

## **Introduction**

This is the thirteenth annual report covering cancer incidence and the tenth to cover cancer mortality in the Greater Bay Area (Regions 1 and 8 of the California Cancer Registry (CCR)). It includes information on all incident cancer cases and all cancer deaths occurring from 1988 through 2005 among residents of Alameda, Contra Costa, Marin, Monterey, San Francisco, San Benito, San Mateo, Santa Clara, and Santa Cruz counties. This report describes the distribution of cancer occurrence and mortality in the Greater Bay Area by tumor anatomical site and by patient age at diagnosis, sex, race/ethnicity, year of diagnosis, and county of residence. Incidence and mortality rates are reported separately for males and females, and for four mutually exclusive racial/ethnic groups: non-Hispanic whites (whites), non-Hispanic blacks (blacks), Hispanics, and non-Hispanic Asians/Pacific Islanders (Asians/Pacific Islanders).

The data included in this report were collected by the Greater Bay Area Cancer Registry (GBACR), a state and federally funded cancer registry, operated by the Northern California Cancer Center (NCCC). Data collected by cancer registries are used to calculate rates of cancer incidence, mortality and survival, to examine changes in cancer incidence and mortality over time, to generate hypotheses about the causes of cancer, and to evaluate treatment protocols and the impact of cancer screening programs. NCCC provides cancer incidence and mortality information to concerned citizens, educators, health care professionals, researchers, legislators, and other community members.

## **Cancer Surveillance in the Greater Bay Area**

Population-based cancer reporting in the Greater Bay Area began in 1969, when the National Cancer Institute (NCI) selected Alameda, Contra Costa, Marin, San Francisco and San Mateo counties to participate in its Third National Cancer Survey. Subsequent reporting of cancer incidence data in the Greater Bay Area was implemented by the NCI in 1973 through the Surveillance, Epidemiology, and End Results (SEER) program, an ongoing cancer registry program in several states and metropolitan areas throughout the US. The Greater Bay Area Registry was operated within the State of California Department of Health Services until 1982, when it moved to NCCC.

In 1987, cancer reporting became mandatory throughout the state of California, as established by Assembly Bill 136. This legislation designated cancer as a reportable disease and created the statewide California Cancer Registry (CCR), which is organized under a regional structure composed of ten registries. These constituent geographic reporting regions share information about cases diagnosed outside their region of residence in order to ensure complete reporting within each regional cancer registry. Statewide implementation of cancer incidence data reporting by the ten regional cancer registries was effective as of January 1, 1988<sup>1</sup>.

The registries for the San Francisco Bay Area (San Francisco, Alameda, Contra Costa, Marin, and San Mateo counties), designated as Region 8 of the CCR, and the Santa Clara Region (Monterey, San Benito, Santa Clara, and Santa Cruz counties), designated as Region 1 of the CCR, together are known as the Greater Bay Area Cancer Registry (GBACR). The map below identifies the counties included in the GBACR. The Region 8 registry includes approximately 70% of the annual GBACR cases.

In 1995, the CCR received funding from the US Centers for Disease Control and Prevention (CDC) to enhance cancer surveillance activities statewide. A major provision of this grant is that each of the CCR's regional registries produces annual reports of cancer incidence and mortality.



### **Greater Bay Area Population**

The Greater Bay Area is one of the most ethnically diverse regions in the US. Population demographic data for all counties for detailed racial/ethnic groups were last reported in 2000 by the US Census Bureau. According to the 2000 Census, there were more than 6.5 million people living in the Greater Bay Area, with the majority of residents identifying as non-whites. The 2000 Census was the first to allow respondents to choose more than one race category in addition to reporting Hispanic ethnicity, and about 5% of our population reported belonging to more than one racial group, one of the highest proportions of persons reporting multiracial status in the US. Nearly 20% of the total population described their race singularly as Asian, including Chinese (7.2% of total), Filipino (4.5%), Asian Indian (2.2%), Vietnamese (2.2%) and Japanese (1.2%). With respect to other races, 7.1% of the total population reported their race singularly as black, 0.6% as American Indian or Alaska Native, 0.5% as native Hawaiian or Pacific Islander, 56.7% as white, and 10.8% as other. With respect to Hispanic ethnicity, which is asked of respondents separately from race, 22.8% of the population reported any Hispanic ethnicity, including 15.8% reporting Mexican ethnicity. In the period 1990-2000, there was over 40% growth in the size of the Asian/Pacific Islander and Hispanic populations in our regions, while the non-Hispanic white population declined slightly and the black, American Indian or Alaska Native populations remained the same size.

Furthermore, the Greater Bay Area has a great diversity of lifestyles and a wide range of socioeconomic structures, cultural practices, and occupations. The nine-county area is also characterized by geographic variation with many “micro-climates” of differing weather and pollution patterns.

## Presentation of Data

This publication includes incidence and mortality data for cancer cases and deaths occurring in the period January 1, 1988 through December 31, 2005, years for which cancer reporting to the registry is believed to be complete at the time of publication\*. As there is a lag between cancer diagnosis/death and report to the registry, data for more recent cases or deaths are not yet considered complete for the purpose of assessing patterns and trends. Annual mid-year population estimates by age, sex, and race/ethnicity for each county were obtained from the US Census Bureau and the California Department of Finance (DOF) Demographic Research Unit (Appendix 3)<sup>2,3,4</sup>. Rates are not presented in this report for the more detailed racial/ethnic groups because population estimates are not readily available for these groups from the Census Bureau or DOF. Incidence rates from 1990 through 2002 for detailed Asian subgroups have been presented in a separate report<sup>5</sup>, using a special tabulation of population estimates.

In the introduction of this report, we present tables ranking the five most commonly diagnosed cancers and the five most common sites contributing to cancer mortality. The data in these tables are based only on cancer case and death counts and do not account for the population diversity nor are they adjusted for age. These tables (Tables 1-A, 1-B, 2-A, 2-B) are organized by sex and race/ethnicity for the Greater Bay Area and the State of California, along with a brief summary of the findings. Data are also presented for specific Asian subgroups (Chinese, Japanese, Filipino, Korean, and Vietnamese) in these tables, since Asian/Pacific Islanders are a heterogeneous racial/ethnic group comprising a substantial proportion of the regional population.

Cancer incidence and mortality rates for a particular population group or subgroup have been calculated only if the group included at least fifteen cases/deaths from the specific cancer and if the corresponding total population for the designated time period was 10,000 or more. The purpose of these restrictions is to produce relatively stable rates. Additionally, in compliance with privacy rules, case counts that are less than 5 are not reported. As a result of these restrictions, information for some groups is not presented in some tables. Appendices contain SEER classification codes for each cancer site, population estimates for the Greater Bay Area, the 2000 US standard million population, relevant mathematical formulae, references, and a current list of NCCC publications.

In the main body of this report, six tables are presented for each type of cancer, showing cancer incidence or mortality counts, rates, and 95% confidence intervals, and are organized as follows:

- By year, sex, and race/ethnicity for the Greater Bay Area as a whole for the individual years between 1988-2005
- By age group and sex for the Greater Bay Area as a whole for the aggregate five-year period 2001-2005
- By county, sex and race/ethnicity, for the aggregate five-year period 2001-2005

For each type of cancer, Tables 1-3 show cancer incidence data arranged with the above format, while Tables 4-6 show cancer mortality data.

\*Veterans Health Administration (VHA) hospitals did not report cancer cases to California Cancer Registries for the year 2005. Therefore, case counts and incidence rates for adult males in 2005 are underestimated and should be interpreted with caution. For more information, see page 11 of this report.

It should be noted that recent incidence and mortality data presented in Tables 2, 3, 5, and 6 for each cancer type are computed as average annual rates: these rates average data from the most recent five years (2001-2005) of complete registry data in order to maximize the stability of the data. This practice is common in public health reporting and is consistent with other cancer surveillance publications.

Cancer incidence data are organized primarily by anatomic site of the tumor, with sections for all cancer sites combined and for each of 31 specific cancers presented alphabetically by site. These are the most commonly diagnosed cancers, constituting 91% of all invasive cancers in the Greater Bay Area over the 18-year period 1988-2005. In addition, four major subsites of leukemia are presented (acute lymphocytic, chronic lymphocytic, acute myeloid, chronic myeloid). These four subsites constitute 87% of all leukemia cases diagnosed. All incidence rates, except for rates by age group, are age-adjusted to the Year 2000 US standard million population. The total/crude incidence rates presented in Table 2 are not age-adjusted to this standard.

Mortality data are organized in a similar fashion, with sections for all cancer sites combined and for each of the 27 most common cancer sites. These are the same sites for which cancer incidence is reported, with the exception that mortality rates for the *in situ* form of three cancers (breast, colorectal, and melanoma) and Kaposi's sarcoma are not available. The cancer sites constitute 91% of all deaths by cancer in the Greater Bay Area over the time period 1988-2005. Mortality data are presented for four subtypes of leukemia and all leukemias combined. These subsites comprise 70% of all deaths from leukemia. All mortality rates, except for rates by age group, are age-adjusted to the Year 2000 US standard million population. The total crude mortality rates presented in Table 5 are not age-adjusted to this standard.

## Materials and Methods

### Incidence

Cancer incidence data presented in this report are based on new cases of primary cancer diagnosed in Greater Bay Area residents in the period January 1, 1988 through December 31, 2005, and reported to the GBACR as of January 2008. Case ascertainment through 2005 was estimated to be complete by this date\*. Data are presented for invasive cancers (i.e., tumors that have infiltrated the surrounding tissue) for each cancer site with the exception of bladder cancer, for which cancer incidence counts and rates are based on combined *in situ* and invasive cases. In addition, information on *in situ* cancers (tumors that have characteristics of malignancy but are noninvasive) is presented for three cancer sites: female breast, colorectal and melanoma of the skin.

\*Veterans Health Administration (VHA) hospitals did not report cancer cases to California Cancer Registries for the year 2005. Therefore, case counts and incidence rates for adult males in 2005 are underestimated and should be interpreted with caution. For more information, see page 11 of this report.

A *cancer case* is defined in this report as a primary malignant tumor, that is, one originating in a particular organ or anatomic site rather than having spread from another location. Because individuals can have more than one primary cancer, the number of new (incident) cases is greater by approximately 8% than the number of persons newly diagnosed with cancer.

Primary site and histologic type of the cancer have been coded according to the International Classification of Diseases for Oncology (ICD-O), Third Edition<sup>6</sup>, and sites have been grouped following the conventions of the SEER program (Appendix 1). Kaposi's sarcoma (KS) includes all cases with ICD-O-3 histology code 9140, irrespective of anatomic site; these malignancies are included in counts and rates for both KS data and the site-specific cancer.

Of the 474,406 cases of invasive cancer diagnosed in the period 1988-2005 for persons of known age residing in the Greater Bay Area, 6,825 (1.4%) cases of unknown race/ethnicity were included in counts and rates for all races combined, but could not be assigned to a specific racial/ethnic group. Cases with an ill-defined or other miscellaneous cancer site constituted 12,791 (2.7%) of all region-wide incident cancer counts and were included only in the counts and rates calculated for all sites combined.

In this report, we caution users about completeness of data. Case counts for the year 2005 are not complete due to the discontinuation of reporting cancer diagnoses by the Veterans Health Administration (VHA). Thus incidence rates based on these counts likely represent underestimates and should be interpreted with caution.

### Mortality

Cancer mortality data presented in this report are based on new deaths from primary cancer occurring in Greater Bay Area residents in the period January 1, 1988 through December 31, 2005, and reported to the GBACR as of January 2008. Data are presented for invasive cancers (i.e., tumors that have infiltrated the surrounding tissue) for each cancer site. Only deaths among California residents of known age were included in these analyses. The cause of death was coded according to the International Classification of Diseases-9 (ICD-9) for cases diagnosed during the 1988-1998 and the International Classification of Diseases-10 (ICD-10) for cases diagnosed from 1999 forward. Cancer sites were grouped following the conventions of the SEER program (Appendix 2).

Of the 183,234 deaths by cancer in the period 1988-2005 for persons of known age residing in the Greater Bay Area, 109 (0.06%) deaths of persons of unknown race/ethnicity were included in counts and rates for all races combined, but could not be assigned to a specific racial/ethnic group. Cases with an ill-defined or other miscellaneous cancer site constituted 13,114 (7.1%) of all region-wide incident cancer deaths and were included only in the counts and rates calculated for all sites combined.

### Population Estimates

Annual mid-year population estimates by age, sex, and race/ethnicity for each county were obtained from the Census Bureau and DOF (Appendix 3)<sup>2,3,4</sup>. The Census Bureau provides a set of

population counts by age, sex, county, and race/ethnicity from 1990 to the present. For the years 1988-1989, DOF estimates were benchmarked to provide a consistent series of population data from 1988 to 2005 by single year of age, sex, county, and race/ethnicity<sup>7</sup>. Population estimates are subject to periodic revisions, which may modify the age-, race-, and sex-specific population distribution for all the years in the series. The rates presented in this report are therefore not directly comparable to those in previous reports, but are internally consistent with the most recently released official population estimates. Beginning with the 2000 Census, respondents were given the option to choose more than one race category to indicate their racial identities. Following these changes, Census Bureau has produced population estimates, which include a category for "multirace" for years 2000 and forward. The Census Bureau has re-assigned the multi-race population (approximately 5% of the Greater Bay Area population in 2000) into single race categories to create a "bridged population." In this report, rates based on the bridged population estimates are presented for non-Hispanic white, non-Hispanic black, Hispanic, and non-Hispanic Asian/Pacific Islander populations.

### Definition of Race/Ethnicity

Race/ethnicity for cancer patients was determined from the hospital medical records and death certificates and grouped in this report according to the mutually exclusive categories of white, black, Hispanic, and Asian/Pacific Islander. Population estimates are produced by the Census Bureau and DOF for these four racial/ethnic groups and for non-Hispanic American Indians and non-Hispanic multirace. Persons coded as American Indian and non-Hispanic multirace are excluded from race-specific rates, but are included in data for all races combined. An evaluation of the accuracy of American Indian classification in CCR demonstrated that a large proportion of American Indian cancer cases are coded as non-Hispanic white<sup>8</sup>, based on information from the medical record. Rates are therefore not produced separately for American Indians.

Race and ethnicity were reported as separate data items during data collection for both cases and deaths. Persons with race reported as white, black, or unknown, but with a last name on the 1980 U.S. Census list of 12,497 Hispanic surnames<sup>9</sup> were categorized as Hispanic for analyses in this report. Maiden name, when present, was used instead of last name to identify Hispanic women by surname. Similarly, persons with race coded as white, black, or unknown, but with a Vietnamese or Hmong surname (Appendix 6) were categorized as Asian.

The use of surname to identify persons of Hispanic ethnicity was adopted by CCR because of the recognized under-reporting of Hispanic ethnicity on the medical record and death certificate. A study conducted by the Northern California Cancer Center documented that the use of Hispanic surnames, in addition to information from the medical record, results in increased sensitivity and accuracy of cancer rates<sup>10</sup>. Overall statewide cancer incidence and mortality rates for Hispanics, based on this definition, are approximately 14 percent higher than those based on medical record and death certificate alone, and rates for non-Hispanic whites are approximately 1.4 percent lower.

## Technical Terms

The following definitions are presented for several technical terms that appear in this report. Relevant formulae for the calculation of rates and confidence intervals are found in Appendix 4.

**Age-adjusted rate:** *Age-adjustment* is a statistical method that allows meaningful comparisons of disease incidence and mortality to be made among populations with differing age distributions. An age-adjusted cancer incidence rate is the number of new cancers per 100,000 population that would occur in a specific time period if that population had a given, or standard, age distribution. In this report, rates are age-adjusted by the direct method<sup>11</sup> to the Year 2000 US standard million population<sup>12</sup> (Appendix 5). Rates that are not age-adjusted are referred to as *crude rates*, which are presented in the last row of Tables 2 and 5.

**Age-specific rate:** *The age-specific incidence rate* is the number of new cases or deaths from a disease, such as cancer, that occurs within a specified age group of a population, in a defined time period. In this report, age at diagnosis/death is grouped into 18 five-year age categories, beginning with birth to four years old and ending with ages 85 and older. Average annual age-specific rates are reported per 100,000 population and are presented in Tables 2 and 5.

**Confidence interval:** A *confidence interval* for an observed rate is a measure of the precision of the rate. The observed incidence rate, which is an estimate of true incidence based on counts of disease cases and of population, is subject to variation from the true value of the rate. The confidence interval for the observed rate is a range of values within which the true rate is thought to lie, with a specified level of confidence, e.g., 95%. Rates based on larger numbers are subject to less variation.

**Histology:** *Histology* is the study of the minute structure of cells, tissues, and organs in relation to their function. Cancers are identified and diagnosed primarily on the basis of histology. They often are classified further by histologic subtype.

**In situ/invasive:** In this report, the terms *in situ* and *invasive* describe the extent to which a cancer has infiltrated the surrounding tissue. *In situ* cancers have all the characteristics of malignancy but are noninvasive (i.e., the basement membrane of the involved tissue has not been penetrated). Invasive tumors are classified according to how far the disease has spread from the site of origin at the time of diagnosis.

## Cautions on Interpretation

Incidence data presented in this report are based on cases of primary cancer (i.e., not metastatic) initially diagnosed in the Greater Bay Area residents between January 1, 1988 and December 31, 2005 and reported to the GBACR as of January 2008. Mortality data in this report are based on deaths due to primary cancer occurring in the Greater Bay Area within the same time periods as the incidence data. Although case/death ascertainment for this time period is essentially complete, it is likely that some additional cases diagnosed and deaths occurring in this interval will be reported in the future.

Reports published prior to 2003 showed cancer incidence and mortality rates for populations with at least 100,000 and with at least 5 cases or deaths. To better monitor incidence and mortality for smaller populations, the population minimum was lowered to 50,000 beginning with reports published in 2003 thru 2006. Most recently, consistent with California Cancer Registry guidelines, reports published since 2007 show cancer incidence and mortality rates for populations with at least 10,000 and with at least 15 cases or deaths. ***Rates based on small populations (common for San Benito and Monterey Counties) should be interpreted with caution.*** These rates have wide 95% confidence intervals and are less stable than rates based on larger populations. Please refer to Appendix 3 for population totals by sex, county, and race/ethnicity in the Greater Bay Area.

The Year 2000 standard million population was used for age-adjustment of incidence and mortality rates presented in this report; this is not the same standard population used in reports published prior to 2002. Because the Year 2000 standard million population reflects an older age distribution and as cancer occurs more often in older people, rates adjusted to the Year 2000 standard million population are likely to be higher than those adjusted to the Year 1970 standard million population (as done in previous years), even if there has been no actual change in the level of cancer occurrence. The rates presented in this report also may not be comparable to those published in previous reports because, starting with the 2003 report, a slightly different source of population estimates are now being utilized as described in the “Population Estimates” section on page 7.

The reliability of race/ethnicity-specific rates is contingent on the accuracy of racial/ethnic classification for both cases/deaths and population estimates. Because information on the race/ethnicity of cancer cases is largely obtained from the patients' medical records, it may come from sources of varying reliability, including the patient, hospital personnel, and medical records staff<sup>13</sup>. Similarly, race/ethnicity data for cancer deaths obtained through death certificates also may sometimes be unreliable, as this information is not necessarily provided by next-of-kin. Thus, a small part of the variation in rates among racial/ethnic groups may be attributable to misclassification rather than a true difference in cancer risk. Some racial/ethnic-specific rates may be slightly underestimated because they exclude the 1.4% of all cases during the period 1988-2005 for whom race/ethnicity is unknown from the racial/ethnic group to which they truly belonged.

The reliability of site-specific rates depends on the accuracy with which each cancer site is coded. Exclusion of the approximately 3% of all cancer cases and 7% of all cancer deaths classified as having ill-defined, unknown, or other miscellaneous site during the period 1988-2005 could result in some underestimation of rates for the anatomic sites or histologic types these cases and deaths truly represented. In this report, cases with the ICD-O-3 histology code for Kaposi's sarcoma (KS)

are counted as KS and are also included in the counts and incidence rates for any site-specific cancer; this is the same classification system that the CCR uses in its publications. However, 86% of KS cases in the Greater Bay Area have the site coded as non-melanoma skin cancer, a category not included in either the CCR report or this one. The 14% of KS cases coded at sites other than skin primarily involve the oral cavity and pharynx, stomach, and colon/rectum.

Mortality rates are presented in order to better understand the burden of cancer death in this region. Cancer mortality rates are the number of cancer deaths per 100,000 population, and not the proportion of cancer deaths in those diagnosed with the disease. Therefore, the interpretation of differences in mortality by age, sex, and race/ethnicity is complex, and needs to be considered in conjunction with the incidence rates of the cancer of interest. In addition, mortality rates are influenced by access to and use of health care services, the stage of disease at diagnosis, treatment effectiveness, changes in the clinical management of the disease over time, and other clinical issues. These factors may be responsible for some of the population subgroup differences in mortality rates, as they vary by age, race/ethnicity, and, to a lesser extent, sex. Therefore, any consideration of differences in mortality rates must take these issues into account.

On the basis of prior research suggesting underreporting of melanomas, the GBACR initiated targeted efforts to increase reporting of melanomas by dermatologists' offices, free-standing dermatopathologic laboratories and referral hospitals. These activities resulted in an increased number of melanomas reported to the cancer registry, which is reflected in the higher 2005 rates for invasive and in situ melanomas.

### Impacts of Discontinued VA Reporting

In all 50 US states, cancers are reportable to cancer registries by law. However, as federal facilities, Veterans Health Administration (VHA) hospitals are exempt from state requirements on submitting cancer patient data. Although VHA hospitals have cooperated with such requests for many years, for the year 2005 they stopped reporting cancers to registries in California and nationwide<sup>14,15</sup>, citing concerns regarding the inclusion of VHA patients in research projects. This decision impacts the completeness of population-based cancer incidence data from 2005 forward by making the collection of cancer information incomplete and the surveillance of cancer trends inaccurate. The true extent of the bias caused by the VHA decision is not simple to determine for several reasons. First, due to the locations and sizes of the VHA hospitals, the problem varies by geography. Second, because cancer incidence varies by sex, age, race/ethnicity, and cancer site, the extent of the problem differs by demographic and disease characteristics such as cancer site. Third, because many cancer patients are seen by multiple hospitals for diagnosis, consultation, or treatment, some cancers occurring in VHA patients are reported to the cancer registry by non-VHA facilities. Thus, it is difficult to quantify the extent to which the VA change in policy affects cancer rates and trends. Fourth, changes in cancer incidence are reflective of the trends of disease development and/or the cancer control efforts. The disrupted reporting of VHA cases will contribute to those trends, making it challenging to interpret the observed changes in cancer incidence.

## Leading Cancer Sites by Sex and Race/Ethnicity

### Males

Table 1-A (page 14) presents the five most commonly diagnosed cancers, based on numbers of cases, in the Greater Bay Area for the period 2001-2005 by sex and race/ethnicity. In males, prostate cancer was the most frequently occurring cancer, except in Korean and Vietnamese men in whom lung cancer predominates. Lung and colorectal cancers ranked second or third across most racial/ethnic groups. NHL was common in black, Hispanic, Japanese and Filipino males; the common occurrences of NHL in the Greater Bay Area was expected, given the burden of the AIDS epidemic in this region. Stomach cancer was relatively common in Japanese, Koreans, and Vietnamese; melanoma was common in whites, while kidney and renal pelvis were common in blacks and Hispanics. Liver cancer was a common cancer among Chinese, Filipinos, Koreans, and Vietnamese. Incidence profiles for the five most common cancer sites in the Greater Bay Area largely resembled those observed for the state of California (Table 1-B, page 15) with few notable differences. In the Greater Bay Area oropharyngeal cancer and NHL ranked as the fifth most common cancer for Chinese and Japanese males, respectively, where as in California stomach and bladder cancers were among the top five sites for Chinese and Japanese Males, respectively. Another notable difference is that lung and liver cancers were relatively more common among Koreans in the Greater Bay Area than California, while stomach cancer was more common in the Korean population in California as a whole. Data from the Greater Bay Area are also included in the data for the entire state of California.

### Females

The most frequently diagnosed cancer among females of all racial/ethnic groups in the Greater Bay Area during the period 2001-2005 was breast cancer (Table 1-A). Lung and colorectal cancers ranked second or third, except in Koreans in whom stomach cancer ranked second. Corpus uteri cancer ranked fourth in most racial/ethnic groups, except for Koreans and Vietnamese, in whom lung and thyroid cancers ranked fourth, respectively. Pancreatic cancer was the fifth most common cancer in black females, while NHL ranked fifth in white, Hispanic, and Chinese females. Thyroid cancer was common in Vietnamese, Koreans and Filipinas, ranking either fourth or fifth. Incidence profiles for the five cancers most commonly diagnosed among females in the period 2001-2005 were similar to those of the state (Table 1-B), with few notable differences. In the Greater Bay Area, NHL cancer ranked fifth for white and Hispanic females, thyroid cancer ranked fifth for Koreans, and cancer of the cervix ranked fifth for Vietnamese, where as in California melanoma ranked fifth in white females, cervical cancer ranked fifth in Hispanics, and liver cancer ranked fifth in Koreans and Vietnamese.

## **Leading Causes of Cancer Mortality by Sex and Race/Ethnicity**

### Males

The five most common causes of cancer death in the Greater Bay Area during the period 2001-2005 are shown in Table 2-A (page 16). Lung cancer was the most frequent cause of cancer mortality in males, regardless of race/ethnicity. Among white and black males, death from prostate cancer ranked second, while it ranked third in Hispanics, Japanese and Filipinos. Colorectal cancer caused the second highest number of cancer deaths in Hispanics, Chinese, Japanese, and Filipinos, but the third highest in all other racial/ethnic groups except Vietnamese. Pancreatic cancer was also a common cause of mortality, ranking fourth in white and Chinese males and fifth in black and Japanese males. Liver cancer was a frequent cause of cancer death for all racial/ethnic groups except whites and Japanese, while NHL was a common cause of cancer mortality in white, Filipino, and Vietnamese males. Stomach cancer was a common cause of cancer death in most racial/ethnic groups, except among white, black, and Filipino males. In California, cancer mortality rankings for males were similar to those in the Greater Bay Area (Table 2-B, page 17), with few variations in rankings.

### Females

Among females in the Greater Bay Area, lung cancer was the leading cause of cancer death across all racial/ethnic groups, except in Filipinas in whom breast cancer was the most common cause of cancer death. Breast cancer was the second most common cause of cancer death in many racial/ethnic groups, except in Chinese, Japanese and Koreans in whom colorectal and stomach cancer predominates, respectively. Colorectal cancer ranked third across nearly all racial/ethnic groups, while liver cancer ranked third in Vietnamese females. Other common causes of cancer mortality in the Greater Bay Area include cancers of the pancreas, ovary, liver, multiple myeloma, and leukemia. These types of cancers also occur among the five most common causes of cancer mortality reported for the state of California, with few notable differences (Table 2-B).