Chinese	46	68	84	90	96	-2.41	0.02	33	54	57	71	95	-0.62	0.75
Filipino	49	68	78	62	69	-4.70	0.01	22	62	60	72	90	-1.75	0.41
Japanese	42	50	57	49	55	-4.47	<0.01	34	41	46	75	65	-1.02	0.60
Korean	*	*	28	31	27	-0.58	0.87	*	22	28	33	33	-0.53	0.80
Latino	293	389	447	537	598	-0.92	0.16	268	521	531	587	660	-0.86	0.06
Non-Latino Black	212	303	309	326	323	-2.41	<0.01	219	364	376	416	350	-1.63	0.05
Non-Latino White	2,002	3,049	3,128	3,110	3,163	-0.85	<0.01	2,100	3,216	3,247	3,281	3,113	-0.94	0.02
South Asian	*	*	*	*	*	3.41	0.53	*	*	*	*	*	—	—
Vietnamese	*	20	*	33	39	-1.24	0.69	*	*	20	34	42	1.59	0.58

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PROSTATE

	MALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value
Chinese	143	428	636	714	967	2.62	0.02
Filipino	337	715	1,087	982	1,113	0.35	0.78
Japanese	157	459	531	468	537	-1.36	0.36
Korean	*	42	59	115	118	3.75	0.11
Latino	1,875	4,465	5,975	6,216	7,492	0.89	0.30
Non-Latino Black	1,823	4,121	4,981	4,867	5,341	0.03	0.98
Non-Latino White	20,743	46,068	42,923	40,107	40,989	-1.34	0.25
South Asian	32	67	127	184	199	-1.62	0.24
Vietnamese	23	43	106	126	200	2.37	0.17

RECTUM AND RECTOSIGMOID

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value
Chinese	70	156	166	182	203	-1.87	0.09	62	117	112	107	169	-1.52	0.28
Filipino	73	115	135	172	187	0.49	0.45	41	101	85	126	117	-1.34	0.31
Japanese	68	111	123	128	135	-0.59	0.57	49	84	101	95	110	0.19	0.88
Korean	*	34	46	74	66	3.11	0.20	*	26	52	45	65	2.62	0.19
Latino	399	651	731	863	998	0.02	0.98	312	470	471	582	692	-1.08	0.17
Non-Latino Black	190	345	355	385	338	-1.56	0.13	214	316	301	298	315	-2.96	<0.01
Non-Latino White	3,359	4,871	4,603	4,712	4,721	-1.66	<0.01	2,724	3,987	3,704	3,825	3,601	-1.66	<0.01
South Asian	*	*	22	20	22	-2.28	0.52	*	*	*	*	*	-8.27	0.07
Vietnamese	*	20	37	44	56	-0.38	0.89	*	27	30	39	56	-0.97	0.52

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STOMACH

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value
Chinese	69	139	170	197	213	-1.32	0.13	61	102	126	147	173	-1.03	0.34
Filipino	33	75	94	97	70	-1.92	0.29	35	47	69	66	60	-3.91	0.03
Japanese	89	130	155	144	126	-4.15	0.01	76	101	120	121	111	-4.07	<0.01
Korean	68	105	143	153	183	-2.01	0.13	45	66	107	101	128	0.29	0.84
Latino	467	736	847	870	998	-1.12	0.01	327	555	604	630	739	-1.26	0.04
Non-Latino Black	233	383	343	381	331	-2.47	0.01	160	255	271	260	263	-1.87	0.02
Non-Latino White	1,913	2,782	2,653	2,631	2,439	-2.76	<0.01	1,108	1,596	1,488	1,459	1,393	-2.41	<0.01
South Asian	*	*	*	*	*	-9.07	0.02	*	*	*	*	*	—	—
Vietnamese	25	46	70	90	81	-5.00	0.02	23	39	52	56	53	-6.90	<0.01

TESTIS

	MALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value
Chinese	*	23	26	22	29	-0.35	0.86
Filipino	*	*	*	21	21	4.72	0.16
Japanese	*	*	*	22	*	—	—
Korean	*	*	*	*	*	—	—
Latino	272	485	545	634	730	1.82	0.01
Non-Latino Black	30	44	47	51	57	3.08	<0.01
Non-Latino White	1,215	1,938	1,792	1,821	1,850	1.32	<0.01
South Asian	*	*	*	*	*	—	—
Vietnamese	*	*	*	*	*	—	—

* When fewer than 20 cases are reported, an asterisk was used to avoid identifying individuals with rare diseases

THYROID

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value
Chinese	*	26	26	33	43	2.44	0.32	38	84	114	128	137	1.87	0.21
Filipino	27	38	52	48	68	0.59	0.73	100	151	180	226	250	0.70	0.49
Japanese	*	*	*	*	*	4.07	0.28	21	38	41	36	46	1.22	0.33
Korean	*	*	*	*	*	—	—	20	26	43	51	59	3.21	0.12
Latino	90	183	201	226	286	1.37	0.24	367	637	826	972	1,204	3.07	<0.01
Non-Latino Black	20	38	55	54	59	3.33	0.11	75	111	136	139	179	3.08	<0.01
Non-Latino White	566	859	867	904	1,066	1.57	<0.01	1,338	2,174	2,206	2,467	2,796	3.18	<0.01
South Asian	*	*	*	*	*	—	—	*	*	20	*	36	4.06	0.28
Vietnamese	*	*	*	*	22	-0.71	0.79	22	59	77	71	72	-3.11	0.12

URINARY BLADDER

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	EAPC	p-value
Chinese	73	122	139	134	160	-3.56	0.02	23	43	51	63	62	-2.35	0.07
Filipino	49	73	89	99	113	0.53	0.60	*	*	*	29	23	-0.76	0.74
Japanese	39	55	85	89	121	3.22	0.02	*	32	23	41	44	0.77	0.71
Korean	*	21	47	45	41	0.74	0.84	*	*	*	*	22	7.11	0.04
Latino	454	731	792	796	989	-1.12	0.05	173	250	295	309	368	-0.79	0.32
Non-Latino Black	223	340	353	342	391	-1.12	0.07	100	185	174	204	177	-1.10	0.16
Non-Latino White	6,427	10,049	10,052	10,459	10,577	-0.57	<0.01	2,145	3,343	3,273	3,346	3,352	-0.62	0.01
South Asian	*	22	21	24	24	-3.98	0.11	*	*	*	*	*	—	—
Vietnamese	*	*	25	36	43	1.75	0.56	*	*	*	*	*	—	—

* When fewer than 20 cases are reported, an asterisk was used to avoid identifying individuals with rare diseases

APPENDIX B: NUMBER OF OBSERVED DEATHS BY SEX, RACE/ETHNICITY AND SITE, AND STATISTICAL TEST OF LINEAR TRENDS

ALL SITES

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value
Chinese	844	1,393	1,542	1,736	2,059	-1.69	<0.01	604	1,047	1,272	1,441	1,688	-1.09	<0.01
Filipino	565	1,047	1,282	1,346	1,444	0.03	0.95	417	755	918	1,130	1,347	1.02	<0.01
Japanese	431	690	787	801	843	-1.43	<0.01	415	720	784	818	911	-1.14	0.02
Korean	212	359	448	557	605	-0.60	0.42	159	254	385	440	511	1.11	0.16
Latino	4,130	6,967	7,839	8,826	10,002	0.07	0.67	3,771	6,667	7,286	8,357	9,703	0.27	0.18
Non-Latino Black	3,841	5,981	5,997	6,033	6,156	-1.66	<0.01	3,113	5,056	5,174	5,423	5,683	-0.68	<0.01
Non-Latino White	38,998	59,379	59,520	58,172	58,322	-1.45	<0.01	37,428	56,908	57,957	56,447	57,415	-0.89	<0.01
South Asian	38	81	88	126	162	-2.25	0.28	32	66	104	110	166	1.87	0.31
Vietnamese	142	311	437	486	650	-1.83	0.07	84	211	322	354	455	-0.93	0.29

BRAIN AND OTHER NERVOUS SYSTEM

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value
Chinese	*	21	23	37	32	1.56	0.59	*	*	26	29	32	0.65	0.79
Filipino	*	*	23	29	28	3.80	0.27	*	20	28	21	21	-4.16	0.30
Japanese	*	*	*	*	*	—	—	*	*	*	*	*	-4.77	0.32
Korean	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Latino	150	249	264	290	339	-0.81	0.39	95	177	194	267	302	2.76	<0.01
Non-Latino Black	50	79	94	100	85	-0.03	0.98	44	78	69	74	86	-0.09	0.94
Non-Latino White	1,003	1,647	1,704	1,735	1,744	0.27	0.46	839	1,350	1,333	1,302	1,400	-0.22	0.55
South Asian	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Vietnamese	*	*	20	*	*	—	—	*	*	*	*	*	-0.35	0.94

* When fewer than 20 deaths are reported, an asterisk was used to avoid identifying individuals with rare diseases

BREAST

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value
Chinese	*	*	*	*	*	—	—	79	133	177	177	212	-1.71	0.14
Filipino	*	*	*	*	*	—	—	92	156	188	238	256	1.11	0.34
Japanese	*	*	*	*	*	—	—	54	101	98	104	102	-1.31	0.30
Korean	*	*	*	*	*	—	—	22	23	32	30	47	-1.24	0.47
Latino	*	*	*	*	*	—	—	697	1,169	1,291	1,464	1,537	-1.04	0.01
Non-Latino Black	*	*	*	*	*	—	—	611	952	991	1,034	1,015	-1.39	<0.01
Non-Latino White	39	58	83	79	71	0.86	0.43	6,764	10,059	10,036	9,278	9,072	-2.14	<0.01
South Asian	*	*	*	*	*	—	—	*	*	22	27	42	3.40	0.17
Vietnamese	*	*	*	*	*	—	—	*	24	37	46	47	-1.85	0.51

CERVIX UTERI

	FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value
Chinese	23	32	34	37	30	-5.38	<0.01
Filipino	*	37	39	39	49	-0.22	0.89
Japanese	*	*	*	*	*	1.87	0.61
Korean	*	*	*	*	*	-4.10	0.15
Latino	170	337	351	338	424	-1.07	0.24
Non-Latino Black	114	140	144	145	150	-3.02	<0.01
Non-Latino White	511	797	676	747	860	-1.88	<0.01
South Asian	*	*	*	*	*	—	—
Vietnamese	*	21	25	*	*	—	—

* When fewer than 20 deaths are reported, an asterisk was used to avoid identifying individuals with rare diseases

COLON

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value
Chinese	79	116	137	165	186	-2.08	0.03	61	116	143	170	162	-1.72	0.10
Filipino	47	67	114	117	113	0.48	0.75	35	46	52	95	98	1.40	0.50
Japanese	48	80	94	107	111	0.58	0.57	58	92	93	100	94	-3.23	0.01
Korean	*	23	27	33	41	2.26	0.36	*	20	27	40	47	5.97	0.03
Latino	292	518	553	659	762	0.82	0.23	273	470	514	577	723	0.37	0.41
Non-Latino Black	284	459	485	467	523	-0.94	0.13	322	526	510	552	601	-0.99	0.04
Non-Latino White	3,515	5,058	4,878	4,714	4,619	-2.59	<0.01	3,739	5,312	5,122	4,852	4,860	-2.42	<0.01
South Asian	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Vietnamese	*	*	*	27	25	-2.28	0.47	*	*	23	26	32	-1.60	0.54

COLON AND RECTUM

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value
Chinese	94	150	168	197	233	-1.86	0.03	67	132	167	200	185	-1.49	0.24
Filipino	60	92	143	146	154	0.52	0.61	46	56	72	114	122	0.66	0.71
Japanese	64	103	125	130	130	-0.33	0.69	68	110	117	115	117	-3.43	<0.01
Korean	*	34	37	48	54	0.89	0.71	*	24	36	43	59	5.31	0.03
Latino	378	673	722	817	935	0.22	0.65	329	565	625	679	843	-0.11	0.82
Non-Latino Black	331	532	581	570	625	-0.63	0.21	382	613	604	626	665	-1.59	<0.01
Non-Latino White	4,152	6,028	5,903	5,672	5,564	-2.48	<0.01	4,328	6,158	5,987	5,650	5,667	-2.36	<0.01
South Asian	*	*	*	*	*	-6.61	0.25	*	*	*	*	*	—	—
Vietnamese	*	*	22	32	28	-3.24	0.32	*	20	29	27	33	-3.31	0.26

* When fewer than 20 deaths are reported, an asterisk was used to avoid identifying individuals with rare diseases

CORPUS AND UTERUS

	FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value
Chinese	20	28	25	23	27	-6.49	<0.01
Filipino	*	*	23	36	33	2.43	0.32
Japanese	*	*	*	22	*	—	—
Korean	*	*	*	*	*	—	—
Latino	93	180	201	188	289	1.29	0.24
Non-Latino Black	96	146	158	180	176	-0.58	0.45
Non-Latino White	919	1,312	1,369	1,293	1,348	-0.89	<0.01
South Asian	*	*	*	*	*	—	—
Vietnamese	*	*	*	*	*	—	—

ESOPHAGUS

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value
Chinese	25	42	39	38	45	-5.84	<0.01	*	*	*	*	*	0.97	0.81
Filipino	*	*	*	27	22	-0.06	0.98	*	*	*	*	*	—	—
Japanese	*	31	23	36	32	0.13	0.97	*	*	*	*	*	-1.55	0.65
Korean	*	*	*	*	*	-7.99	0.04	*	*	*	*	*	—	—
Latino	94	169	246	234	273	0.19	0.82	37	42	51	59	71	-0.61	0.66
Non-Latino Black	154	205	221	185	165	-4.45	0.00	49	96	80	86	80	-2.22	0.06
Non-Latino White	1,037	1,527	1,658	1,798	2,028	1.39	<0.01	415	572	618	661	722	0.77	0.18
South Asian	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Vietnamese	*	*	*	*	*	—	—	*	*	*	*	*	—	—

* When fewer than 20 deaths are reported, an asterisk was used to avoid identifying individuals with rare diseases

HODGKIN LYMPHOMA

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value
Chinese	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Filipino	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Japanese	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Korean	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Latino	27	50	53	69	51	0.33	0.76	*	28	28	37	35	0.07	0.98
Non-Latino Black	*	21	*	*	*	-1.43	0.49	*	22	*	22	*	-2.94	0.26
Non-Latino White	136	211	177	152	161	-2.95	<0.01	97	145	138	135	145	-0.42	0.69
South Asian	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Vietnamese	*	*	*	*	*	—	—	*	*	*	*	*	—	—

KIDNEY AND RENAL PELVIS

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value
Chinese	*	*	25	31	41	3.82	0.24	*	*	*	*	*	-1.93	0.57
Filipino	*	23	25	33	30	0.77	0.67	*	*	*	*	*	—	—
Japanese	*	*	*	*	22	—	—	*	*	*	*	*	—	—
Korean	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Latino	118	249	271	315	378	0.96	0.14	79	127	157	185	222	1.52	0.14
Non-Latino Black	57	100	98	132	146	2.76	0.03	39	65	83	70	87	1.01	0.50
Non-Latino White	872	1,303	1,386	1,447	1,440	-0.31	0.25	522	853	820	844	846	-0.60	0.07
South Asian	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Vietnamese	*	*	*	*	*	—	—	*	*	*	*	*	—	—

* When fewer than 20 deaths are reported, an asterisk was used to avoid identifying individuals with rare diseases

LARYNX

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value
Chinese	*	*	*	*	*	-0.14	0.96	*	*	*	*	*	—	—
Filipino	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Japanese	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Korean	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Latino	61	65	73	89	96	-3.41	0.07	*	*	*	*	*	—	—
Non-Latino Black	59	99	94	96	97	-1.16	0.38	*	24	27	*	32	3.16	0.23
Non-Latino White	402	572	567	525	476	-2.67	<0.01	126	200	155	184	159	-1.85	0.12
South Asian	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Vietnamese	*	*	*	*	*	—	—	*	*	*	*	*	—	—

LEUKEMIA

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value
Chinese	27	43	58	66	76	0.64	0.55	*	31	46	35	56	0.99	0.58
Filipino	23	65	60	58	60	-2.92	0.16	20	36	51	51	37	-2.31	0.36
Japanese	*	30	25	30	27	-1.60	0.60	*	*	26	22	23	-1.69	0.53
Korean	*	*	*	*	*	-2.18	0.55	*	*	*	*	*	0.24	0.94
Latino	248	455	442	531	591	0.22	0.77	157	376	355	414	445	-0.34	0.67
Non-Latino Black	119	199	194	181	190	-2.24	<0.01	90	138	151	146	160	-0.55	0.45
Non-Latino White	1,617	2,506	2,457	2,513	2,601	-0.83	0.01	1,227	1,898	1,916	1,910	1,949	-0.70	<0.01
South Asian	*	*	*	*	*	-6.21	0.13	*	*	*	*	*	—	—
Vietnamese	*	21	*	*	28	0.85	0.82	*	*	*	*	24	-4.45	0.28

* When fewer than 20 deaths are reported, an asterisk was used to avoid identifying individuals with rare diseases

LEUKEMIA (ACUTE LYMPHOCYTIC)

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value
Chinese	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Filipino	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Japanese	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Korean	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Latino	63	112	121	152	157	-0.05	0.97	26	98	69	100	117	1.98	0.32
Non-Latino Black	*	20	*	*	*	-5.64	0.04	*	*	*	*	*	-6.80	0.03
Non-Latino White	113	176	139	161	136	-2.26	0.06	83	128	120	101	112	-1.72	0.21
South Asian	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Vietnamese	*	*	*	*	*	—	—	*	*	*	*	*	—	—

LEUKEMIA (ACUTE MYELOID)

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value
Chinese	*	*	20	28	33	3.07	0.30	*	*	20	*	26	0.49	0.87
Filipino	*	22	23	31	*	-1.98	0.57	*	*	23	21	*	-3.71	0.23
Japanese	*	*	*	*	*	—	—	*	*	*	*	*	-3.20	0.34
Korean	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Latino	58	109	115	155	195	3.81	<0.01	39	91	104	128	153	2.71	0.02
Non-Latino Black	26	44	57	43	62	-0.18	0.92	24	31	54	51	55	2.21	0.27
Non-Latino White	445	756	731	855	863	1.19	<0.01	361	578	592	672	673	1.31	<0.01
South Asian	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Vietnamese	*	*	*	*	*	—	—	*	*	*	*	*	—	—

* When fewer than 20 deaths are reported, an asterisk was used to avoid identifying individuals with rare diseases

LEUKEMIA (CHRONIC LYMPHOCYTIC)

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value
Chinese	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Filipino	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Japanese	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Korean	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Latino	*	26	23	30	37	1.44	0.60	*	30	30	*	29	-2.06	0.41
Non-Latino Black	27	45	44	38	36	-3.80	0.05	*	26	23	27	28	-0.68	0.78
Non-Latino White	306	525	517	520	606	-0.06	0.92	203	370	364	351	403	-0.17	0.81
South Asian	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Vietnamese	*	*	*	*	*	—	—	*	*	*	*	*	—	—

LEUKEMIA (CHRONIC MYELOID)

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value
Chinese	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Filipino	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Japanese	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Korean	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Latino	40	61	50	78	71	-2.82	0.03	30	53	43	55	48	-3.99	0.04
Non-Latino Black	*	30	23	34	*	-4.34	0.10	*	25	*	*	*	-2.68	0.37
Non-Latino White	210	303	281	273	192	-4.42	<0.01	142	222	247	206	163	-2.93	0.02
South Asian	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Vietnamese	*	*	*	*	*	—	—	*	*	*	*	*	—	—

* When fewer than 20 deaths are reported, an asterisk was used to avoid identifying individuals with rare diseases

LIVER

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value
Chinese	110	199	223	264	274	-0.79	0.30	32	60	89	85	115	0.24	0.85
Filipino	45	74	88	91	121	0.86	0.56	*	33	36	36	53	0.58	0.86
Japanese	*	32	27	38	42	0.52	0.84	*	43	40	57	64	4.37	0.10
Korean	37	72	80	100	86	-1.77	0.18	*	24	54	55	61	1.48	0.50
Latino	165	326	406	532	689	4.49	0.00	116	197	241	316	406	3.47	<0.01
Non-Latino Black	99	142	168	206	261	3.31	<0.01	51	87	93	90	131	2.67	0.14
Non-Latino White	613	1,093	1,204	1,378	1,528	2.86	0.00	386	678	747	878	833	2.31	<0.01
South Asian	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Vietnamese	24	62	96	106	151	0.45	0.78	*	*	28	48	46	5.53	0.09

LUNG AND BRONCHUS

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value
Chinese	235	387	443	426	584	-1.77	0.06	138	220	273	308	373	-1.21	0.10
Filipino	148	307	374	422	461	1.42	0.06	53	120	124	163	247	3.51	<0.01
Japanese	109	167	176	191	201	-1.86	0.02	62	111	142	156	159	0.33	0.71
Korean	57	81	99	120	163	-0.40	0.78	22	27	51	59	99	5.37	0.03
Latino	954	1,500	1,639	1,806	1,919	-1.26	0.00	485	849	946	1,123	1,230	0.56	0.13
Non-Latino Black	1,302	1,920	1,942	1,924	1,875	-2.09	0.00	576	1,107	1,092	1,174	1,270	0.65	0.17
Non-Latino White	12,674	18,775	18,194	17,430	16,915	-2.16	0.00	8,919	14,213	15,063	14,994	15,163	0.06	0.71
South Asian	*	*	*	*	31	—	—	*	*	*	*	*	—	—
Vietnamese	30	94	117	148	169	-3.43	<0.01	*	34	57	63	89	-0.88	0.63

* When fewer than 20 deaths are reported, an asterisk was used to avoid identifying individuals with rare diseases

MELANOMA OF THE SKIN

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value
Chinese	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Filipino	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Japanese	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Korean	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Latino	26	52	57	77	76	1.13	0.55	31	41	42	61	58	0.25	0.85
Non-Latino Black	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Non-Latino White	854	1,376	1,382	1,453	1,340	-0.41	0.35	551	778	782	753	747	-1.71	<0.01
South Asian	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Vietnamese	*	*	*	*	*	—	—	*	*	*	*	*	—	—

MYELOMA

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value
Chinese	*	*	*	24	21	1.19	0.74	*	*	*	*	20	-5.92	0.12
Filipino	*	25	28	26	25	-3.73	0.05	*	*	*	22	30	4.32	0.20
Japanese	*	*	*	*	*	0.86	0.87	*	*	*	*	*	—	—
Korean	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Latino	90	151	187	204	240	1.29	0.26	71	142	141	167	231	1.63	0.09
Non-Latino Black	97	159	158	148	159	-1.83	0.13	98	153	152	183	184	-0.36	0.69
Non-Latino White	604	978	1,060	1,045	1,091	0.07	0.89	545	931	944	929	943	-0.24	0.66
South Asian	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Vietnamese	*	*	*	*	*	—	—	*	*	*	*	*	—	—

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NON-HODGKIN LYMPHOMA

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value
Chinese	30	59	62	61	77	-1.82	0.22	*	30	45	56	63	2.97	0.13
Filipino	22	48	73	70	90	3.68	0.02	*	37	38	53	51	2.14	0.41
Japanese	*	25	36	40	33	-0.11	0.96	*	33	26	32	35	-1.75	0.29
Korean	*	*	*	*	*	6.38	0.07	*	*	*	*	*	—	—
Latino	177	347	403	551	540	2.32	<0.01	151	257	320	424	420	1.60	0.12
Non-Latino Black	87	140	115	166	162	0.20	0.87	63	99	108	133	133	1.01	0.19
Non-Latino White	1,498	2,379	2,564	2,731	2,622	0.15	0.65	1,440	2,162	2,315	2,462	2,257	-0.34	0.39
South Asian	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Vietnamese	*	*	21	23	24	1.41	0.79	*	*	*	*	20	0.67	0.87

ORAL CAVITY AND PHARYNX

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value
Chinese	47	74	67	76	84	-3.97	<0.01	*	23	28	43	31	-1.64	0.36
Filipino	*	26	33	29	30	-1.62	0.38	*	*	20	*	*	-7.20	0.02
Japanese	*	*	*	*	*	-0.88	0.81	*	*	*	*	*	—	—
Korean	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Latino	75	124	150	162	167	-1.09	0.19	27	58	56	52	83	0.53	0.72
Non-Latino Black	108	186	155	147	137	-4.27	<0.01	46	50	60	59	68	-1.16	0.42
Non-Latino White	806	1,247	1,222	1,138	1,039	-2.32	<0.01	556	773	769	700	689	-2.33	<0.01
South Asian	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Vietnamese	*	*	22	*	30	—	—	*	*	*	*	*	—	—

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OVARY

	FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value
Chinese	27	44	47	67	89	1.47	0.21
Filipino	21	42	42	67	84	3.34	0.04
Japanese	23	54	45	30	48	-2.36	0.29
Korean	*	*	*	*	23	8.36	0.03
Latino	196	375	419	478	577	1.23	0.08
Non-Latino Black	134	186	173	216	205	-1.38	0.21
Non-Latino White	2,089	3,181	3,355	3,152	3,364	-0.35	0.28
South Asian	*	*	*	*	*	—	—
Vietnamese	*	*	*	*	24	3.58	0.46

PANCREAS

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value
Chinese	42	61	84	84	99	-1.87	0.12	38	56	44	83	93	-0.68	0.75
Filipino	29	46	64	61	53	-2.33	0.26	20	36	43	66	79	2.16	0.27
Japanese	35	45	51	50	63	-1.86	0.21	38	34	55	66	79	-0.28	0.86
Korean	*	*	23	28	32	3.56	0.32	*	*	29	39	31	1.02	0.75
Latino	263	359	381	492	566	-0.15	0.85	204	401	442	510	601	1.01	0.17
Non-Latino Black	202	289	267	292	286	-2.51	<0.01	212	321	347	382	333	-1.11	0.13
Non-Latino White	1,835	2,818	2,960	2,666	3,099	-0.33	0.33	1,963	3,016	3,115	3,081	3,164	-0.47	0.02
South Asian	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Vietnamese	*	*	*	23	31	-2.20	0.65	*	*	*	22	28	0.51	0.8

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PROSTATE

	MALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value
Chinese	37	56	73	79	98	-1.86	0.25
Filipino	83	148	147	140	139	-3.08	<0.01
Japanese	29	63	72	54	71	-3.27	0.06
Korean	*	*	*	*	*	3.00	0.56
Latino	403	750	865	913	955	-0.49	0.46
Non-Latino Black	566	949	993	964	986	-1.77	<0.01
Non-Latino White	4,578	7,546	7,663	7,012	6,696	-2.67	<0.01
South Asian	*	*	*	*	*	—	—
Vietnamese	*	*	*	*	*	0.82	0.86

RECTUM AND RECTOSIGMOID JUNCTION

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value
Chinese	*	34	31	32	45	-0.62	0.76	*	*	24	30	23	-1.45	0.69
Filipino	*	25	29	29	41	1.14	0.69	*	*	20	*	24	-2.09	0.47
Japanese	*	23	31	23	*	-4.76	0.02	*	*	24	*	23	-4.39	0.13
Korean	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Latino	86	155	169	158	173	-2.15	0.02	56	95	111	102	120	-2.80	0.01
Non-Latino Black	47	73	96	103	102	1.47	0.26	60	87	94	74	64	-5.28	<0.01
Non-Latino White	637	970	1,025	958	945	-1.92	<0.01	589	846	865	798	807	-1.98	<0.01
South Asian	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Vietnamese	*	*	*	*	*	—	—	*	*	*	*	*	—	—

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STOMACH

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value
Chinese	56	104	108	130	145	-2.14	0.11	25	64	95	83	112	0.28	0.85
Filipino	22	39	47	51	46	-1.77	0.36	*	26	43	33	36	-3.08	0.27
Japanese	66	89	113	96	89	-4.28	<0.01	41	75	80	81	83	-1.73	0.27
Korean	42	73	81	105	104	-2.01	0.22	25	39	65	58	68	-0.32	0.85
Latino	291	484	542	557	670	-0.28	0.62	194	369	381	422	484	-0.79	0.31
Non-Latino Black	162	270	243	250	243	-2.23	<0.01	67	185	180	158	182	-1.52	0.22
Non-Latino White	1,148	1,693	1,571	1,503	1,342	-3.64	<0.01	757	1,178	1,048	897	910	-3.66	<0.01
South Asian	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Vietnamese	*	24	32	26	50	-6.31	0.05	*	*	31	24	36	-4.09	0.16

TESTIS

	MALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value
Chinese	*	*	*	*	*	—	—
Filipino	*	*	*	*	*	—	—
Japanese	*	*	*	*	*	—	—
Korean	*	*	*	*	*	—	—
Latino	31	34	53	42	51	-0.22	0.94
Non-Latino Black	*	*	*	*	*	—	—
Non-Latino White	67	97	99	87	97	-0.55	0.40
South Asian	*	*	*	*	*	—	—
Vietnamese	*	*	*	*	*	—	—

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THYROID

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value
Chinese	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Filipino	*	*	*	*	*	—	—	*	*	*	22	*	-1.71	0.80
Japanese	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Korean	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Latino	*	*	20	37	36	9.55	<0.01	*	34	51	53	62	1.59	0.46
Non-Latino Black	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Non-Latino White	78	90	88	108	112	-0.35	0.74	68	139	139	142	137	-0.76	0.38
South Asian	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Vietnamese	*	*	*	*	*	—	—	*	*	*	*	*	—	—

URINARY BLADDER

	MALES							FEMALES						
	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value	1988-1989	1990-1992	1993-1995	1996-1998	1999-2001	APC	p-value
Chinese	*	21	*	32	31	1.01	0.73	*	*	*	20	*	-1.84	0.61
Filipino	*	*	*	*	*	-1.73	0.47	*	*	*	*	*	—	—
Japanese	*	*	*	20	21	—	—	*	*	*	*	*	—	—
Korean	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Latino	60	107	136	147	182	0.88	0.24	34	46	68	71	97	2.07	0.21
Non-Latino Black	60	94	83	101	107	-1.90	0.22	49	65	86	80	72	-1.66	0.24
Non-Latino White	1,128	1,793	1,873	1,960	1,973	-0.52	0.05	510	753	803	855	855	0.04	0.91
South Asian	*	*	*	*	*	—	—	*	*	*	*	*	—	—
Vietnamese	*	*	*	*	*	—	—	*	*	*	*	*	—	—

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APPENDIX C: METHODS USED IN THE GENERATION OF SPECIAL SITE-SPECIFIC GRAPHS

The following detailed groupings were used for additional graphs throughout this monograph

PAGE	TITLE OF GRAPH	DESCRIPTION OF CASES SELECTED
65	Trends in Age-adjusted Esophagus Incidence Rates in California (1988-2001): Male, Non-Latino White	• Non-Latino white males • Adenocarcinoma (8140, 8141, 8190, 8231, 8260, 8263, 8310, 8430, 8480, 8490, 8560, 8570, 8572)[1] • Squamous cell (8050, 8076)
69	Trends in Age-adjusted Hodgkin Lymphoma Incidence Rates in California (1988-2001): Male, Non-Latino White	• Non-Latino white males • Nodular sclerosis (9663 to 9667 inclusive[1]) • Other (all other histologies)
70	Trends in Age-adjusted Kaposi Sarcoma Incidence Rates in California (1988-2001): Male, Non-Latino White	• Non-Latino white males • Aged 20-49 years • Aged 50 years or greater
92	Trends in Age-adjusted Non-Hodgkin Lymphoma Incidence Rates in California (1988-2001): Male, Non-Latino White	• Non-Latino white males • Aged 0-24 years • Aged 25-54 years • Aged 55 years or greater

[1] Code refers to ICDO-3

APPENDIX D: DENOMINATORS USED IN THE CALCULATION OF PERIODIC RATES

Sex	Race/ ethnicity	Period	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85 and over
Male	Chinese	1988-1989	47,060	43,721	45,003	54,346	55,251	61,715	66,623	53,664	52,595	27,568	26,494	27,168	23,480	21,527	14,422	9,281	4,632	2,229
Male	Chinese	1990-1992	75,365	73,209	74,025	87,307	89,502	98,023	126,790	104,149	99,713	59,275	52,419	44,700	38,435	36,961	26,256	18,202	9,481	5,245
Male	Chinese	1993-1995	80,855	82,362	85,166	94,730	98,271	134,561	135,385	114,561	102,685	80,249	67,651	48,570	44,196	41,666	31,607	25,370	12,563	7,418
Male	Chinese	1996-1998	88,607	91,515	91,709	101,564	108,622	111,150	113,010	124,263	115,685	101,203	62,844	54,379	49,551	45,810	37,362	26,477	15,676	8,582
Male	Chinese	1999-2001	92,261	100,668	100,251	108,678	115,002	117,639	117,624	136,364	126,667	122,172	68,067	59,189	54,509	51,955	42,900	33,615	18,728	11,765
Male	Filipino	1988-1989	56,014	56,774	54,219	57,480	57,242	56,071	55,607	50,036	50,467	33,243	25,332	19,306	16,231	15,556	10,366	11,025	9,424	3,937
Male	Filipino	1990-1992	95,389	91,094	95,734	93,283	92,511	99,707	91,921	93,922	82,356	61,155	48,351	36,208	31,922	25,020	19,259	16,220	13,080	7,216
Male	Filipino	1993-1995	93,627	96,193	97,615	101,760	100,489	96,427	96,732	98,453	90,305	74,703	61,996	45,926	37,134	29,999	23,730	20,241	13,109	8,889
Male	Filipino	1996-1998	98,865	105,295	106,505	110,296	108,167	105,177	101,545	132,366	88,254	68,251	75,021	51,415	42,587	32,079	28,309	22,265	12,548	10,141
Male	Filipino	1999-2001	104,105	112,401	115,385	116,713	116,445	109,569	106,355	137,517	106,203	131,790	95,056	59,063	47,940	35,109	32,075	24,225	11,958	11,903
Male	Japanese	1988-1989	17,099	15,255	13,231	15,505	24,116	29,473	35,507	27,429	22,055	16,267	11,341	13,374	15,721	15,802	10,162	3,813	1,291	1,905
Male	Japanese	1990-1992	25,024	24,130	21,315	23,509	34,677	41,415	47,341	41,619	35,595	26,566	20,037	20,568	22,132	22,366	16,326	9,190	3,732	3,238
Male	Japanese	1993-1995	26,327	25,755	23,072	23,816	32,678	36,051	45,731	42,168	38,613	30,301	25,854	21,157	20,380	20,765	16,362	11,195	5,891	3,735
Male	Japanese	1996-1998	26,730	27,321	24,832	24,804	31,080	34,715	40,122	42,753	41,025	33,537	27,171	21,756	16,049	18,161	17,300	14,120	6,070	4,214
Male	Japanese	1999-2001	27,132	26,857	23,601	24,541	29,292	31,364	36,513	43,322	44,045	36,875	30,440	22,363	16,908	17,569	19,837	17,066	10,259	4,682
Male	Korean	1988-1989	18,814	19,332	17,435	22,884	21,615	19,355	25,657	18,027	15,156	15,103	13,727	7,867	4,876	4,150	3,309	1,600	831	193
Male	Korean	1990-1992	28,874	30,487	28,806	36,128	31,107	35,132	37,311	30,061	28,395	25,305	22,567	14,707	10,312	7,734	5,169	3,206	1,722	687
Male	Korean	1993-1995	30,209	32,327	32,215	38,804	35,707	37,092	38,500	53,726	33,390	27,240	24,374	18,194	13,985	9,527	6,312	4,179	2,239	1,162
Male	Korean	1996-1998	33,475	34,156	35,521	40,368	37,425	42,862	41,680	57,573	38,385	30,586	27,362	21,362	17,619	11,321	7,756	5,179	2,864	1,668
Male	Korean	1999-2001	33,741	36,096	38,826	42,024	39,086	47,712	45,880	41,018	43,380	33,227	29,769	25,168	21,272	13,115	8,508	6,120	3,736	2,151
Male	Latino	1988-1989	881,085	707,296	631,284	768,543	1,007,432	822,792	725,816	528,814	367,513	279,036	181,303	163,515	130,793	105,289	58,670	37,030	25,131	16,155
Male	Latino	1990-1992	1,433,445	1,242,517	1,034,309	1,241,400	1,642,316	1,444,506	1,137,238	917,725	665,725	405,157	347,920	274,545	225,575	171,079	126,365	69,238	30,297	27,313
Male	Latino	1993-1995	1,562,215	1,460,565	1,261,376	1,348,257	1,579,719	1,517,424	1,327,454	1,066,049	803,073	575,082	421,077	308,672	244,216	186,855	125,402	83,467	44,275	31,011
Male	Latino	1996-1998	1,690,881	1,675,629	1,430,385	1,456,324	1,617,123	1,590,312	1,457,671	1,216,171	940,422	685,005	494,234	344,790	263,056	202,652	147,457	96,697	49,254	34,707
Male	Latino	1999-2001	1,619,746	1,896,671	1,599,425	1,561,793	1,624,526	1,663,262	1,587,887	1,365,398	1,077,770	794,380	567,392	379,928	281,897	215,408	160,472	113,827	54,233	38,405
Male	Non-Latino Black	1988-1989	207,855	170,067	150,407	166,188	205,901	231,011	209,135	164,542	121,407	90,111	78,504	65,360	58,023	47,456	32,220	21,238	10,553	6,467
Male	Non-Latino Black	1990-1992	305,206	272,481	254,152	256,385	286,539	323,817	305,036	258,681	205,787	157,512	130,668	104,343	86,500	73,512	50,635	34,330	17,526	11,163
Male	Non-Latino Black	1993-1995	287,314	282,254	277,465	264,031	280,602	286,575	284,587	273,381	229,820	177,723	146,265	111,905	93,257	76,248	53,497	37,453	19,364	12,678
Male	Non-Latino Black	1996-1998	269,424	312,027	300,835	273,466	262,665	260,334	284,126	287,671	255,844	200,934	161,360	119,468	99,074	76,984	56,176	40,576	21,832	17,581
Male	Non-Latino Black	1999-2001	291,534	331,802	324,176	282,002	244,729	242,036	275,056	302,365	291,967	224,147	176,456	127,031	106,712	61,722	59,043	43,870	23,071	18,304
Male	Non-Latino White	1988-1989	1,182,886	1,072,313	927,753	977,318	1,302,097	1,639,791	1,715,845	1,524,368	1,362,435	1,017,103	779,199	735,167	745,086	732,813	561,367	373,282	205,486	123,997
Male	Non-Latino White	1990-1992	1,685,282	1,587,105	1,425,792	1,480,620	1,826,301	2,252,272	2,388,265	2,276,124	2,071,553	1,628,310	1,312,881	1,158,701	1,109,245	1,067,348	827,002	585,686	355,568	213,218
Male	Non-Latino White	1993-1995	1,560,446	1,561,666	1,472,179	1,474,522	1,673,126	2,003,376	2,189,665	2,195,111	2,104,397	1,751,497	1,486,179	1,231,102	1,064,218	1,006,675	828,283	635,582	375,621	245,891
Male	Non-Latino White	1996-1998	1,435,601	1,536,136	1,518,967	1,479,438	1,519,062	1,754,479	1,980,460	2,150,039	2,138,462	1,874,055	1,650,257	1,302,602	1,066,192	968,403	829,285	691,479	413,844	278,604
Male	Non-Latino White	1999-2001	1,519,753	1,519,607	1,567,955	1,464,348	1,366,178	1,505,582	1,771,067	2,102,087	2,171,327	1,987,870	1,832,543	1,373,805	1,046,165	905,850	828,348	724,376	456,688	311,237
Male	South Asian	1988-1989	17,505	14,079	10,827	10,565	12,765	16,035	16,501	17,777	11,109	8,209	6,777	4,314	2,656	1,726	956	565	311	176
Male	South Asian	1990-1992	27,927	25,890	20,978	20,456	24,573	35,130	37,474	33,879	25,749	19,540	14,630	9,645	6,564	4,422	2,562	1,645	837	504
Male	South Asian	1993-1995	35,334	31,032	26,472	26,004	31,084	45,475	45,976	41,430	33,449	25,649	19,922	13,452	9,660	6,616	4,137	2,590	1,219	792
Male	South Asian	1996-1998	42,736	37,371	31,871	31,962	37,581	61,821	60,485	49,499	40,150	31,459	25,274	17,261	12,796	6,814	5,510	3,456	1,623	1,030
Male	South Asian	1999-2001	50,175	43,113	37,472	37,109	41,195	75,167	71,988	57,569	46,851	37,236	30,563	21,069	15,862	11,010	7,085	4,362	2,031	1,388
Male	Vietnamese	1988-1989	24,392	26,855	25,790	33,479	30,407	30,595	30,341	24,433	14,792	9,341	6,296	4,348	3,717	2,086	1,403	971	452	146
Male	Vietnamese	1990-1992	33,856	45,195	41,036	52,159	47,061	51,275	56,272	42,510	29,331	21,042	15,447	11,400	6,996	6,055	4,290	2,587	1,305	562
Male	Vietnamese	1993-1995	43,779	46,650	45,842	54,788	48,798	57,725	55,885	48,102	37,805	28,268	22,651	17,253	12,856	8,544	6,310	3,875	2,077	1,015
Male	Vietnamese	1996-1998	47,705	50,135	49,746	56,820	50,535	64,185	61,605	55,597	45,474	38,277	29,855	23,106	16,826	13,033	8,551	5,302	2,718	1,448
Male	Vietnamese	1999-2001	51,626	53,610	53,649	59,150	52,274	70,636	67,410	62,687	55,046	46,690	37,039	28,359	20,736	16,523	12,152	6,660	3,531	1,683

Sex	Race/ ethnicity	Period	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85 and over
Female	Chinese	1988-1989	43,505	41,717	41,559	47,676	53,087	64,862	71,475	68,449	57,227	28,320	26,011	26,573	27,615	22,823	16,231	10,820	6,358	4,237
Female	Chinese	1990-1992	70,005	69,851	63,024	78,362	87,021	109,445	115,056	114,992	99,271	65,675	54,037	45,625	46,058	34,370	30,414	21,244	12,603	9,168
Female	Chinese	1993-1995	77,155	75,462	77,045	87,218	95,872	119,623	121,388	127,868	115,386	98,112	73,515	52,894	51,705	45,351	37,686	26,963	16,329	12,540
Female	Chinese	1996-1998	83,650	87,135	85,067	95,787	101,723	116,205	128,125	140,379	131,501	117,548	92,331	59,762	57,312	51,335	41,958	32,742	23,047	15,912
Female	Chinese	1999-2001	89,145	95,787	93,089	104,355	113,577	125,565	135,857	153,968	147,617	138,083	111,152	96,781	62,821	57,315	52,230	38,489	23,766	18,286
Female	Filipino	1988-1989	52,604	55,609	51,179	54,329	59,516	64,303	75,917	74,112	63,421	40,968	31,445	25,302	26,093	23,300	15,050	10,169	4,464	1,244
Female	Filipino	1990-1992	82,864	85,609	83,462	86,519	93,967	101,630	110,796	115,356	104,307	76,691	61,725	47,040	44,830	39,119	27,958	19,529	9,244	4,179
Female	Filipino	1993-1995	97,612	92,290	91,509	96,351	101,179	107,514	120,297	121,700	110,634	94,757	79,131	57,934	51,663	44,120	34,419	24,223	12,301	6,951
Female	Filipino	1996-1998	92,361	95,751	99,549	105,381	108,481	113,497	123,785	127,444	128,363	112,024	96,680	65,628	55,482	48,122	40,878	28,112	15,358	8,723
Female	Filipino	1999-2001	97,110	105,224	107,589	113,513	115,603	119,451	127,301	153,189	140,091	131,090	114,128	79,422	66,319	54,123	47,240	34,070	18,418	12,465
Female	Japanese	1988-1989	16,704	14,769	12,620	15,902	22,664	31,097	35,609	28,295	25,301	19,431	16,325	27,216	25,976	15,120	9,540	3,805	1,824	4,576
Female	Japanese	1990-1992	25,209	25,395	20,306	24,916	33,604	44,041	45,094	44,074	39,879	31,387	20,238	38,347	36,152	26,053	18,153	9,076	4,359	7,107
Female	Japanese	1993-1995	25,525	21,682	22,156	24,320	33,572	42,598	47,269	46,051	42,081	34,076	31,467	34,715	32,739	31,077	25,113	14,443	7,623	7,368
Female	Japanese	1996-1998	24,790	26,373	24,019	24,785	35,345	40,156	45,554	47,089	44,290	39,783	33,058	31,383	29,328	33,013	29,074	19,208	10,227	7,874
Female	Japanese	1999-2001	26,036	27,875	25,690	25,140	35,109	37,914	45,930	49,946	46,494	39,455	35,605	28,060	25,928	34,328	33,035	23,373	12,963	7,981
Female	Korean	1988-1989	18,136	19,386	17,625	21,734	29,662	22,875	28,479	24,527	29,810	17,271	12,561	9,148	7,631	6,486	4,549	3,210	1,514	482
Female	Korean	1990-1992	28,782	30,072	28,660	34,444	33,421	36,265	45,364	38,661	36,535	28,827	22,867	17,365	13,874	11,350	8,627	5,826	3,139	1,581
Female	Korean	1993-1995	29,872	31,245	31,329	38,864	38,332	43,011	48,740	43,479	42,747	34,633	27,798	21,120	16,941	13,336	10,395	7,264	4,195	2,651
Female	Korean	1996-1998	28,862	32,415	33,885	38,865	38,241	47,757	46,117	47,127	46,856	38,238	32,726	25,156	19,836	15,436	12,098	6,580	5,223	3,641
Female	Korean	1999-2001	28,052	35,587	36,686	41,376	42,156	52,505	49,484	50,775	55,164	43,947	37,614	28,190	22,835	17,440	13,800	9,835	6,264	4,671
Female	Latino	1988-1989	876,359	681,819	606,011	636,596	736,743	740,794	671,681	480,604	363,771	252,117	201,072	177,872	161,469	125,890	76,330	60,884	57,841	28,620
Female	Latino	1990-1992	1,372,699	1,194,664	1,044,202	1,051,329	1,173,660	1,196,079	1,055,871	940,535	642,132	470,986	336,751	301,498	262,155	206,049	142,710	108,640	83,772	60,704
Female	Latino	1993-1995	1,496,400	1,400,863	1,206,424	1,170,171	1,252,734	1,281,826	1,167,867	865,651	775,800	582,369	444,878	342,658	267,374	228,759	171,166	122,786	72,006	58,756
Female	Latino	1996-1998	1,629,141	1,607,396	1,368,645	1,288,443	1,331,316	1,374,978	1,278,863	1,121,728	908,662	683,732	525,205	354,258	309,585	253,527	189,662	139,857	80,298	68,609
Female	Latino	1999-2001	1,745,884	1,815,631	1,630,869	1,406,265	1,419,509	1,436,127	1,391,859	1,257,794	1,045,436	805,106	601,450	425,368	331,757	272,287	228,138	157,115	86,472	77,631
Female	Non-Latino Black	1988-1989	205,396	165,506	153,156	152,660	185,319	218,914	210,342	171,314	134,147	100,600	83,264	72,369	66,367	62,105	46,290	34,638	20,173	15,664
Female	Non-Latino Black	1990-1992	297,610	261,072	278,042	256,828	269,320	312,189	306,765	267,730	218,886	170,133	142,560	117,445	101,196	87,233	71,875	51,854	33,280	27,474
Female	Non-Latino Black	1993-1995	288,621	282,578	279,002	246,454	258,883	285,350	296,257	280,640	242,527	199,361	159,386	127,332	100,768	85,413	74,889	58,556	36,803	32,262
Female	Non-Latino Black	1996-1998	278,635	301,514	291,976	255,878	248,544	265,521	285,746	289,551	265,057	215,968	176,221	136,557	115,373	86,584	77,886	62,148	40,526	37,050
Female	Non-Latino Black	1999-2001	279,055	323,650	313,949	283,505	239,157	244,601	275,240	306,451	267,289	238,956	197,045	146,114	120,917	97,775	91,023	66,740	44,150	41,240
Female	Non-Latino White	1988-1989	1,129,761	1,009,892	873,536	917,893	1,203,088	1,542,461	1,621,454	1,474,042	1,330,135	1,006,773	763,251	751,556	687,776	687,455	705,722	555,735	362,557	353,018
Female	Non-Latino White	1990-1992	1,586,385	1,485,536	1,377,981	1,362,950	1,601,755	2,125,142	2,274,351	2,189,641	2,027,885	1,613,445	1,319,257	1,188,547	1,220,877	1,267,455	1,351,012	862,700	602,796	543,668
Female	Non-Latino White	1993-1995	1,478,485	1,475,038	1,383,202	1,366,138	1,556,282	1,881,445	2,078,562	2,120,376	2,059,881	1,757,364	1,482,617	1,262,302	1,169,554	1,178,362	1,311,026	913,017	657,565	595,501
Female	Non-Latino White	1996-1998	1,360,573	1,452,113	1,439,416	1,394,228	1,420,510	1,665,749	1,884,767	2,070,312	2,074,069	1,561,323	1,665,948	1,335,457	1,146,129	1,090,309	1,302,441	958,334	672,373	847,113
Female	Non-Latino White	1999-2001	1,242,674	1,427,216	1,483,632	1,400,318	1,265,387	1,437,053	1,688,974	2,021,447	2,067,455	1,865,264	1,839,278	1,408,013	1,136,736	1,030,256	1,023,755	982,651	727,162	828,726
Female	South Asian	1988-1989	12,821	13,753	11,176	9,318	11,341	14,765	14,256	13,017	10,699	5,788	4,767	3,324	2,715	3,162	1,578	681	434	106
Female	South Asian	1990-1992	25,197	25,029	20,639	18,426	23,073	31,755	29,319	25,158	20,350	13,500	11,028	7,578	6,213	5,909	3,256	1,914	1,059	487
Female	South Asian	1993-1995	32,354	30,309	25,289	23,766	30,540	45,254	35,847	51,914	25,565	19,281	15,048	10,030	6,790	7,482	4,361	2,905	1,452	662
Female	South Asian	1996-1998	38,511	35,568	28,930	29,103	37,610	51,759	48,363	38,672	30,617	25,062	20,266	15,801	11,347	8,992	6,137	4,017	1,911	1,278
Female	South Asian	1999-2001	46,635	40,820	31,589	34,442	41,889	66,246	57,868	45,429	36,051	30,845	24,655	16,913	13,914	10,481	7,535	5,068	2,549	1,674
Female	Vietnamese	1988-1989	22,899	25,152	22,721	26,820	23,364	22,335	24,876	23,676	14,870	7,805	5,215	4,344	3,485	2,810	2,406	1,690	656	323
Female	Vietnamese	1990-1992	37,354	40,545	37,402	43,498	39,725	42,205	45,471	40,207	29,595	20,848	14,008	10,900	6,715	7,016	5,517	3,785	1,840	1,245
Female	Vietnamese	1993-1995	41,034	45,636	41,529	47,265	43,138	52,659	50,729	45,658	38,243	31,618	22,880	16,487	12,875	10,389	7,728	5,281	2,862	2,028
Female	Vietnamese	1996-1998	44,715	47,324	45,579	51,133	47,551	63,096	57,868	51,462	47,091	42,766	31,093	22,187	17,058	13,742	10,135	6,778	3,664	2,613
Female	Vietnamese	1999-2001	46,385	50,712	49,635	54,281	51,968	73,542	65,276	57,401	55,638	55,756	38,306	27,676	21,201	17,105	12,549	8,276	4,907	5,587

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