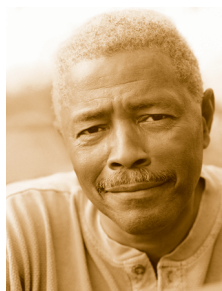


The Burden of Cardiovascular Disease in California

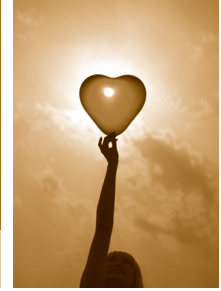


A REPORT OF THE CALIFORNIA
HEART DISEASE AND STROKE
PREVENTION PROGRAM



The Burden of Cardiovascular Disease in California

A REPORT OF THE CALIFORNIA HEART DISEASE AND STROKE PREVENTION PROGRAM



JULY 2007

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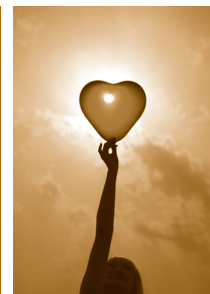


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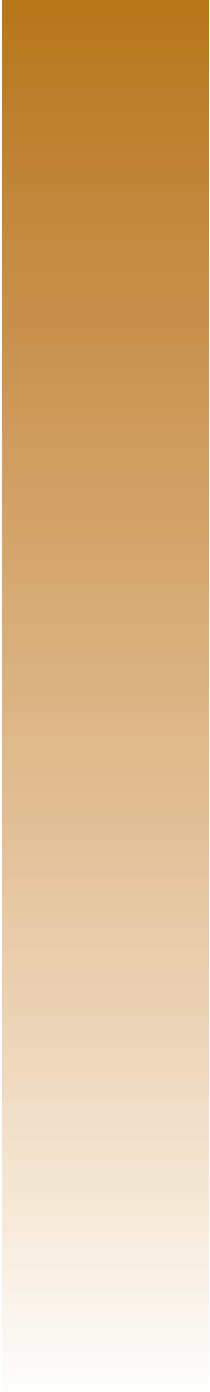
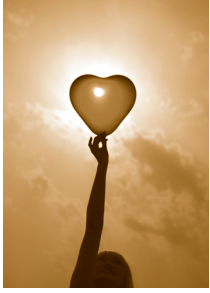
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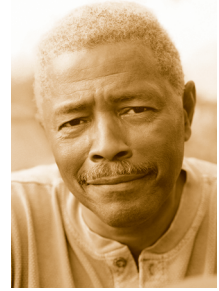
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Preface



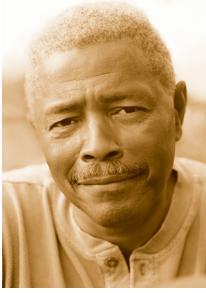
The Burden of Cardiovascular Disease in California: A Report of the California Heart Disease and Stroke Prevention Program is an effort consistent with the mission of the California Heart Disease and Stroke Prevention (CHDSP) Program: To reduce premature death and disability from heart disease and stroke among Californians.

This report follows a similar report released in 2002 titled, *Heart Disease and Stroke in California: Surveillance and Prevention*.¹

This report also serves as a companion document to *California's Master Plan for Heart Disease and Stroke Prevention and Treatment 2007–2015*.²

The purpose of this report is to present current data on heart disease, stroke, heart failure, and related risk factors, including high cholesterol, high blood pressure, diabetes, cigarette smoking, overweight and obesity, and physical inactivity. When possible and appropriate, these data are presented overall and by gender, race/ethnicity, age, educational attainment, income, and residence. National data are provided for comparisons with state data.

The information presented in this report will support public health programs dedicated to reducing the burden of cardiovascular disease, in California and elsewhere, through both primary and secondary prevention efforts.



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Executive Summary



Heart Disease and Stroke Prevalence (2003)

- Almost seven percent (6.9 percent) of adults 18 years and older (7.0 percent of men and 6.8 percent of women) indicated that they had been given a heart disease diagnosis by a physician.
- Almost nine percent (8.8 percent) of adults 65 years and older (8.4 percent of men and 9.2 percent of women) indicated that they had been given a stroke diagnosis by a physician. Individuals aged 80 years and older and African Americans had the highest prevalence of stroke.

Heart Disease, Stroke, and Heart Failure Mortality

- Cardiovascular disease (CVD), which includes heart disease, heart failure, and stroke, is the leading cause of death in California, accounting for more than 73,000 deaths (about one-third of the total) in 2004.
- The total number of deaths from CVD exceeds the combined number of deaths from malignant neoplasms (cancer), diabetes, chronic liver disease/cirrhosis, suicide, homicide, and Human Immunodeficiency Virus (HIV).
- From 2000 through 2004, the overall heart disease mortality rate declined 19.4 percent, from 192.6 to 155.2 deaths per 100,000 population. American Indians and African Americans experienced the greatest declines in heart disease mortality, at 28.4 percent and 22.2 percent, respectively.

- From 2000 through 2004, the overall stroke mortality rate declined 17.8 percent, from 61.2 to 50.3 deaths per 100,000 population. Declines for American Indians and whites are of relatively large magnitude, at 29.7 percent and 18.4 percent, respectively.
- From 2000 through 2004, the overall heart failure mortality rate increased 11.1 percent, from 10.8 to 12.0 deaths per 100,000 population. Increases for Hispanics and whites are the greatest, at 27.1 percent and 14.4 percent, respectively.

Heart Disease, Stroke, and Heart Failure Morbidity

- Annually, there are about 575,000 heart disease-related hospital discharges (a measure of morbidity), about 200,000 stroke-related hospital discharges, and about 350,000 heart failure-related hospital discharges.
- From 2000 through 2004, the overall heart disease morbidity rate declined 4.4 percent, from 18.2 to 17.4 discharges per 1,000 population. Although women have experienced a decline in heart disease morbidity (6.8 percent, from 14.8 to 13.8 discharges per 1,000 population), men have not.
- From 2000 through 2004, the overall stroke morbidity rate declined 13.2 percent, from 6.8 to 5.9 discharges per 1,000 population. Both women and men have experienced declines in stroke morbidity (14.1 percent for women and 14.7 percent for men).



■ From 2000 through 2004, the overall heart failure morbidity rate increased 13.8 percent, from 9.4 to 10.7 discharges per 1,000 population. Both women and men have experienced increases in heart failure morbidity (13.8 percent for women and 13.5 percent for men). Among racial/ethnic groups, African Americans experienced the highest increase in heart failure morbidity rates (38.5 percent).

Risk Factor Prevalence

■ According to the 2001 California Health Interview Survey (CHIS) data, of adults reporting a heart disease diagnosis, one in three respondents (32.2 percent) indicated that they had been told by a physician that their blood cholesterol was high.

■ According to the 2003 CHIS data, nearly one in four adults (23.5 percent) reported having been diagnosed with high blood pressure by a physician. Individuals 80 years and older (59.9 percent) and African Americans (33.9 percent) have the highest prevalence of high blood pressure.

■ Almost seven percent (6.6 percent) of adults (7.1 percent of men and 6.0 percent of women) indicated that they have been diagnosed with diabetes by a physician, according to the 2003 CHIS data. The oldest age group (80 years and older) has a prevalence (16.6 percent) that is more than ten times greater than the prevalence (1.6 percent) of the youngest group (18 through 39 years).

■ According to the 2003 CHIS data, the overall adult cigarette smoking prevalence is 16.5 percent. For men, the prevalence (20.3 percent) is considerably higher than it is for women (12.9 percent).

■ The 2003 CHIS data indicate that 35.6 percent of adults are overweight and 20.4 percent are obese. A greater proportion of men versus women are overweight or obese (43.5 percent and 21.0 percent for men versus 27.1 percent and 19.9 percent for women). For all racial/ethnic groups except Asians, more than 50 percent of adults are overweight or obese.

■ According to the 2001 CHIS data, nearly three in ten adults (28.5 percent) are considered physically inactive. The prevalence of inactivity is greater for women (34.6 percent) than for men (22.1 percent). Among all racial/ethnic groups, Hispanics have the highest prevalence of physical inactivity (43.3 percent).

Introduction



As is the case nationally,³ cardiovascular disease (CVD), including heart disease, heart failure, and stroke, is the leading cause of death in California, accounting for more than 73,000 deaths, or almost one-third of all deaths in 2004. Indeed, the total number of Californians who die each year from CVD is staggering. In 2004, the number of deaths from CVD exceeded the number of deaths from malignant neoplasms (cancer), diabetes, chronic liver disease/cirrhosis, suicide, homicide, and HIV, combined (Table 1).

Furthermore, the CVD burden is experienced across the California population, although some groups experience the burden disproportionately. Of further concern, given the changing demographics in California, is that the risk of death from heart disease, stroke, and heart failure increases with older age (Table 2).

As the average length of life extends, the numbers of deaths from heart disease, stroke, and heart failure will increase in future years. With an ever-increasing number of heart disease and stroke events, amidst a healthcare system that is struggling against shrinking resources, the felt burden will not be insignificant.

Morbidity from CVD also takes a large toll in California. In 2004, the State recorded more than 775,000 CVD-related hospital discharges, including nearly 200,000 stroke-related hospital discharges. As is the case with mortality, morbidity from CVD

Table 1: Top 15 Causes of Death, California (2004)

Cause of Death	Deaths	Age-Adjusted Deaths per 100,000	Percentage of Total Deaths
Cardiovascular Disease (including Heart Disease, Stroke, & Heart Failure)	73,099		31.1
Heart Disease	52,177	155.2	
Stroke	16,883	50.3	
Heart Failure	4,039	12.0	
Malignant Neoplasms (Cancer)	53,708	160.6	22.8
Chronic Lower Respiratory Disease	12,519	38.0	5.3
Accidents (Unintentional Injuries)	10,598	29.6	4.5
Influenza & Pneumonia	7,331	21.7	3.1
Diabetes Mellitus	7,119	21.3	3.0
Alzheimer's Disease	6,962	20.6	3.0
Chronic Liver Disease/Cirrhosis	3,685	10.6	1.6
Intentional Self-Harm (Suicide)	3,362	9.4	1.4
Essential Hypertension & Hypertensive Renal Disease	2,860	8.5	1.2
Homicide	2,484	6.7	1.1
Nephritis, Nephrotic Syndrome, & Nephrosis	2,371	7.1	1.0
Parkinson's Disease	1,830	5.6	0.8
Conditions Originating in the Perinatal Period	1,420	3.7	0.6
HIV	1,376	3.7	0.6
All Other Causes	44,576		18.9
Total Deaths	235,300		100.0

Source: The 2004 California Death Statistical Master File

Notes: 1. HP2010 is *Healthy People 2010*.

2. The number of deaths from Heart Disease using the NCHS definition is 65,000 (i.e., 12,823 more).

3. The age-adjusted mortality rate (deaths per 100,000) using the NCHS definition for Heart Disease is 193.0.

is also experienced disproportionately across the State's population: males and African Americans have elevated rates, as compared to other population groups.

Table 2: Cardiovascular Disease Deaths by Gender and Age, California (2004)

Age	NUMBER OF HEART DISEASE DEATHS			NUMBER OF STROKE DEATHS			NUMBER OF HEART FAILURE DEATHS		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
under 45	650	234	884	227	146	373	30	12	42
45-54	2,039	666	2,705	419	306	725	46	31	77
55-64	3,592	1,429	5,021	594	487	1,081	98	70	168
65-74	4,982	2,998	7,980	1,102	1,054	2,156	195	187	382
75-84	8,259	7,662	15,921	2,380	3,258	5,638	537	639	1,176
85 plus	7,103	12,563	19,666	2,112	4,798	6,910	754	1,440	2,194
Total	26,625	25,552	52,177	6,834	10,049	16,883	1,660	2,379	4,039

Source: The 2004 California Death Statistical Master File **Note:** The total number of deaths shown above is 73,099.



Morbidity and mortality from CVD are related to a host of other conditions. This report presents data on the following risk factors:

- **High Cholesterol (Hypercholesterolemia)**

Cholesterol is deposited in the vessel walls, a condition known as atherosclerosis. These deposits can form plaques that obstruct blood flow. Cholesterol plaques may also rupture, forming blood clots.

- **High Blood Pressure (Hypertension)**

Sustained higher blood pressure results in pathological changes in the blood vessels. This leads to CVD, as well as damage to organs such as the eye and kidney.

- **Diabetes**

This disease of abnormal glucose metabolism can cause damage to blood vessels and can be a factor leading to CVD.

- **Cigarette Smoking (Tobacco)**

This behavior contributes to atherosclerosis through several mechanisms: decreased oxygen levels in the blood; nicotine-induced constriction of blood vessels, thereby causing an increase in heart rate and blood pressure; and changes to the blood-clotting mechanisms.

- **Overweight or Obesity**

This condition can lead to the development of high blood pressure, high cholesterol, and diabetes, all of which increase the risk for CVD.

- **Physical Inactivity**

Being physically inactive negatively impacts blood pressure and resting heart rate, as well as total cholesterol level and fat distribution.

Following a discussion of the methods used in this report, the results will present current data on heart disease, stroke, heart failure, and related risk factors, including high cholesterol, high blood pressure, diabetes, cigarette smoking, overweight and obesity, and physical inactivity.

Methodology



A number of data sources and statistical techniques were used to calculate the descriptive statistics presented in this report. First, there is a detailed listing of the disease definitions used during the analyses. Next, there is a discussion of mortality, morbidity, and population data, followed by a comment on age adjustment. Finally, a general discussion about calculating rates is followed by a description of the prevalence data and some information on race/ethnicity.

Disease Definitions

In calculating a rate, to identify a cause of death (for mortality) or a type of hospital discharge (for morbidity), the International Classification of Diseases (ICD) Codes are used. Deaths are coded with ICD-10 Codes⁴ (i.e., ICD Codes from the 10th Revision), whereas hospital discharges (morbidity measures) are coded with ICD-9 Codes⁵ (i.e., ICD Codes from the 9th Revision). In this report, the following ICD Codes were used for the rate calculations:

Heart Disease:

Deaths: ICD-10 Codes I11 (hypertensive heart disease), I20 (angina pectoris), I21 (acute myocardial infarction), I22 (subsequent myocardial infarction), I23 (certain current complications following acute myocardial infarction), I24 (other acute ischemic heart diseases), I25 (chronic ischemic heart disease).

Discharges: ICD-9 Codes 402 (hypertensive heart disease), 410 (acute myocardial infarction), 411 (other acute and subacute forms of ischemic heart disease), 412 (old myocardial infarction), 413 (angina pectoris), 414 (other forms of chronic ischemic heart disease), 429.2 (cardiovascular disease, unspecified).

Stroke:

Deaths: ICD-10 Codes I60 (subarachnoid hemorrhage), I61 (intracerebral hemorrhage), I62 (other nontraumatic intracranial hemorrhage), I63 (cerebral infarction), I64 (stroke, not specified as hemorrhage or infarction), I65 (occlusion and stenosis of precerebral arteries, not resulting in cerebral infarction), I66 (occlusion and stenosis of cerebral arteries, not resulting in cerebral infarction), I67 (other cerebrovascular diseases), I68 (cerebrovascular disorders in diseases classified elsewhere), I69 (sequelae of cerebrovascular disease).

Discharges: ICD-9 Codes 430 (subarachnoid hemorrhage), 431 (intracerebral hemorrhage), 432 (other and unspecified intracranial hemorrhage), 433 (occlusion and stenosis of precerebral arteries), 434 (occlusion of cerebral arteries), 435 (transient cerebral ischemia), 436 (acute, but ill-defined, cerebrovascular disease), 437 (other and ill-defined cerebrovascular disease), 438 (late effects of cerebrovascular disease).



Heart Failure:

Deaths: ICD-10 Code I50 (heart failure).

Discharges: ICD-9 Code 428 (heart failure).

The codes listed above were not chosen arbitrarily; rather, the codes listed above (for each respective disease) represent the *Healthy People 2010* (HP2010) definitions⁶ for heart disease, stroke, and heart failure. Although other definitions for some of these same disease measures (e.g., heart disease) are available for use and will indeed yield different calculated rates, no “acceptable” definition—and, therefore, no calculated rate—is incorrect (provided the calculation is done properly). For example, when working with mortality data and using the National Center for Health Statistics (NCHS) definition⁷ (as opposed to the HP2010 definition) for heart disease, an additional 12,823 deaths are included as heart disease deaths, and the age-adjusted mortality rate increases by 24.4 percent (from 155.2 to 193.0 deaths per 100,000). This is due to the fact that the NCHS definition is broader than the HP2010 definition, as the NCHS definition includes acute rheumatic fever, chronic rheumatic heart disease, essential hypertension and other hypertensive diseases, pulmonary heart disease and diseases of pulmonary circulation, and other forms of heart disease, including pericarditis, endocarditis, myocarditis, and a number of valvular disorders (ICD-10 Codes I00–I09, I11, I13, I20–I51).

Mortality Data

The California mortality data were generated using the 2000 through 2004 California Death Statistical Master Files (DSMF),⁸ available from the California Center for Health Statistics. The most recent year from which data are available is 2004. Each DSMF is a collection of records for deaths occurring in California. The data included in this report come from California residents only. Descriptive information about each decedent, such as gender, race/ethnicity, and age, was obtained from the death record, along with the decedent’s underlying cause of death, based on the 10th Revision of the International Classification of Diseases (ICD-10). For this report, any death record with an underlying cause of death of heart disease (ICD-10 Codes I11, I20–I25), stroke (ICD-10 Codes I60–I69), or heart failure (ICD-10 Code I50) was used. All such records were aggregated into numerators for calculating mortality rates (along with population denominators described below). The United States (U.S.) mortality data presented in this report are derived from CDC WONDER, the Wide-ranging ONline Data for Epidemiologic Research menu-driven system⁹ from the Centers for Disease Control and Prevention. U.S. mortality data are presented for heart disease, stroke, and heart failure. In all cases, the ICD-10 Codes used in CDC WONDER match those used for the California-specific analyses.



Morbidity Data

The morbidity data were generated using the 2000 through 2004 California Patient Discharge Data Files (PDDF),¹⁰ available from the California Office of Statewide Health Planning and Development. The most recent year from which data are available is 2004. Each PDDF is a collection of hospital discharge records for inpatients discharged from all licensed acute care hospitals (i.e., general acute care hospitals, acute psychiatric hospitals, chemical dependency recovery hospitals, and psychiatric health facilities). Data included in this report come from California residents only. Descriptive information about each discharge (i.e., not each patient, as one individual may have multiple inpatient hospital discharges over the course of a year), such as gender, race/ethnicity, and age, was obtained from the discharge record, along with the patient's diagnosis or diagnoses (ICD-9) at the time of discharge. On a given discharge abstract, a patient may have up to 25 different diagnoses listed. For this report, discharge records containing any mention of heart disease (ICD-9 Codes 402, 410–414, and 429.2), stroke (ICD-9 Codes 430–438), or heart failure (ICD-9 Code 428) in the diagnoses listed were used. All such records were aggregated into numerators for calculating morbidity rates (along with population denominators described below), including by gender and race/ethnicity.

Population Data

Population data for 2000 through 2004 were obtained from the Demographic Research Unit of the California Department of Finance.¹¹ Each annual file presents population counts by age, gender, racial/ethnic group, and county of residence. For example, in 2004, in Alameda County, there were 775 white women who were 90 years old. Using these figures as denominators (along with mortality or morbidity numerators) allows for the calculation of annual mortality and morbidity rates. These rates were calculated overall and for each gender, racial/ethnic group, and county of residence.

Age Adjustment

Age adjustment is a statistical technique that allows for the comparison of the “risks” (here, mortality or morbidity rates) of two or more populations at one point in time or of one population at two or more points in time—independent of population-specific age differences.^{12–14} Age adjustment is necessary, as the underlying age structures of the populations being compared with respect to “risk” most likely differ. For example, if two county-level heart disease mortality rates (that are not age-adjusted) are being compared, and one county's residents are “young” and one county's residents are “old,” then the “old” county will appear to have an elevated risk of disease, based only on the older age distribution of that county's residents. To understand what actually might be conferring an



independent, elevated level of risk on one of these two counties, the effect of age must be removed from the comparison via age adjustment. Computationally, age-adjusted rates are generated via the Direct Method,¹⁵ by applying age-specific rates in a population of interest to a standardized age distribution (in this case, the U.S. Standard Million Population for the year 2000).¹⁶

A Discussion on Calculating Rates and Limitations of Data for American Indians

For the mortality and morbidity data, age-adjusted rates are presented overall, by gender, and by race/ethnicity. Rates are presented, rather than the counts (or numbers of events), as rates reflect what is occurring within the population. That is, a rate is defined as the number of events occurring within a defined population (i.e., the numerator), divided by the number of individuals within that population (i.e., the denominator)—then multiplied by a “standard” figure (e.g., 100,000), in order to be expressed in a way that is comparable across diseases and/or populations. To look only at the count—the numerator (e.g., the number of deaths)—can be very misleading. A numerator can be increasing significantly over time, but the rate can still be on the decline, if the population (i.e., the denominator) is growing more rapidly than the numerator is. For example, if 10 events occurred within a population of 8,000 in the year 1990 and 20 events (of the same kind) occurred within a

population of 20,000 in 2000, then if one looked only at the numerator (i.e., the number of events), one would conclude that the measure doubled in 10 years. However, when one rightfully considers the change in the population in which these events are occurring, then one would calculate that the rate for 1990 is 125 per 100,000 and the rate for 2000 is 100 per 100,000—which means that the rate has gone down. In fact, the rate has declined 20 percent. Of course, whenever data are presented, it is crucial to determine if one is viewing a simple count or a calculated rate.

Caution must be exercised when considering certain racial/ethnic data—that is, when a racial/ethnic-specific rate is presented. If population subgroups are small or underreported (e.g., underreported in the numerator—as in deaths), then the calculated rates may not be an accurate representation of the true rates of disease for that population. For example, there may be underreporting if an individual is unable to state her/his racial/ethnic group, and a medical provider must assign that individual to a particular group, based on her/his visual appearance or surname. This assignment by the medical provider can be impacted by a preconceived notion of disease rates within specific racial/ethnic populations and lead to an incorrect assignment—i.e., a case of underreporting.

Compared to the general population in the United States, the rates for heart disease and stroke mortality have been consistently reported as lower for American Indians and Alaska Natives, despite the

fact that this population has among the highest cardiovascular disease risk factor prevalences (e.g., smoking, diabetes, and obesity).^{17, 18} However, studies with American Indians, such as the Strong Heart Study, indicate that the rates of heart disease and stroke events are much higher than reported and may be even higher than those of the general population.¹⁹ The Indian Health Service (IHS) has assessed this inconsistency and has determined adjustment factors for 12 IHS regional areas.²⁰ Applying these methods to California data results in a rate of cardiovascular disease among Native Americans that is 30.4 percent higher than the rate calculated with unadjusted numbers.

No data in this report were adjusted for suspected misclassification or underreporting, however. Furthermore, certain population-specific rates that were markedly low, relative to the other groups, are not reported, although the overall measures do include all of the events.

In this report, some rates were determined to be statistically unreliable by calculating for each rate a relative standard error (RSE), defined as 100 times the quotient of the standard error and the rate.^{21, 22} Any rate with a corresponding RSE equal to or greater than 23 percent was considered statistically unreliable and marked as such.

Prevalence Data

All adult prevalence data (i.e., high cholesterol, high blood pressure, diabetes, cigarette smoking, overweight/obesity, and physical inactivity) presented in this report were generated using the Adult Survey (18+ years) of the California Health Interview Survey (CHIS).^{23, 24} Although data from other California surveys can be used to produce prevalences (e.g., the Behavioral Risk Factor Survey), only CHIS contains data on all elements of interest for this report; hence, CHIS was selected as the sole source for prevalence data. CHIS, begun in 2001 and conducted every two years, provides information on the health status of Californians and their ability to access health care services. CHIS is a telephone household survey using a two-stage geographically stratified Random Digit Dial sample design that produces statistically reliable data for 41 California counties or county groups. In 2001, over 55,000 households participated in CHIS, and in 2003, the number of participating households dropped slightly to about 42,000. The self-reported responses from these households are weighted statistically to reflect what would be found if the survey were administered to all California households (i.e., the population from which the sample was drawn). In other words, the prevalences generated from the data collected from sampled households are representative. Although a wide range of topics have been included over the different administrations of CHIS, for this report, the focus was on heart disease, stroke, heart failure, and related risk factors.





For each item of interest, a percent prevalence (i.e., the proportion of the population for whom a condition is true, expressed as a percentage) was calculated. For example, the calculated percent prevalence of heart disease (6.9 percent) indicates that in the California adult population, 7 in 100 individuals answered in the affirmative when asked if a physician had ever told them that they have heart disease. Prevalences were calculated overall and for each gender, racial/ethnic group, and county or county group of residence.

Race/Ethnicity

Data are presented here by race/ethnicity as per the constraints of the data sources used in the analyses. First, for the mortality rates, from 2000 through 2002, the following five racial/ethnic categories were used: African American, white, American Indian, Asian/Pacific Islander, and Hispanic. Starting with the 2003 rates, Asians were separated from (Other) Pacific Islanders, who were merged with Native Hawaiians to form NHOPI (i.e., Native Hawaiian and Other Pacific Islander). These reporting changes were necessary to have year-specific congruence between the 2003 and 2004 mortality numerators and the corresponding population denominators.

For morbidity rates, for all years, 2000 through 2004, the same five racial/ethnic categories were used: African American, white, American Indian, Asian/Pacific Islander, and Hispanic; however, the 2004 racial/ethnic morbidity rates were estimated using Ordinary Least Squares Regression (described below), as there is incongruence between the 2004 morbidity numerators and the corresponding population denominators, with respect to the racial/ethnic identifiers.

For the prevalence data, the following six racial/ethnic categories were used: Hispanic (called Latino in the CHIS but changed for consistency in this report); American Indian/Alaska Native (AIAN); Asian; African American; white; and Other Single or Multiple Race. These racial/ethnic designations were established by the Center for Health Policy Research at the University of California, Los Angeles.^{23, 24}

Ordinary Least Squares Regression Method for Determining Estimates

The Ordinary Least Squares Regression (OLSR) Method²⁵ was used to determine the racial/ethnic morbidity rates for the year 2004, as there is incongruence between the 2004 morbidity numerators and the corresponding population denominators, with respect to the racial/ethnic identifiers. OLSR was performed as follows: First, for each racial/ethnic group, the 2000 through 2004 disease-specific data points were plotted on a scatter plot to determine the statistical relationship between the amount of change in the measure of interest and the time elapsed. Next, this type of statistical relationship, for a given racial/ethnic group and disease,

was described by a line that would best fit the data points on the scatter plot; this line was then defined by an equation in the form of $y = a + bx$, where y is the future outcome data point of interest, a is the y -intercept, b is the slope of the line, and x is the elapsed time. Finally, the racial/ethnic-specific estimates were determined by using this equation and setting x to determine y for the year 2004. Essentially, what this method does is answer the question: “Given the prevailing trend in the data over the study period, what can be expected for this measure for the year 2004, holding all things constant?” The answer to that question comes in the form of a racial/ethnic- and disease-specific morbidity rate estimate for 2004.





Disease Results



HEART DISEASE

Heart Disease Prevalence

To ascertain prevalence, often used as the extent to which the population of interest directly experiences the disease or condition, adult respondents to the 2003 CHIS were asked the following question about heart disease:

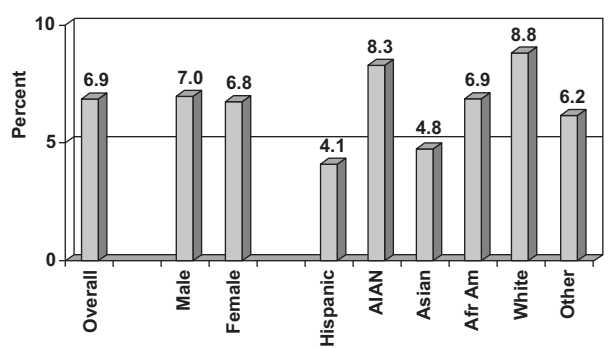
“Has a doctor ever told you that you have any kind of heart disease?”

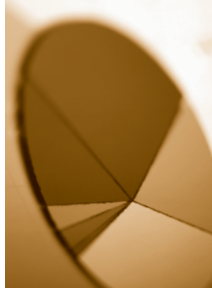
Almost seven percent (6.9 percent) of adults (7.0 percent of men and 6.8 percent of women) indicated that they had been given a heart disease diagnosis by a physician (Figure 1). By race/ethnicity, the heart disease prevalences vary: white, 8.8 percent; American Indian/Alaska Native (AIAN), 8.3 percent; African American, 6.9 percent; “Other” Single/Multiple Race, 6.2 percent; Asian, 4.8 percent; and Hispanic, 4.1 percent.

With respect to age, education, and income, the prevalences of heart disease vary, especially among the different age groups (Figure 2). First, individuals 80 years of age and older reported the highest prevalence (29.4 percent), followed by individuals 65 through 79 years (22.4 percent), individuals

40 through 64 years, (6.4 percent) and individuals 18 through 39 years (1.5 percent). Heart disease is associated with increasing age, as the oldest group has a prevalence that is nearly twenty times greater than that of the youngest group. Second, a clear dose-response relationship exists between educational attainment and heart disease prevalence. With higher educational attainment, the prevalences are lower: 9.2 percent for individuals with no formal education; 7.4 percent for individuals with a high school diploma; and 6.4 percent for individuals with some post-secondary education.

Figure 1 Prevalence of Heart Disease in California Adults (2003): Overall, Gender, and Race/Ethnicity



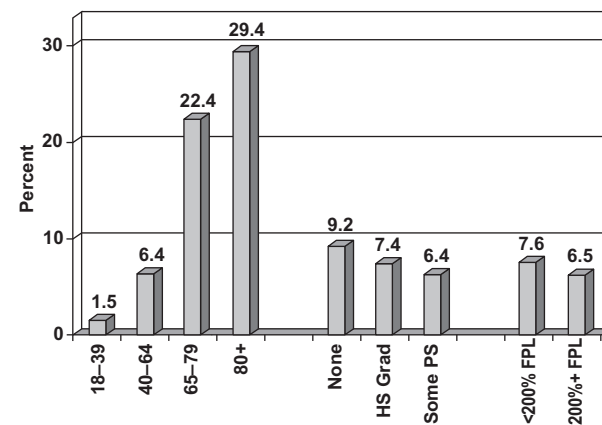


HEART DISEASE

Finally, in terms of income, there is a slight difference in heart disease prevalence between the two groups: 7.6 percent for those whose income is less than 200 percent of the federal poverty level (FPL) and 6.5 percent for those whose income is greater than or equal to 200 percent of the FPL.

Prevalences for heart disease by county (or county group) are in Appendix B.

Figure 2 Prevalence of Heart Disease in California Adults (2003): Age, Education, and Income



At a Glance— Heart Disease Mortality

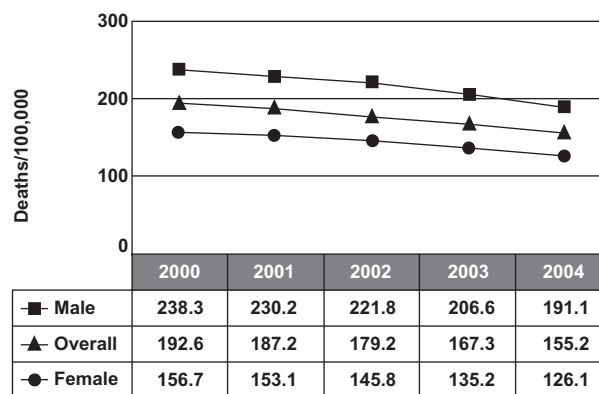
- Condition: Diseases of the Heart
- ICD-10 Codes: I11, I20–I25
- Measure: Mortality Rate
- Type of Data: Trends, 2000–2004
- Stratification: Gender, Race/ethnicity

For Diseases of the Heart [ICD-10 Codes I11 (hypertensive heart disease) and I20–I25 (ischemic heart disease)], the age-adjusted mortality rate has been declining (Figure 3). Overall, for the years 2000 through 2004, the mortality rate has declined 19.4 percent, from 192.6 deaths per 100,000 population to 155.2 deaths per 100,000 population.

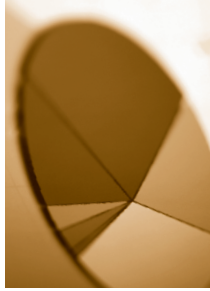
Both genders have experienced declines in heart disease mortality. For men, whose rates are about 50 percent higher than those of women, the decline from 2000 through 2004 is 19.8 percent (from 238.3 per 100,000 to 191.1 per 100,000); for women, the decline is about the same: 19.5 percent (from 156.7 per 100,000 to 126.1 per 100,000).

The mortality rates shown in Figure 3, which include more than 50,000 deaths per year (i.e., about one in five deaths), are calculated using mortality data from the 2000 through 2004 California DSMFs and population data from the California Department of Finance. Rates are age-adjusted to the U.S. Standard Million Population using the Direct Method. County-level data are presented both in a map that follows (Figure 6) and in Appendix B.

Figure 3 Age-Adjusted Heart Disease Mortality in California, Overall and by Gender (2000–2004)



HEART DISEASE



HEART DISEASE

Heart Disease Mortality by Race/Ethnicity

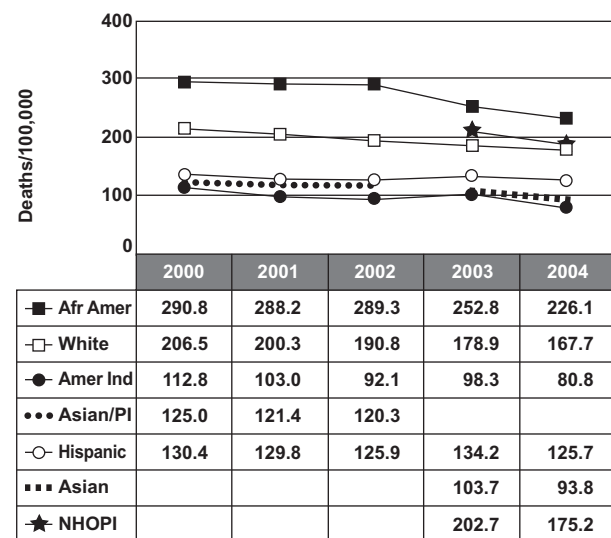
With respect to race/ethnicity, all population groups experienced declines in heart disease mortality from 2000 through 2004 (Figure 4). The declines for American Indians and African Americans were the greatest, at 28.4 percent and 22.2 percent, respectively. For Hispanics, the mortality rate stayed relatively stable, with just a 3.6 percent decline over the period of interest.

Although the decline for African Americans was relatively great, this group, nonetheless, continues to have mortality rates that are considerably higher than those of the other racial/ethnic groups. In contrast, American Indians and Asian/Pacific Islanders (and Asians, starting in 2003) experienced relatively low burdens of heart disease mortality; in fact, across all years, the rates for these two groups were less than half those of African Americans.

Although African Americans have the highest age-adjusted mortality rates, as shown in Figure 4, in terms of actual numbers of deaths, whites account for about three-fourths of all heart disease deaths in California (38,258 of 52,177 or 73.3 percent in 2004).

In Figure 4, the age-adjusted heart disease mortality rates are presented for the racial/ethnic data available from both the 2000 through 2004 California DSMFs and the population data from the California Department of Finance. Starting with the 2003 data files, Asians were separated from (Other) Pacific Islanders, who are merged with Native Hawaiians to form NHOPI.

Figure 4 Age-Adjusted Heart Disease Mortality in California, by Race/Ethnicity (2000–2004)

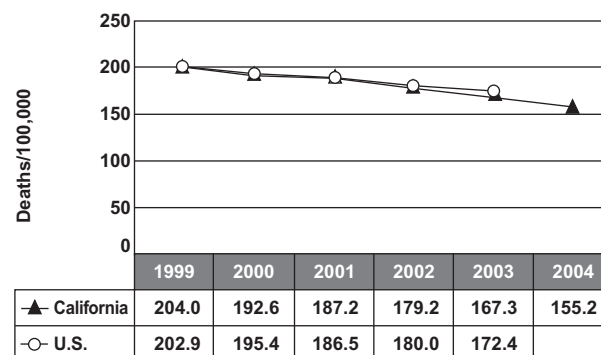


Heart Disease Mortality: California and the United States

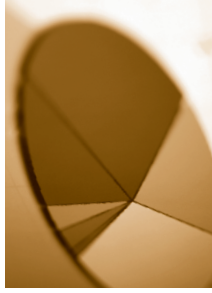
Figure 5 presents heart disease mortality rates for both California (1999 through 2004) and the U.S. (1999 through 2003). These data indicate that California's heart disease mortality rates are not appreciably different than those of the U.S. In 1999, California's rate (204.0 deaths per 100,000 population) was slightly higher than that of the U.S. (202.9 deaths per 100,000 population).

By 2003, California's rate was slightly lower (167.3 deaths per 100,000 population for California versus 172.4 deaths per 100,000 population for the U.S.). Consequently, the state and national declines in heart disease mortality from 1999 through 2003 are similar: California, 18.0 percent; U.S., 15.0 percent.

Figure 5 Age-Adjusted Heart Disease Mortality in California (1999–2004); U.S. (1999–2003)

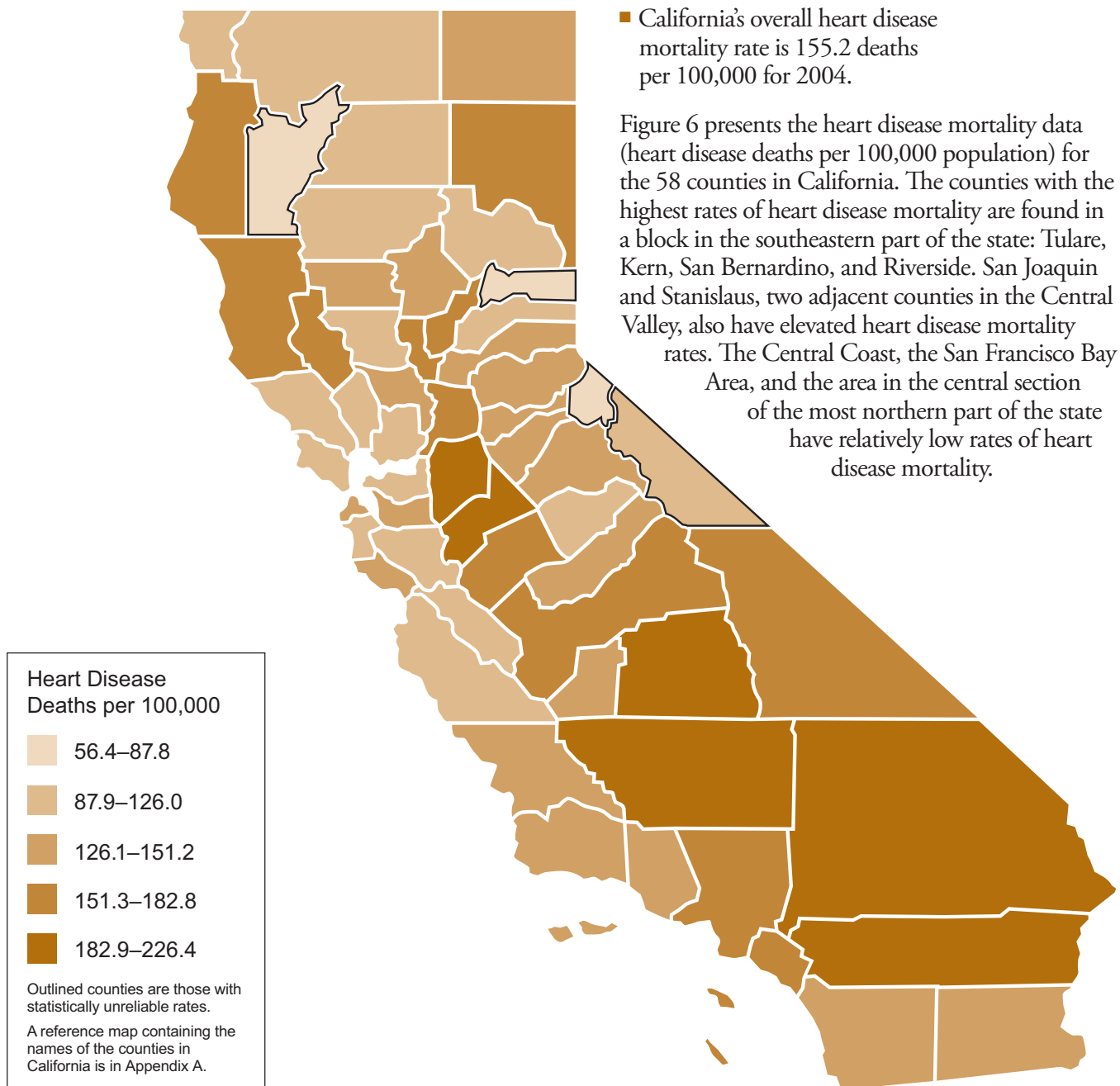


HEART DISEASE



HEART DISEASE

Figure 6
Age-Adjusted Heart Disease Mortality
by County, California (2004)



At a Glance— Heart Disease Morbidity

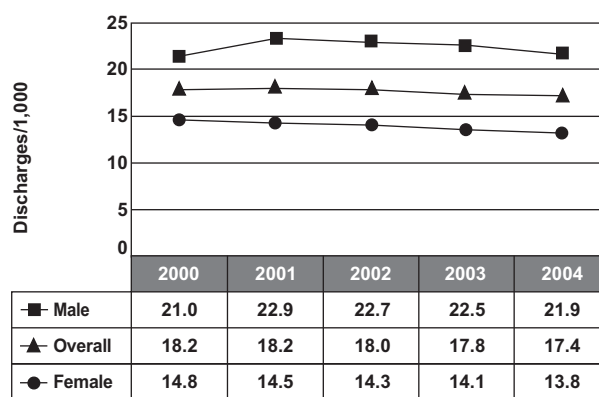
- Condition: Diseases of the Heart
- ICD-9 Codes: 402, 410–414, 429.2
- Measure: Morbidity Rate
(as measured by hospital discharges)
- Stratification: Gender, Race/ethnicity

For Diseases of the Heart [ICD-9 Codes 402 (hypertensive heart disease), 410–414 (ischemic heart disease), and 429.2 (cardiovascular disease, unspecified)], the age-adjusted morbidity rate has declined slightly (Figure 7). Overall, from 2000 through 2004, the morbidity rate has declined 4.4 percent, from 18.2 discharges per 1,000 population to 17.4 discharges per 1,000 population.

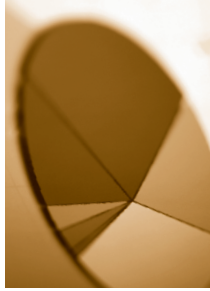
Although women have experienced a decline in heart disease morbidity (6.8 percent, from 14.8 per 1,000 to 13.8 per 1,000), men have not. For men, whose rates are about 40 to 50 percent higher than those of women, there is an increase in morbidity of 4.3 percent, from 21.0 per 1,000 in the year 2000 to 21.9 per 1,000 in the year 2004.

The morbidity rates shown in Figure 7, which include about 575,000 discharges per year (i.e., about one in seven discharges), are calculated using hospitalization data from the 2000 through 2004 California PDDFs and population data from the California Department of Finance. Rates are age-adjusted to the U.S. Standard Million Population using the Direct Method. County-level data are presented both in a map that follows (Figure 9) and in Appendix B.

Figure 7 Age-Adjusted Heart Disease Morbidity in California, Overall and by Gender (2000–2004)



HEART DISEASE



HEART DISEASE

Heart Disease Morbidity by Race/Ethnicity

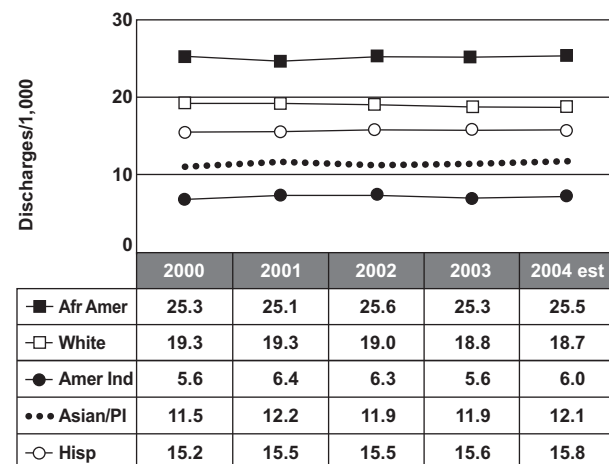
With respect to race/ethnicity, heart disease morbidity has remained relatively stable across all racial/ethnic groups (Figure 8). Overall, only whites experienced a decline (3.1 percent), from 19.3 discharges per 1,000 population in 2000 to 18.7 discharges per 1,000 population in the year 2004.

The increases for the other racial/ethnic groups are as follows: African Americans (0.8 percent); American Indians (7.1 percent); Asian/Pacific Islanders (5.2 percent); and Hispanics (3.9 percent). Although the greatest increase was experienced by American Indians, this group has the lowest morbidity rates across the years of interest, less than one-fourth of those of African Americans, whose rates are the highest.

In terms of actual numbers of heart-disease-related hospital discharges in California, whites account for about three-fourths of the total (408,205 of 577,553 or 70.7 percent in 2003).

In Figure 8, the actual age-adjusted heart disease morbidity rates are presented for the racial/ethnic data available from both the 2000 through 2003 California PDDFs and the population data from the California Department of Finance. In 2004, the racial/ethnic discharge data and the racial/ethnic population data are incompatible, and actual rates cannot be calculated. For 2004, therefore, hospital discharge (i.e., morbidity) rates were estimated statistically, based upon the prevailing racial/ethnic trends from the previous four years.

Figure 8 Age-Adjusted Heart Disease Morbidity in California, by Race/Ethnicity (2000–2003 and estimates for 2004)

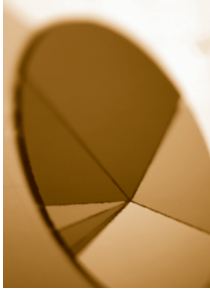




HEART DISEASE

Figure 9
Age-Adjusted Heart Disease Morbidity
by County, California (2004)





STROKE

Stroke Prevalence

Adults aged 65 years and older who responded to 2003 CHIS were asked the following question about stroke:

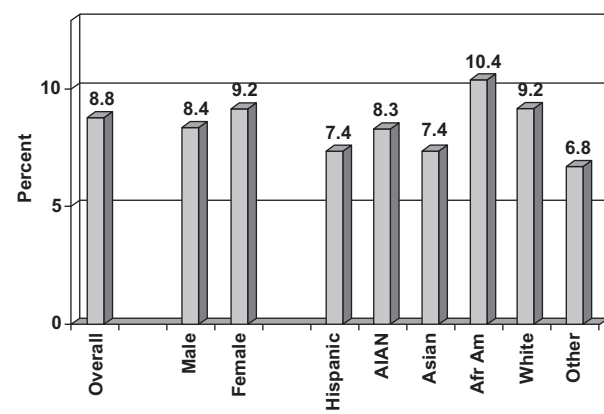
“Has a doctor ever told you that you had a stroke?”

As shown below in Figure 10, almost nine percent (8.8 percent) of adults 65 years and older (8.4 percent of men and 9.2 percent of women) indicated that they had been given a stroke diagnosis by a physician. By race/ethnicity, the stroke prevalences vary, with African Americans having the highest prevalence, 10.4 percent, followed by whites, 9.2 percent; American Indian/Alaska Natives (AIAN), 8.3 percent; Hispanics and Asians, both 7.4 percent; and those of “Other” Single/Multiple Race, 6.8 percent.

With respect to age, education, and income, there is some variation in the prevalences of stroke (Figure 11). First, individuals 80 years of age and older reported a higher prevalence of having been given a stroke diagnosis by a physician than individuals 65 through 79 years of age (12.7 percent, versus

7.4 percent). These data indicate that stroke is associated with increasing age, as the older group of seniors has a prevalence that is 72 percent greater than that of the younger group of seniors. Second, the results for educational attainment and stroke are mixed. Of those with no formal education, 4.3 percent reported having a stroke diagnosis (though, statistically, this estimate is considered unreliable). Of the remaining two educational groups, the higher the educational attainment, the lower the prevalence: 10.4 percent for individuals with a high school diploma and 7.6 percent for individuals with some post-secondary education.

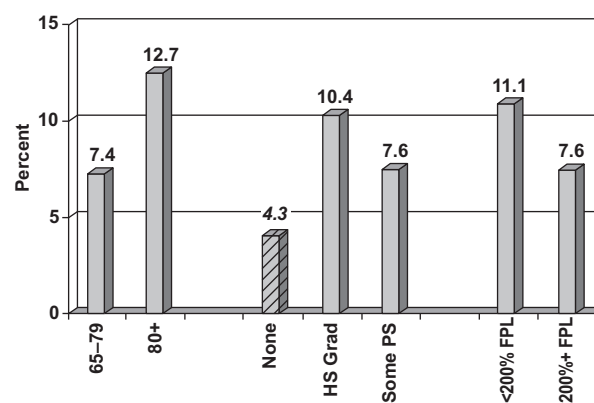
Figure 10 Prevalence of Stroke in California Adults, 65+ (2003): Overall, Gender, and Race/Ethnicity



Finally, in terms of income, there was a higher prevalence of stroke (11.1 percent) for those whose income is less than 200 percent of the FPL, relative to that of those whose income is greater than or equal to 200 percent of the FPL (7.6 percent). In brief, those with lower incomes experience the burden of stroke to a greater extent than do their wealthier counterparts.

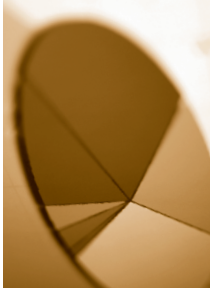
Prevalences for stroke by county (or county group) are presented in Appendix B.

Figure 11 Prevalence of Stroke in California Adults, 65+ (2003): Age, Education, and Income



Note: Cross-hatching indicates statistical unreliability.

STROKE



STROKE

At a Glance— Stroke Mortality

- Condition: Stroke
- ICD-10 Codes: I60–I69
- Measure: Mortality Rate
- Type of Data: Trends, 2000–2004
- Stratification: Gender, Race/ethnicity

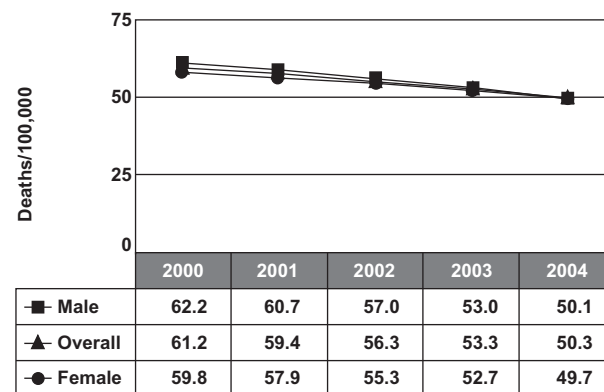
As was the case for Diseases of the Heart, for Stroke [ICD-10 Codes I60–I69 (cerebrovascular diseases)], the age-adjusted mortality rate has been on the decline (Figure 12).

Overall, from 2000 through 2004, the mortality rate has declined 17.8 percent, from 61.2 deaths per 100,000 population to 50.3 deaths per 100,000 population.

Both genders have experienced declines in stroke mortality. For men, whose rates are only slightly higher than those of women, the decline from 2000 through 2004 is 19.5 percent (from 62.2 per 100,000 to 50.1 per 100,000); for women, the decline is slightly less: 16.9 percent (from 59.8 per 100,000 to 49.7 per 100,000).

The mortality rates shown in Figure 12, which include about 17,000 deaths per year (i.e., about 1 in 14 deaths), are calculated using mortality data from the 2000 through 2004 California DSMFs and population data from the California Department of Finance. Rates are age-adjusted to the U.S. Standard Million Population using the Direct Method. County-level data are presented both in a map that follows (Figure 15) and in Appendix B.

Figure 12 Age-Adjusted Stroke Mortality in California, Overall and by Gender (2000–2004)



Stroke Mortality by Race/Ethnicity

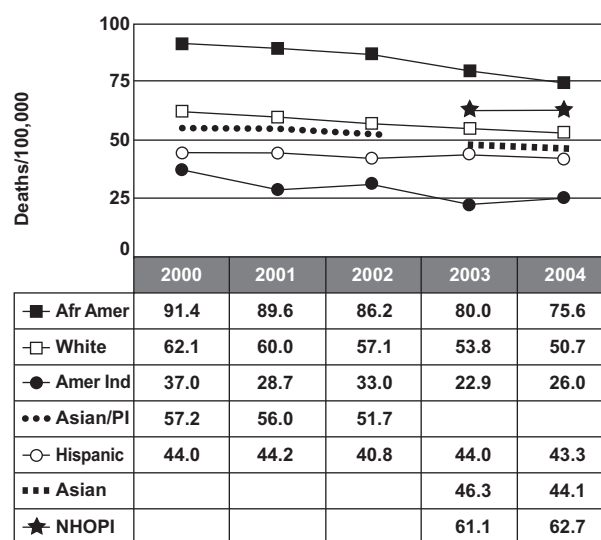
With respect to race/ethnicity, all population groups experienced declines in stroke mortality from 2000 through 2004 (Figure 13). The declines for American Indians and whites are the greatest, at 29.7 percent and 18.4 percent, respectively. For Hispanics, the stroke mortality rate stayed relatively stable, with just a 1.6 percent decline over the period of interest.

Although the decline for African Americans (17.3 percent) was close to that of whites, (18.4 percent), African Americans experience mortality rates that are considerably higher than those of the other racial/ethnic groups, although the disparities appear to be narrowing. American Indians and Hispanics experienced relatively low burdens of stroke mortality; in fact, across all years, the rates for these two groups were less than half those of African Americans.

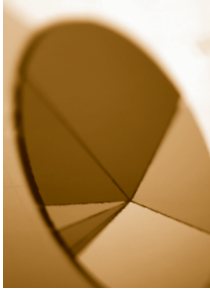
Although African Americans have the highest age-adjusted mortality rates, as shown in Figure 13, in terms of actual numbers of stroke deaths in California, about seven of ten decedents (11,722 of 16,883 or 69.4 percent in 2004) are white.

In Figure 13, the age-adjusted stroke mortality rates are presented for the racial/ethnic data available from both the 2000 through 2004 California DSMFs and the population data from the California Department of Finance. Starting with the 2003 data files, Asians were separated from (Other) Pacific Islanders, who are merged with Native Hawaiians to form NHOPI.

Figure 13 Age-Adjusted Stroke Mortality in California, by Race/Ethnicity (2000–2004)



STROKE



STROKE

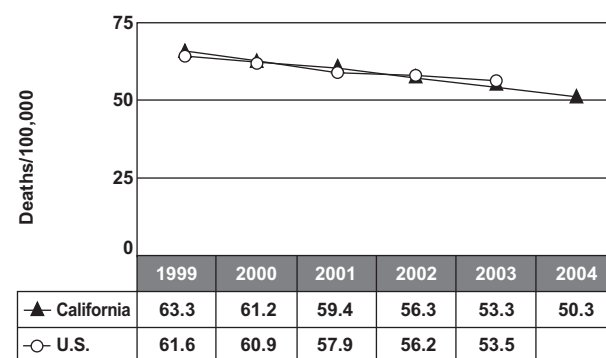
Stroke Mortality: California and the United States

Figure 14 presents stroke mortality rates for both California (1999 through 2004) and the U.S. (1999 through 2003).

These data indicate that, as was the case for heart disease mortality, California's stroke mortality rates are not appreciably different than those of the U.S. In 1999, California's rate (63.3 deaths per 100,000

population) was slightly higher than that of the U.S. (61.6 deaths per 100,000 population). By 2003, California's rate was slightly lower (53.3 deaths per 100,000 population for California versus 53.5 deaths per 100,000 population for the U.S.). Consequently, the state and national declines in stroke mortality from 1999 through 2003 are similar: California, 15.8 percent; U.S., 13.1 percent.

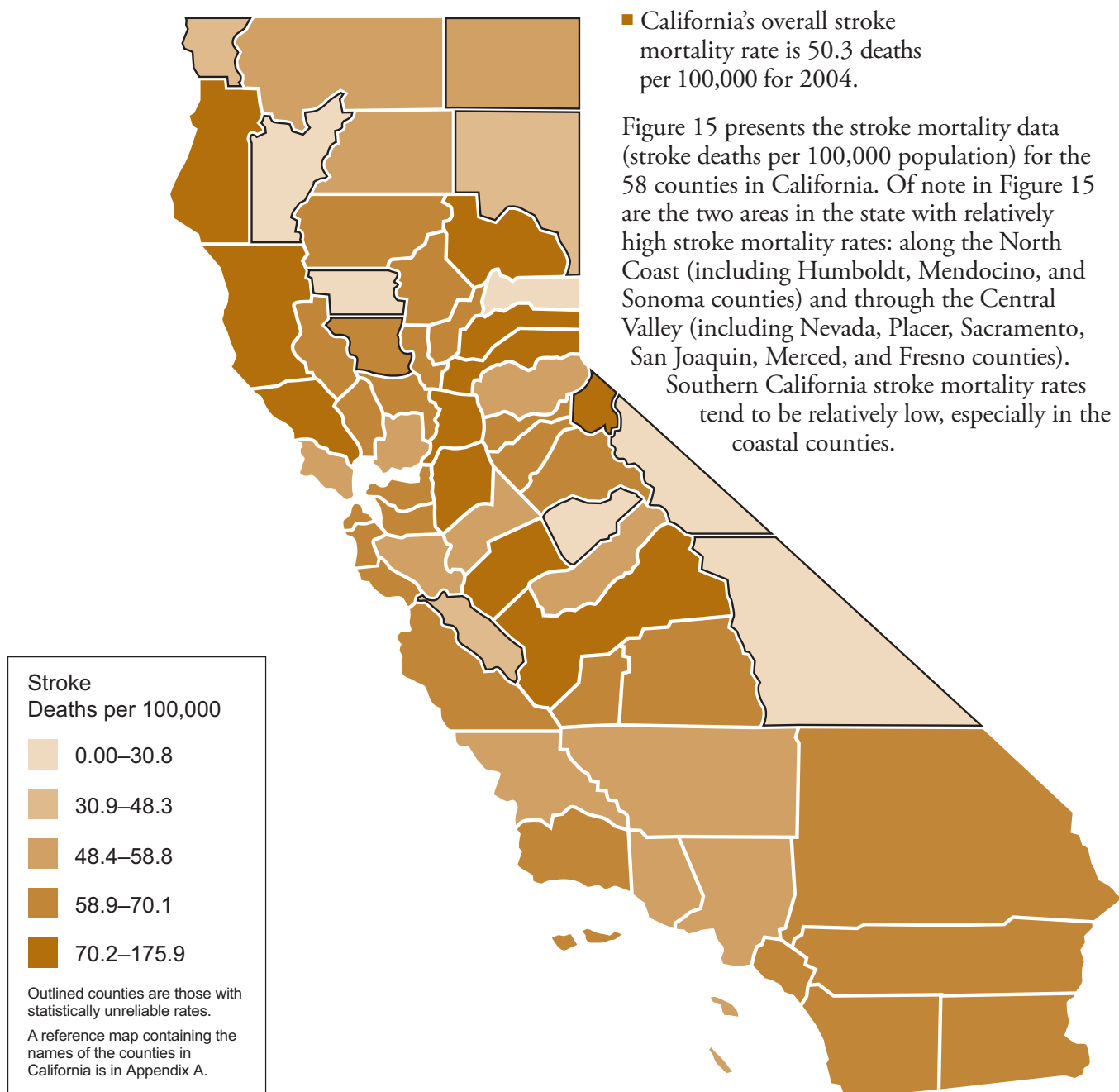
Figure 14 Age-Adjusted Stroke Mortality in California (1999–2004); U.S. (1999–2003)

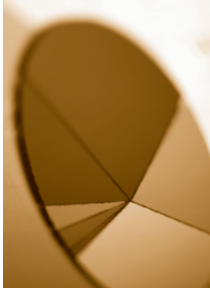




STROKE

Figure 15
Age-Adjusted Stroke Mortality
by County, California (2004)





STROKE

At a Glance— Stroke Morbidity

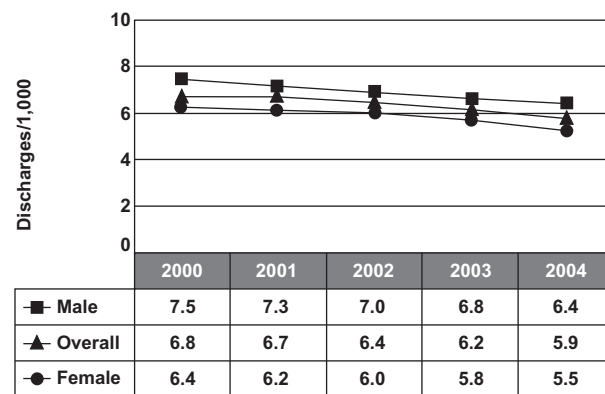
- Condition: Stroke
- ICD-9 Codes: 430–438
- Measure: Morbidity Rate
(as measured by hospital discharges)
- Type of Data: Trends, 2000–2004
- Stratification: Gender, Race/ethnicity

For Stroke [ICD-9 Codes 430–438 (cerebrovascular disease)], the age-adjusted morbidity rate has been on the decline (Figure 16). Overall, from 2000 through 2004, the morbidity rate has declined 13.2 percent, from 6.8 discharges per 1,000 population to 5.9 discharges per 1,000 population.

Both men and women have experienced declines in stroke morbidity. For women, this decline is 14.1 percent, from 6.4 discharges per 1,000 in the year 2000 to 5.5 discharges per 1,000 in the year 2004. For men, whose rates are slightly higher than those of women, there was a decrease in morbidity of 14.7 percent, from 7.5 discharges per 1,000 in the year 2000 to 6.4 discharges per 1,000 in the year 2004.

The morbidity rates shown in Figure 16, which include about 197,000 discharges per year (i.e., about 1 in 20 discharges), are calculated using hospitalization data from the 2000 through 2004 California PDDFs and population data from the California Department of Finance. Rates are age-adjusted to the U.S. Standard Million Population using the Direct Method. County-level data are presented both in a map that follows (Figure 18) and in Appendix B.

Figure 16 Age-Adjusted Stroke Morbidity in California, Overall and by Gender (2000–2004)



Stroke Morbidity by Race/Ethnicity

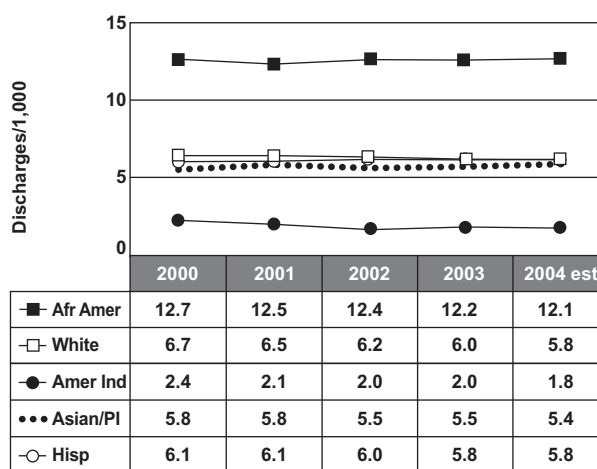
With respect to race/ethnicity, stroke morbidity has been on a slight decline across the racial/ethnic groups, with only two groups, American Indians and whites, experiencing moderate relative declines from 2000 through 2004 (Figure 17). Respectively, the declines for American Indians and whites are as follows: 25.0 percent, from 2.4 discharges per 1,000 population to 1.8 discharges per 1,000 population and 13.4 percent, from 6.7 discharges per 1,000 population to 5.8 discharges per 1,000 population.

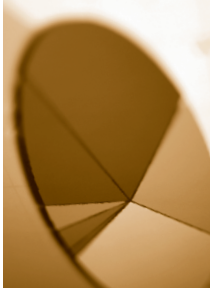
The modest declines for the other racial/ethnic groups are as follows: African Americans, 4.7 percent; Asian/Pacific Islanders, 6.9 percent; and Hispanics, 4.9 percent. Although the greatest decline in stroke-related morbidity was experienced by American Indians, this group has the lowest morbidity rates across the years of interest, less than one-fifth of those of African Americans, whose rates are the highest.

In terms of actual numbers of stroke-related hospital discharges in California, whites account for about two-thirds of the total (129,911 of 201,328 or 64.5 percent in 2003).

In Figure 17, the actual age-adjusted stroke disease morbidity rates are presented for the racial/ethnic data available from both the 2000 through 2003 California PDDFs and the population data from the California Department of Finance. In 2004, the racial/ethnic discharge data and the racial/ethnic population data are incompatible, and actual rates cannot be calculated. For 2004, therefore, hospital discharge (i.e., morbidity) rates were estimated statistically, based on the prevailing racial/ethnic trends from the previous four years.

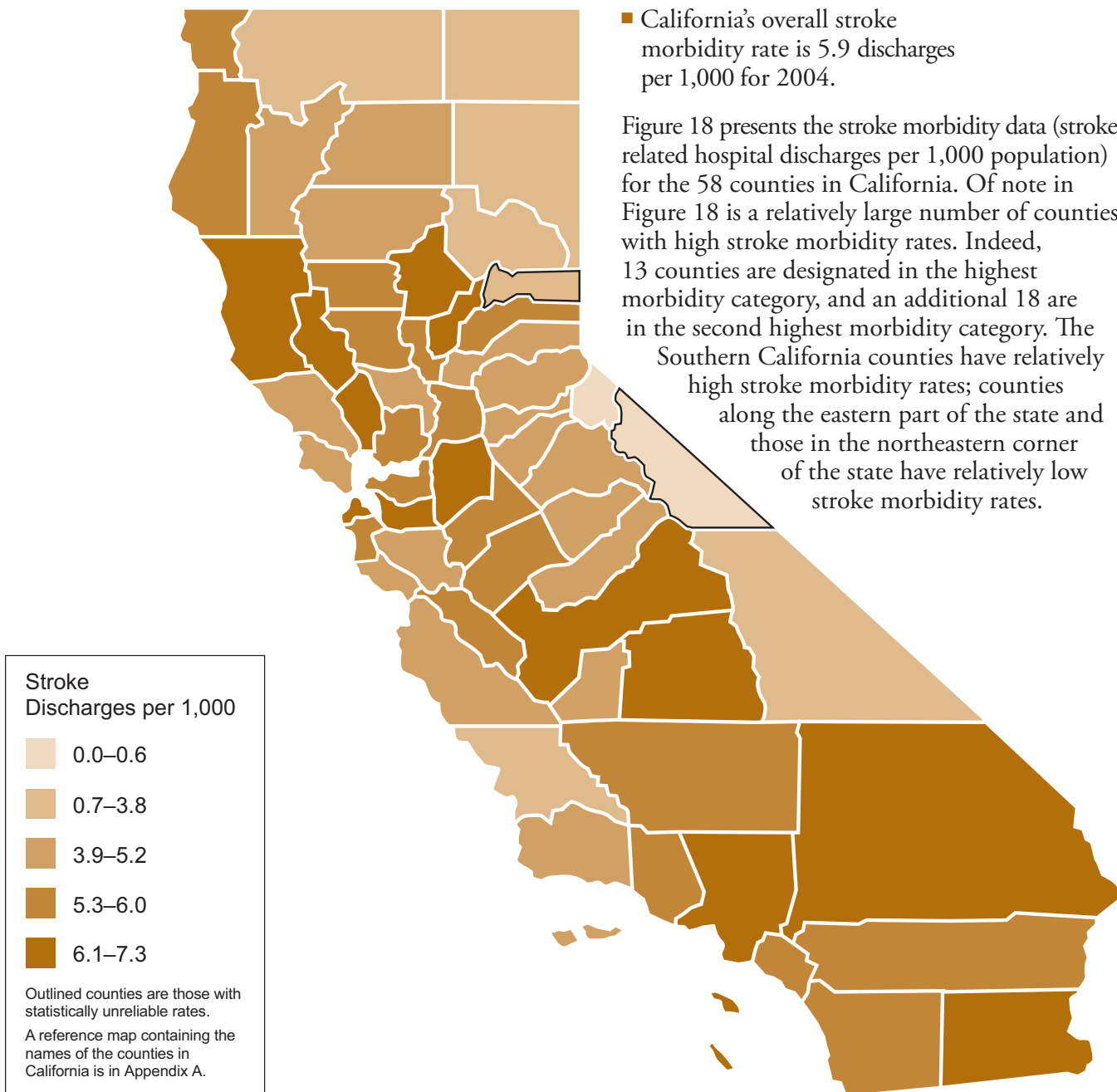
Figure 17 Age-Adjusted Stroke Morbidity in California, by Race/Ethnicity (2000–2003 and estimates for 2004)

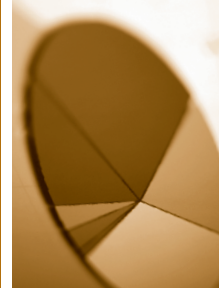




STROKE

Figure 18
Age-Adjusted Stroke Morbidity
by County, California (2004)





HEART FAILURE

Heart Failure Prevalence

Starting with the 2005 administration of CHIS, a question that elicits heart failure prevalence was included; however, those data were not available during the development of this report.

At a Glance— Heart Failure Mortality

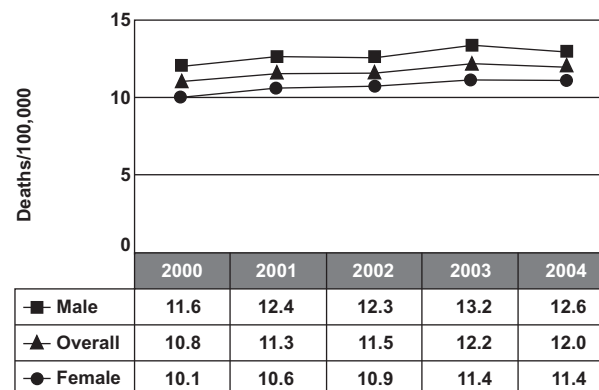
- Condition: Heart Failure
- ICD-10 Code: I50
- Measure: Mortality Rate
- Type of Data: Trends, 2000–2004
- Stratification: Gender, Race/ethnicity

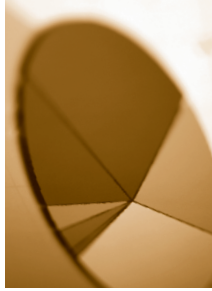
For Heart Failure (ICD-10 Code I50), the age-adjusted mortality rate has been increasing (Figure 19). Overall, from 2000 through 2004, the mortality rate increased 11.1 percent, from 10.8 deaths per 100,000 population to 12.0 deaths per 100,000 population.

Both genders have experienced increases in heart failure mortality. For men, whose rates are slightly higher than those of women, the increase from 2000 through 2004 is 8.6 percent (from 11.6 per 100,000 to 12.6 per 100,000); for women, the increase is 50 percent higher: 12.9 percent (from 10.1 per 100,000 to 11.4 per 100,000).

The mortality rates shown in Figure 19, which include more than 4,000 deaths per year, are calculated using mortality data from the 2000 through 2004 California DSMFs and population data from the California Department of Finance. Rates are age-adjusted to the U.S. Standard Million Population using the Direct Method. County-level data are presented both in a map that follows (Figure 22) and in Appendix B.

Figure 19 Age-Adjusted Heart Failure Mortality in California, Overall and by Gender (2000–2004)





HEART FAILURE

Heart Failure Mortality by Race/Ethnicity

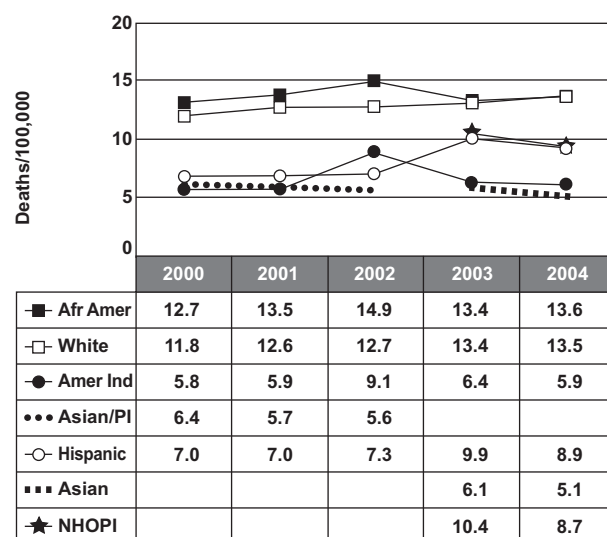
With respect to race/ethnicity, most of the population groups experienced increases in heart failure mortality from the year 2000 through the year 2004 (Figure 20). The increases for Hispanics and whites were the greatest, at 27.1 percent and 14.4 percent, respectively. For African Americans, the increase was modest (7.1 percent), and for American Indians, the mortality rate stayed relatively stable, with just a 1.7 percent increase over the period of interest.

Although most of the population groups experienced increases in heart failure mortality, for African Americans and whites, the mortality rates have consistently been noticeably higher than those of the other racial/ethnic groups. In contrast, American Indians and Asian/Pacific Islanders (and Asians, starting in 2003) experienced relatively low burdens of heart failure mortality; in fact, across all years, the rates for these two groups were roughly half those of African Americans.

Although African Americans have experienced the highest age-adjusted mortality rates over the years of interest, as shown in Figure 20, in terms of actual numbers of heart failure deaths in California, about four of five decedents (3,198 of 4,039 or 79.2 percent in 2004) are white.

In Figure 20, the age-adjusted heart failure mortality rates are presented for the racial/ethnic data available from both the 2000 through 2004 California DSMFs and the population data from the California Department of Finance. Starting with the 2003 data files, Asians were separated from (Other) Pacific Islanders, who are merged with Native Hawaiians to form NHOPI.

Figure 20 Age-Adjusted Heart Failure Mortality in California, by Race/Ethnicity (2000–2004)

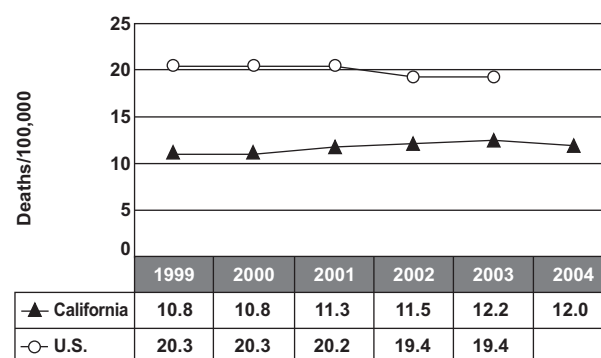


Heart Failure Mortality: California and the United States

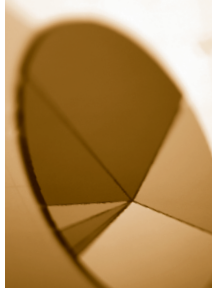
Figure 21 presents heart failure mortality rates for both California (1999 through 2004) and the U.S. (1999 through 2003). These data indicate that, unlike the findings for heart disease mortality and stroke mortality, there is a noteworthy difference between California's heart failure mortality rates and those of the U.S. In 1999, California's rate (10.8 deaths per 100,000

population) was about half that of the U.S. (20.3 deaths per 100,000 population). By 2003, California's rate had risen slightly, while the rate for the U.S. had dropped somewhat (12.2 deaths per 100,000 population for California versus 19.4 deaths per 100,000 population for the U.S.). The state and national changes in heart failure mortality from 1999 through 2003 are as follows: California, 13.0 percent increase; U.S., 4.4 percent decrease.

Figure 21 Age-Adjusted Heart Failure Mortality in California (1999–2004); U.S. (1999–2003)

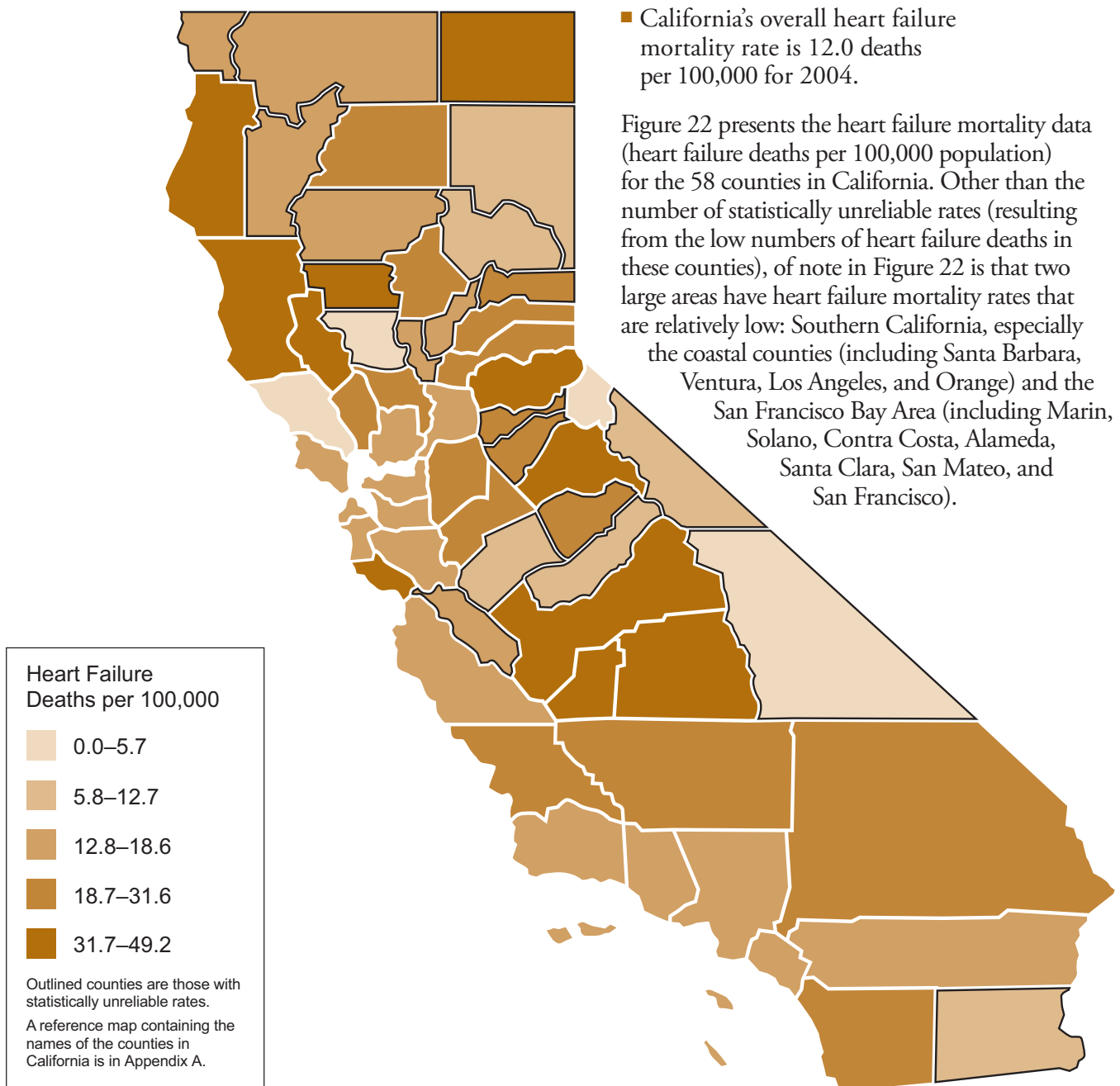


HEART FAILURE



HEART FAILURE

Figure 22
Age-Adjusted Heart Failure Mortality
by County, California (2004)



At a Glance— Heart Failure Morbidity

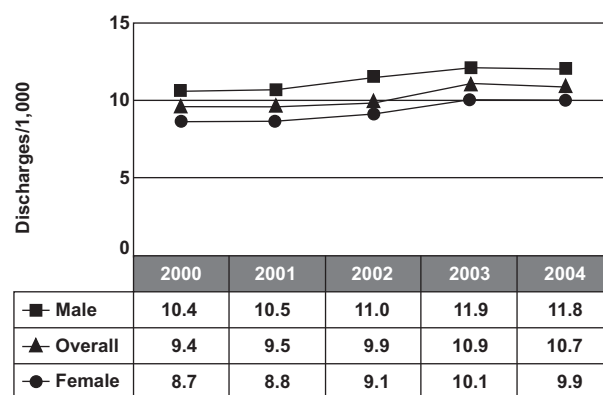
- Condition: Heart Failure
- ICD-9 Code: 428
- Measure: Morbidity Rate
(as measured by hospital discharges)
- Type of Data: Trends, 2000–2004
- Stratification: Gender, Race/ethnicity

For Heart Failure (ICD-9 Code 428), the age-adjusted morbidity rate has been on the rise (Figure 23). Overall, from 2000 through 2004, the morbidity rate has increased 13.8 percent, from 9.4 discharges per 1,000 population to 10.7 discharges per 1,000 population.

Both men and women have experienced increases in heart failure morbidity. For women, this increase is 13.8 percent, from 8.7 discharges per 1,000 in the year 2000 to 9.9 discharges per 1,000 in the year 2004. For men, whose rates are slightly higher than those of women, there is an increase in morbidity of 13.5 percent, from 10.4 discharges per 1,000 in the year 2000 to 11.8 discharges per 1,000 in the year 2004.

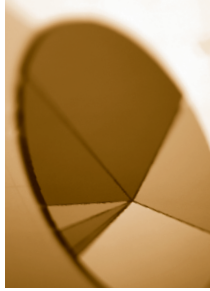
The morbidity rates shown in Figure 23, which include nearly 360,000 discharges per year (i.e., about one in eleven discharges), are calculated using hospitalization data from the 2000 through 2004 California PDDFs and population data from the California Department of Finance. Rates are age-adjusted to the U.S. Standard Million Population using the Direct Method. County-level data are presented both in a map that follows (Figure 25) and in Appendix B.

Figure 23 Age-Adjusted Heart Failure Morbidity in California, Overall and by Gender (2000–2004)



Heart failure morbidity data are also often reported using age-specific rates. These data are presented in Appendix C.

HEART FAILURE



HEART FAILURE

Heart Failure Morbidity by Race/Ethnicity

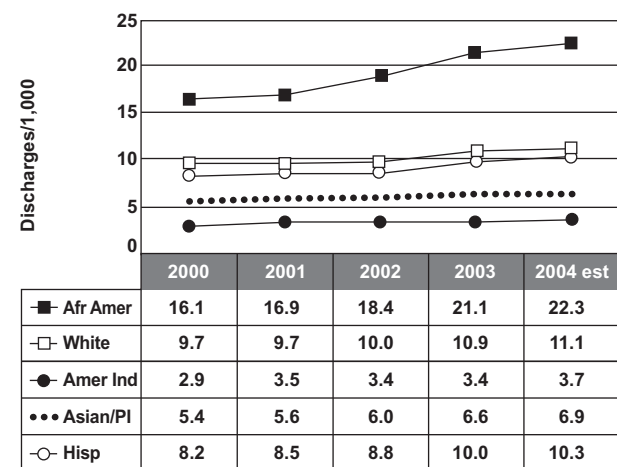
With respect to race/ethnicity, heart failure morbidity has been on the rise across the racial/ethnic groups, with all groups experiencing large relative increases from the year 2000 through the year 2004 (Figure 24). The largest increase is for African Americans: 38.5 percent, from 16.1 discharges per 1,000 population to 22.3 discharges per 1,000 population. This notably large increase for African Americans, whose heart failure mortality rates consistently have been noticeably higher than those of the other racial/ethnic groups, causes the existing disparities to become greater over time.

The increases in heart failure morbidity (i.e., heart-failure-related hospital discharge rates) for the other racial/ethnic groups are as follows: Asian/Pacific Islanders, 27.8 percent; American Indians, 27.6 percent; Hispanics, 25.6 percent; and whites, 14.4 percent.

In terms of actual numbers of heart-failure-related discharges in California, whites account for about two-thirds of the total (237,766 of 350,420 or 67.9 percent in 2003).

In Figure 24, the actual age-adjusted heart failure morbidity rates are presented for the racial/ethnic data available from both the 2000 through 2003 California PDDFs and the population data from the California Department of Finance. In 2004, the racial/ethnic discharge data and the racial/ethnic population data are incompatible and actual rates cannot be calculated. For 2004, therefore, hospital discharge (i.e., morbidity) rates were estimated statistically, based on the prevailing racial/ethnic trends from the previous four years.

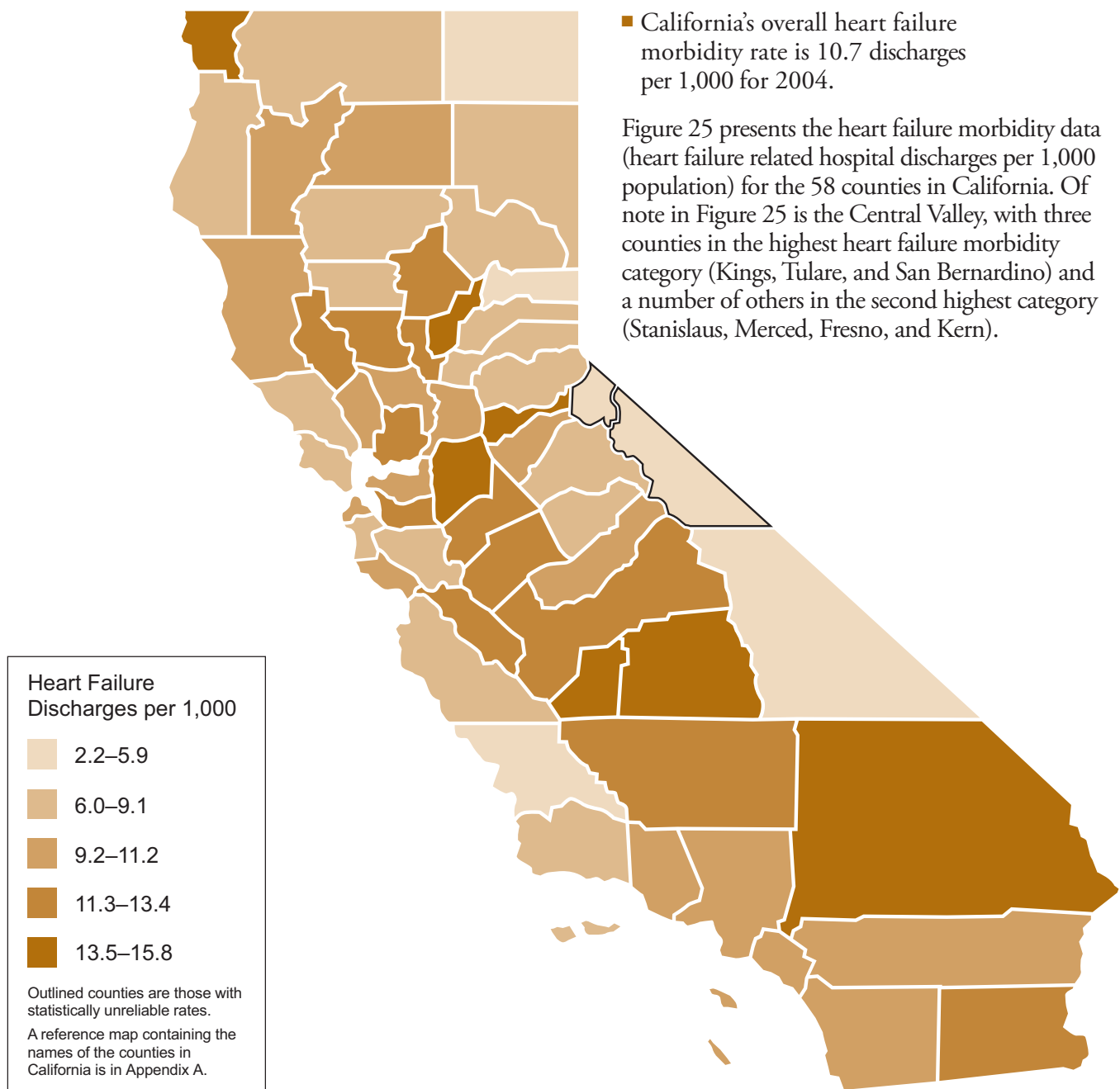
Figure 24 Age-Adjusted Heart Failure Morbidity in California, by Race/Ethnicity (2000–2003 and estimates for 2004)





HEART FAILURE

Figure 25
Age-Adjusted Heart Failure Morbidity
by County, California (2004)





Risk Factor Results

HIGH CHOLESTEROL

High Cholesterol

Adult respondents to the 2001 CHIS were asked questions about heart disease and cholesterol. The relevant questions are as follows:

“Has a doctor ever told you that you have any kind of heart disease?”

For those who answered in the affirmative to the above question:

“About how long ago did you have your blood cholesterol checked?”

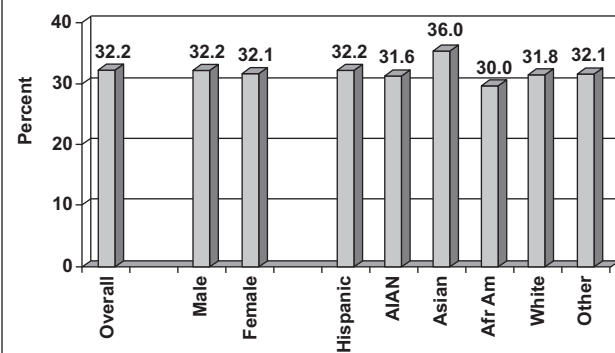
For those who provided an answer that was not “never” to the above question:

“The last time cholesterol was checked, did a doctor tell you your blood cholesterol was high?”

In 2001, seven percent (7.0 percent) of adults (7.3 percent of men and 6.7 percent of women) indicated that they had been given a heart disease diagnosis by a physician (data not shown). By race/ethnicity, the heart disease prevalences vary: American Indian/Alaska Native (AIAN), 11.3 percent; white, 8.9 percent; African American, 8.6 percent; “Other” Single/Multiple Race, 5.3 percent; Asian, 5.1 percent; and Hispanic, 3.6 percent.

Of the 7.0 percent of adults with heart disease, one in three respondents (32.2 percent) indicated that she or he had been told by a physician that her or his blood cholesterol was high (Figure 26). Although there is almost no difference observed by gender, the racial/ethnic-specific prevalences vary, with Asians having the highest prevalence (36.0 percent) and African Americans having the lowest prevalence (30.0 percent).

Figure 26 Prevalence of High Cholesterol* in California Adults (2001): Overall, Gender, and Race/Ethnicity



*for those diagnosed with heart disease

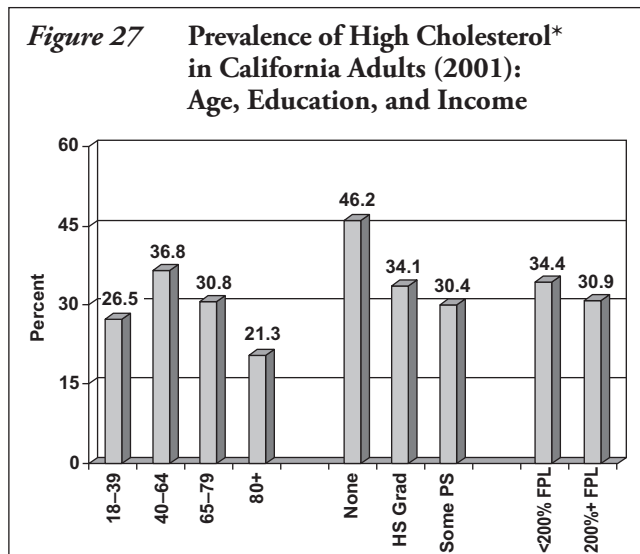


HIGH CHOLESTEROL

With respect to age, education, and income, the prevalences of high cholesterol vary considerably (Figure 27). First, individuals 40 through 64 years reported the highest prevalence (36.8 percent), followed by individuals 65 through 79 years (30.8 percent), individuals 18 through 39 years (26.5 percent), and individuals 80 years of age and older (21.3 percent). Second, a dose-response relationship exists between educational attainment and high cholesterol. Nearly half (46.2 percent) of those with no formal education (who also reported having been given a heart disease diagnosis) reported having high cholesterol.

With higher educational attainment, the prevalence of high cholesterol is lower: 34.1 percent for individuals with a high school diploma and 30.4 percent for individuals with some post-secondary education. Finally, in terms of income, there is a slightly higher prevalence (34.4 percent) for individuals whose income is less than 200 percent of the FPL, relative to that of individuals whose income is greater than or equal to 200 percent of the FPL (30.9 percent).

Note that these prevalences are for those who have been given a heart disease diagnosis. Prevalences by county (or county group) are presented in Appendix B.



*for those diagnosed with heart disease



HIGH BLOOD PRESSURE

High Blood Pressure

Adult respondents to the 2003 CHIS were asked the following two questions about high blood pressure:

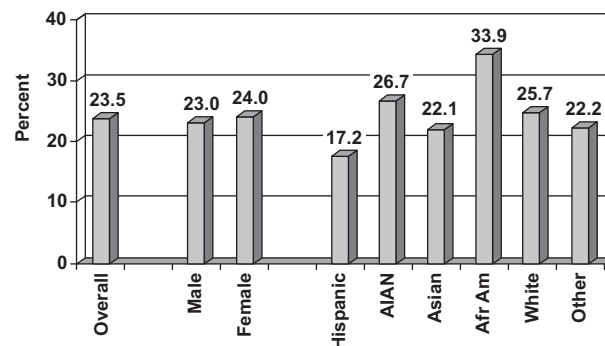
“Has a doctor ever told you that you have high blood pressure?”

For those who answered in the affirmative to the above question:

“Are you now taking any medications to control your high blood pressure?”

Nearly one in four adults (23.5 percent) reported having been diagnosed with high blood pressure by a physician (Figure 28). The prevalences of high blood pressure do not vary appreciably by gender (23.0 percent for men and 24.0 percent for women), though there are some differences by race/ethnicity. African Americans have the highest prevalence of high blood pressure at 33.9 percent; followed by American Indians/Alaska Natives (AIAN), 26.7 percent; whites, 25.7 percent; those of “Other” Single/Multiple Race, 22.2 percent; Asians, 22.1 percent; and Hispanics, 17.2 percent.

Figure 28 Prevalence of High Blood Pressure in California Adults (2003): Overall, Gender, and Race/Ethnicity



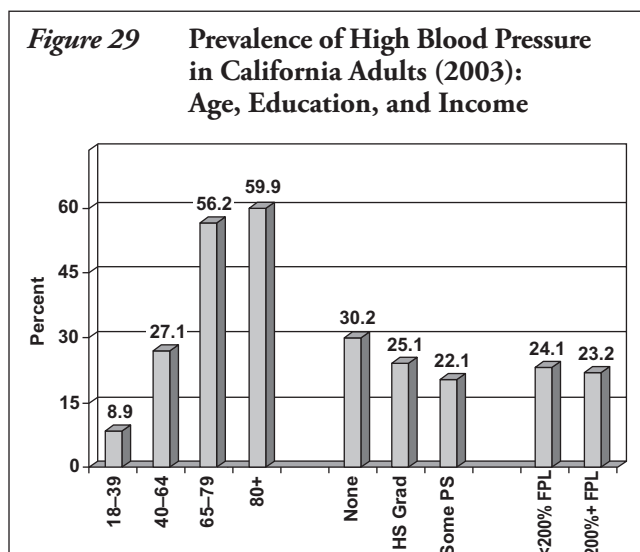


HIGH BLOOD PRESSURE

With respect to age, education, and income, the prevalences of high blood pressure vary, especially among the different age groups (Figure 29). First, individuals 80 years of age and older reported the highest prevalence (59.9 percent), followed by individuals 65 through 79 years (56.2 percent), individuals 40 through 64 years (27.1 percent), and individuals 18 through 39 years (8.9 percent). Clearly, high blood pressure is associated with older age, as the oldest group has a prevalence that is nearly seven times greater than that of the youngest group. Second, a dose-response relationship exists between educational attainment and high blood pressure. Three in ten (30.2 percent) individuals with no formal education reported having high blood pressure. With higher educational attainment, the prevalences are lower: 25.1 percent for individuals with a high school diploma, and 22.1 percent for individuals with some post-secondary education. Finally, in terms of income, there is no noticeable difference in high blood pressure prevalence between the two groups: 24.1 percent for those whose income is less than 200 percent of the FPL, and 23.2 percent for those whose income is greater than or equal to 200 percent of the FPL.

Lastly, regarding the blood pressure medication question (data not shown), of the 23.5 percent of California adults reporting a high blood pressure diagnosis, two-thirds (37.7 percent) reported taking medications to control their condition. A slightly higher proportion of women (69.9 percent) than men (65.3 percent) reported taking medications, and differences in medication use are observed by race/ethnicity: African American (74.9 percent), Asian (73.1 percent), white (71.7 percent), AIAN (63.4 percent), “Other” Single/Multiple Race (60.5 percent), and Hispanic (50.8 percent).

Prevalences for high blood pressure by county (or county group) are presented in Appendix B.





DIABETES

Diabetes

Adult respondents to the 2003 CHIS were asked a series of questions about diabetes. The relevant questions are the following:

“Has a doctor ever told you that you have diabetes or sugar diabetes?”
(This does not include gestational diabetes.)

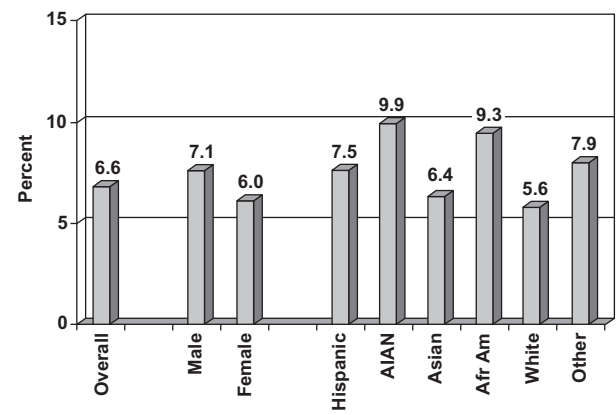
For those who answered in the affirmative to the above question:

“Were you told that you have Type 1 or Type 2 diabetes?”

(If needed, there is a prompt: “Type 1 diabetes results from the body’s failure to produce insulin and is usually diagnosed in children and young adults. Type 2 diabetes results from insulin resistance and is the most common form of diabetes.”)

Almost seven percent (6.6 percent) of adults (7.1 percent of men and 6.0 percent of women) indicated that they had been diagnosed with diabetes by a physician (Figure 30). By race/ethnicity, the diabetes prevalences vary: American Indian/Alaska Native (AIAN), 9.9 percent; African American, 9.3 percent; “Other” Single/Multiple Race, 7.9 percent; Hispanic, 7.5 percent; Asian, 6.4 percent; and white, 5.6 percent.

Figure 30 Prevalence of Diabetes in California Adults (2003): Overall, Gender, and Race/Ethnicity





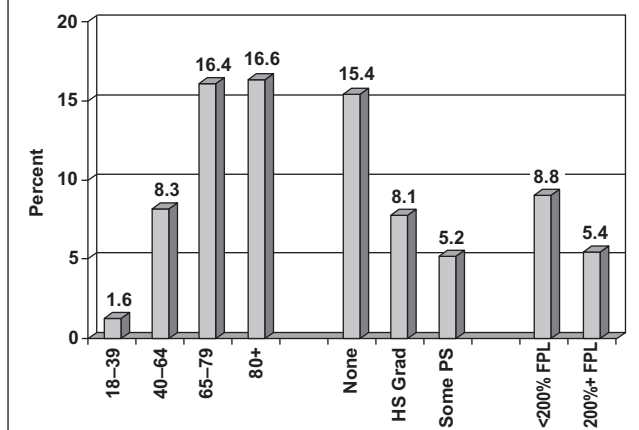
DIABETES

With respect to age, education, and income, there is some variation among the prevalences of diabetes (Figure 31). First, individuals 80 years of age and older reported the highest prevalence (16.6 percent), followed by individuals 65 through 79 years (16.4 percent), individuals 40 through 64 years (8.3 percent), and individuals 18 through 39 years (1.6 percent). These data indicate that diabetes is associated with age, as the oldest group has a prevalence that is more than ten times greater than that of the youngest group. Second, a strong dose-response relationship exists between educational attainment and diabetes. Of those with no formal education, 15.4 percent reported having diabetes. With higher educational attainment, the prevalences are lower: 8.1 percent for individuals with a high school diploma and 5.2 percent for individuals with some post-secondary education. Finally, in terms of income, there was a higher prevalence (8.8 percent) for those whose income is less than 200 percent of the FPL, relative to that of those whose income is greater than or equal to 200 percent of the FPL (5.4 percent). In short, those with lower incomes experience the burden of diabetes to a greater extent than do their wealthier counterparts.

Lastly, of the 6.6 percent of California adults reporting a diabetes diagnosis, 84.3 percent (data not shown) indicated Type 2 diabetes (85.8 percent of men with diabetes and 82.6 percent of women with diabetes). Relative to the other racial/ethnic groups, whites are more likely to report Type 2 diabetes than Type 1 diabetes (87.4 percent versus 12.6 percent). For AIAN, this prevalence ratio is the lowest (74.6 percent versus 25.4 percent).

Diabetes prevalences by county (or county group) are presented in Appendix B.

Figure 31 Prevalence of Diabetes in California Adults (2003): Age, Education, and Income





CIGARETTE SMOKING

Cigarette Smoking

Adult respondents to the 2003 CHIS were asked a series of questions about smoking. The relevant questions are the following:

“Altogether, have you smoked at least 100 or more cigarettes in your entire lifetime?”

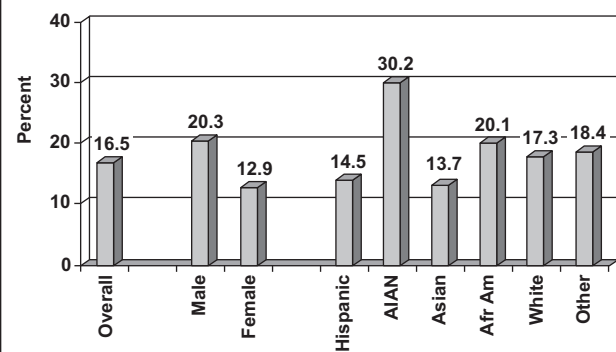
For those who answered in the affirmative to the above question:

“Do you now smoke cigarettes every day, some days, or not at all?”

Taken together, these two questions are used to determine adult smoking prevalence. Respondents who answer the first question in the negative, together with individuals who are asked the second question and choose the “not at all” response, are considered nonsmokers. Individuals who are asked the second question and choose either the “every day” or “some days” response are considered smokers.

The overall cigarette smoking prevalence was determined to be 16.5 percent (Figure 32). For men, the prevalence is considerably higher than it is for women; in fact, at 20.3 percent, the prevalence for men is more than 50 percent greater than it is for women (12.9 percent). By race/ethnicity, the smoking prevalences vary: American Indians/Alaska Natives (AIAN) have the highest prevalence, 30.2 percent; followed by African Americans, 20.1 percent; those of “Other” Single/Multiple Race, 18.4 percent; whites, 17.3 percent; Hispanics, 14.5 percent; and Asians, 13.7 percent.

Figure 32 Prevalence of Cigarette Smoking in California Adults (2003): Overall, Gender, and Race/Ethnicity





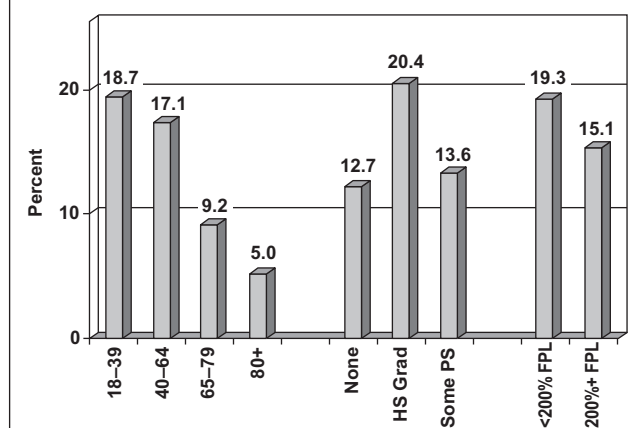
CIGARETTE SMOKING

Cigarette smoking varies with age, education, and income (Figure 33). First, the youngest group of adults, individuals 18 through 39 years, reported the highest smoking prevalence (18.7 percent), followed by individuals 40 through 64 years (17.1 percent), individuals 65 through 79 years (9.2 percent), and individuals 80 years of age and older (5.0 percent). These data indicate that cigarette smoking is negatively associated with age, as the youngest group has a prevalence that is nearly four times greater than that of the oldest group. Second, mixed results were found for educational attainment and cigarette smoking. The highest prevalence of cigarette smoking (20.4 percent) was

calculated for those with a high school diploma, followed by those with some post-secondary education (13.6 percent). Of those with no formal education, just 12.7 percent reported cigarette smoking. Finally, in terms of income, there was a higher smoking prevalence (19.3 percent) for those whose income is less than 200 percent of the FPL, relative to that of those whose income is greater than or equal to 200 percent of the FPL (15.1 percent). That is, those with higher incomes are less likely to be smokers.

Cigarette smoking prevalences by county (or county group) are presented in Appendix B.

Figure 33 Prevalence of Cigarette Smoking in California Adults (2003): Age, Education, and Income





OVERWEIGHT and OBESITY

Overweight and Obesity

Adult respondents to the 2003 CHIS were asked the following two questions from which Body Mass Index (BMI) is calculated:

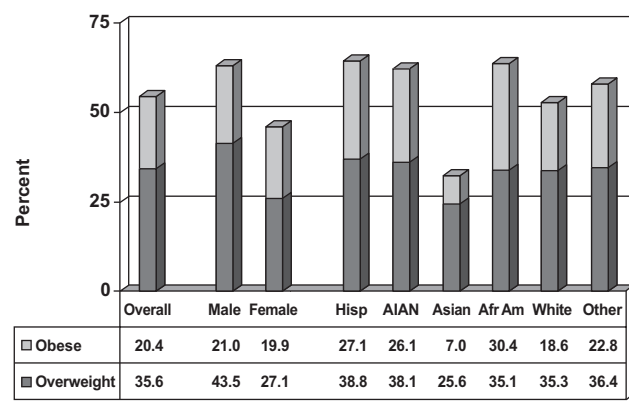
“How tall are you without shoes?”

“How much do you weigh without shoes?”

(This does not include gestational weight gain.)

BMI, calculated as weight in kilograms divided by height in meters squared, is a number that is used as a reliable indicator of body fatness. A BMI value from 25.0 to 29.9 is considered overweight, while a BMI value of 30.0 or greater is considered obese. Overall, using the CHIS data, 35.6 percent of adults are considered overweight and 20.4 percent are obese (Figure 34). A greater proportion of men (versus women) are overweight or obese (43.5 percent and 21.0 percent for men versus 27.1 percent and 19.9 percent for women). For all racial/ethnic groups except Asians, more than half are overweight or obese. For Asians, only 32.6 percent (i.e., 25.6 percent plus 7.0 percent) are overweight or obese.

Figure 34 Prevalence of Overweight and Obesity in California Adults (2003): Overall, Gender, and Race/Ethnicity



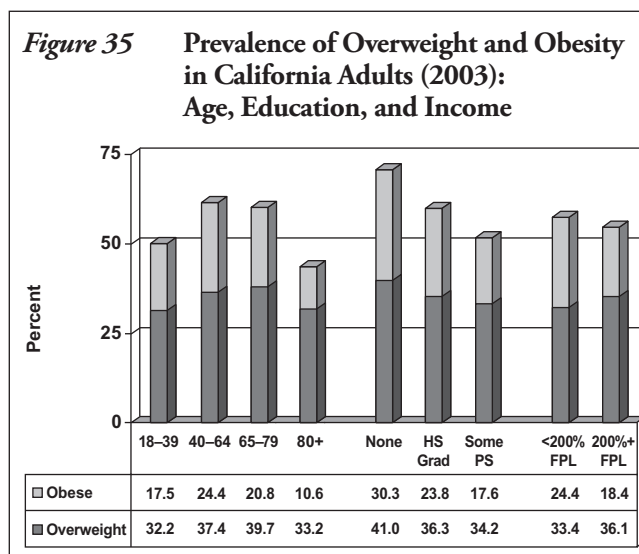


OVERWEIGHT and OBESITY

The prevalences of overweight and obesity vary with age, education, and income (Figure 35). First, individuals 40 through 64 years have the highest prevalence of obesity (24.4 percent) and the second highest prevalence of overweight (37.4 percent). Individuals 65 through 79 years have similar prevalences, with 20.8 percent being obese and 39.7 percent being overweight. Nearly half of the respondents in the youngest and oldest age groups (49.7 percent of those 18 through 39 years and 43.8 percent of those 80 years of age and older) reported being overweight or obese. Second, these data indicate that being overweight or obese is negatively associated with educational attainment.

The highest prevalence of overweight or obesity, 71.3 percent (i.e., 30.3 percent plus 41.0 percent), was calculated for individuals with no formal education, followed by individuals with a high school diploma (60.1 percent), and individuals with some post-secondary education (51.8 percent). Finally, in terms of income, there was a slightly higher prevalence (57.8 percent) for those whose income is less than 200 percent of the FPL, relative to that of those whose income is greater than or equal to 200 percent of the FPL (54.5 percent).

Overweight and obesity prevalences by county (or county group) are presented in Appendix B.





PHYSICAL INACTIVITY

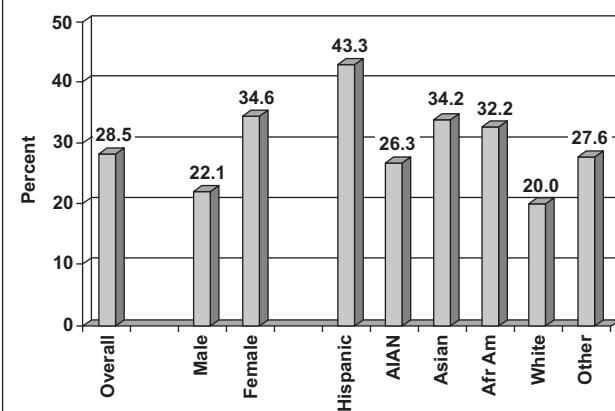
Physical Inactivity

Adult respondents to the 2001 CHIS were asked a number of questions about physical activity. Based on their answers, respondents were considered either to have engaged in physical activities or to have been physically inactive. The kinds of activities about which respondents were asked include the following:

- Walking or bicycling to or from work, school, or to do errands;
- Sitting, standing, walking around;
- Lifting or carrying light loads, moderate loads, or heavy loads;
- Vigorous activities resulting in heavy sweating or large increases in breathing or heart rate;
- Moderate activities resulting in light sweating or moderate increases in breathing or heart rate; and
- Exercises to strengthen muscles, such as lifting weights.

Nearly three in ten adults (28.5 percent) are considered physically inactive (Figure 36). The prevalence of inactivity is greater for women (34.6 percent) than it is for men (22.1 percent), and Hispanics have the highest prevalence (43.3 percent) of the racial/ethnic groups. Following Hispanics, the physical inactivity prevalences in decreasing order are as follows: Asians, 34.2 percent; African Americans, 32.2 percent; those of “Other” Single/Multiple Race, 27.6 percent; American Indians/Alaska Natives (AIAN), 26.3 percent; and whites, 20.0 percent.

Figure 36 Prevalence of Physical Inactivity in California Adults (2001): Overall, Gender, and Race/Ethnicity



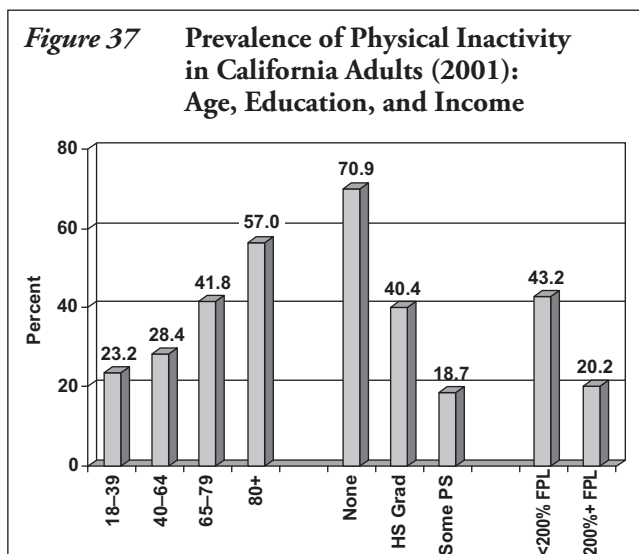


PHYSICAL INACTIVITY

With respect to age, education, and income, there is some variation among the prevalences of physical inactivity (Figure 37). First, individuals 80 years of age and older reported the highest prevalence (57.0 percent), followed by individuals 65 through 79 years (41.8 percent), individuals 40 through 64 years (28.4 percent), and individuals 18 through 39 years (23.2 percent). These data indicate that physical inactivity is associated with age, as the oldest group has a prevalence that is more than two times greater than that of the youngest group. Second, a strong dose-response relationship exists between educational attainment and physical inactivity. Of those with no formal education, 70.9 percent reported being physically inactive.

With higher educational attainment, the prevalences are considerably lower: 40.4 percent for individuals with a high school diploma and 18.7 percent for individuals with some post-secondary education. Finally, in terms of income, there was a higher prevalence of physical inactivity (43.2 percent) for those whose income is less than 200 percent of the FPL, relative to that of those whose income is greater than or equal to 200 percent of the FPL (20.2 percent). In short, those with lower incomes tend to be much less physically active than their wealthier counterparts.


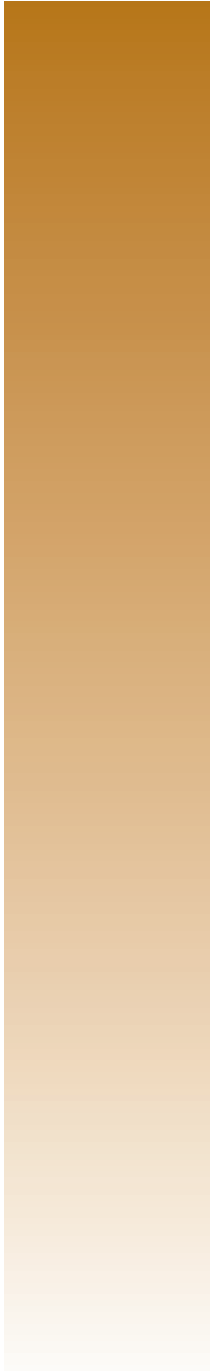
Physical inactivity prevalences by county (or county group) are presented in Appendix B.





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List of Acronyms

AIAN	American Indian/Alaska Native
BMI	Body Mass Index
CDC	Centers for Disease Control and Prevention
CHDSP	California Heart Disease and Stroke Prevention Program
CHIS	California Health Interview Survey
CVD	Cardiovascular Disease
DSMF	Death Statistical Master File
FPL	Federal Poverty Level
HIV	Human Immunodeficiency Virus
HP2010	Healthy People 2010
ICD	International Classification of Diseases
IHS	Indian Health Service
NCHS	National Center for Health Statistics
NHOPI	Native Hawaiian and Other Pacific Islanders
OLSR	Ordinary Least Squares Regression
PDDF	Patient Discharge Data Files
RSE	Relative Standard Error
WONDER	Wide-ranging ONLINE Data for Epidemiologic Research

List of Appendices



Appendix A: Map of California Counties

Appendix B: County-level Data

Appendix C: Age-specific Heart Failure Morbidity Data



Appendix A
Map of California Counties



Appendix B

Age-Adjusted Heart Disease Mortality Rates (Deaths per 100,000 population) Both Genders, All Racial/Ethnic Groups

COUNTY	YEAR				
	2000	2001	2002	2003	2004
ALAMEDA	182.4	166.4	156.4	150.3	144.4
ALPINE	104.3	0.0	171.3	154.1	56.4
AMADOR	163.0	175.0	152.5	157.5	145.8
BUTTE	137.7	160.8	159.1	145.8	146.7
CALAVERAS	143.4	131.1	157.4	161.2	132.8
COLUSA	128.0	166.5	130.0	159.5	104.4
CONTRA COSTA	164.3	167.1	153.8	138.3	119.6
DEL NORTE	128.1	117.7	121.6	129.2	121.5
EL DORADO	135.0	146.6	144.7	136.6	142.5
FRESNO	194.7	196.1	182.7	180.0	159.9
GLENN	139.3	118.4	140.4	118.9	132.3
HUMBOLDT	142.5	167.5	145.3	150.1	159.6
IMPERIAL	159.8	127.5	156.2	159.7	128.0
INYO	169.2	171.8	187.7	204.7	178.0
KERN	222.7	220.9	233.0	213.3	191.8
KINGS	208.0	169.0	174.0	170.5	148.0
LAKE	209.5	159.2	126.4	193.0	165.9
LASSEN	129.5	140.2	168.3	106.6	158.4
LOS ANGELES	222.8	216.2	205.7	174.0	164.5
MADERA	182.9	188.7	181.3	166.3	147.3
MARIN	148.0	160.2	135.8	116.3	103.9
MARIPOSA	107.8	146.1	164.4	165.9	118.8
MENDOCINO	156.6	149.0	126.9	161.3	161.5
MERCED	180.4	198.3	198.9	208.8	177.9
MODOC	91.5	127.3	159.9	209.2	151.2
MONO	63.6	103.6	133.4	105.5	111.5
MONTEREY	152.4	146.4	152.4	133.7	115.6
NAPA	171.4	150.1	156.3	137.3	110.7
NEVADA	120.3	147.1	130.6	147.6	118.9
ORANGE	217.2	209.4	198.5	174.7	164.5
PLACER	179.3	180.2	184.3	140.0	134.5
PLUMAS	114.0	112.9	107.9	113.6	104.2
RIVERSIDE	214.6	212.3	206.3	202.8	189.7
SACRAMENTO	207.2	201.6	201.1	187.0	166.9
SAN BENITO	110.1	102.2	113.5	128.1	125.9
SAN BERNARDINO	244.3	232.8	235.0	235.5	209.9
SAN DIEGO	178.4	171.1	156.8	156.5	147.9
SAN FRANCISCO	151.5	148.4	142.4	147.0	131.6
SAN JOAQUIN	190.2	191.2	188.6	228.5	226.4
SAN LUIS OBISPO	146.8	140.6	129.9	127.5	130.4
SAN MATEO	126.3	127.4	121.4	125.0	116.2
SANTA BARBARA	161.2	153.6	153.1	149.5	144.2
SANTA CLARA	164.6	152.4	137.4	123.7	116.1
SANTA CRUZ	146.3	128.3	122.3	154.5	129.6
SHASTA	168.5	176.1	168.4	138.5	121.5
SIERRA	89.2	103.3	38.8	171.6	67.2
SISKIYOU	147.8	148.9	169.3	133.8	114.3
SOLANO	187.1	178.4	169.2	131.5	104.7
SONOMA	164.6	141.7	148.1	137.3	120.5
STANISLAUS	241.7	233.6	239.1	231.9	193.2
SUTTER	194.8	185.5	171.0	211.6	171.4
TEHAMA	159.0	165.2	151.6	130.3	126.0
TRINITY	177.5	101.8	121.8	60.1	87.8
TULARE	173.9	182.4	163.9	188.9	206.3
TUOLUMNE	183.0	156.0	160.0	143.0	141.2
VENTURA	166.1	162.5	160.8	155.0	142.0
YOLO	135.6	165.2	142.9	135.6	130.9
YUBA	240.8	211.5	197.1	222.7	182.8
CALIFORNIA	192.6	187.2	179.2	167.3	155.2



ICD-10 Codes
I11, I20–I25

Notes: Statistically unreliable rates are in *italics*. Rates are age-adjusted to the U.S. Standard Million population.

Data Sources:
2000–2004
CA Death Statistical Master Files and
CA Department of Finance Population Files.

Appendix B

Age-Adjusted Heart Disease Morbidity Rates (Discharges per 1,000 population) Both Genders, All Racial/Ethnic Groups

COUNTY	YEAR				
	2000	2001	2002	2003	2004
ALAMEDA	18.7	17.8	18.0	17.6	19.0
ALPINE	3.4	8.3	5.7	4.0	5.2
AMADOR	22.8	23.1	21.3	22.8	23.5
BUTTE	17.7	17.9	17.0	16.7	19.1
CALAVERAS	14.8	17.3	16.4	15.7	16.8
COLUSA	18.1	15.4	12.9	12.4	17.8
CONTRA COSTA	16.8	16.2	16.9	16.3	17.0
DEL NORTE	10.0	10.4	10.0	12.0	19.1
EL DORADO	15.9	16.1	14.9	14.0	17.2
FRESNO	17.0	18.2	18.6	18.6	20.3
GLENN	12.9	13.1	11.8	13.1	11.4
HUMBOLDT	14.0	14.3	14.4	13.0	12.3
IMPERIAL	19.2	20.8	21.3	21.4	22.3
INYO	9.6	9.3	9.5	9.2	7.4
KERN	20.3	19.7	19.1	18.9	18.2
KINGS	17.8	17.4	13.8	15.5	17.6
LAKE	26.0	24.1	22.9	24.7	27.2
LASSEN	7.4	7.9	9.5	7.1	8.5
LOS ANGELES	20.5	20.9	20.5	20.4	18.4
MADERA	16.5	16.2	15.9	15.4	19.4
MARIN	13.4	14.2	14.4	15.1	13.8
MARIPOSA	12.3	14.1	15.8	15.6	13.4
MENDOCINO	17.6	18.2	15.4	16.7	16.7
MERCED	18.5	18.5	17.6	17.6	17.9
MODOC	5.7	8.1	11.5	9.8	9.5
MONO	2.6	2.4	3.2	3.1	3.4
MONTEREY	18.7	18.9	18.4	17.3	16.6
NAPA	21.1	20.5	20.9	21.0	21.6
NEVADA	14.5	14.0	12.5	12.7	15.1
ORANGE	18.7	18.7	18.1	17.8	16.8
PLACER	17.1	16.9	16.8	17.1	13.7
PLUMAS	12.4	10.8	11.7	11.5	10.8
RIVERSIDE	19.1	18.7	18.7	18.9	18.6
SACRAMENTO	17.1	15.9	15.7	16.0	14.9
SAN BENITO	15.9	14.5	15.7	16.2	18.5
SAN BERNARDINO	21.8	21.8	21.4	21.2	20.6
SAN DIEGO	16.6	16.5	16.5	16.3	16.0
SAN FRANCISCO	13.6	13.5	13.9	13.9	15.3
SAN JOAQUIN	19.9	19.7	19.5	19.9	21.1
SAN LUIS OBISPO	12.7	12.1	11.7	10.3	10.3
SAN MATEO	13.5	13.0	13.2	13.6	14.9
SANTA BARBARA	13.9	14.3	13.2	12.6	11.6
SANTA CLARA	15.2	15.6	15.1	14.7	15.0
SANTA CRUZ	15.1	14.2	14.4	15.0	15.8
SHASTA	25.1	25.4	24.6	20.7	17.9
SIERRA	7.7	7.3	8.9	13.9	9.8
SISKIYOU	14.6	14.8	15.7	13.6	10.8
SOLANO	19.5	19.4	19.2	19.6	18.8
SONOMA	14.2	15.0	15.0	14.6	14.6
STANISLAUS	21.1	20.6	19.8	19.1	20.2
SUTTER	24.0	23.2	23.9	22.0	23.2
TEHAMA	17.6	18.4	17.6	15.4	13.8
TRINITY	25.1	21.0	19.1	14.7	16.1
TULARE	21.3	21.4	22.5	21.8	24.6
TUOLUMNE	13.5	14.3	14.7	15.2	12.8
VENTURA	17.7	19.4	20.2	20.3	17.8
YOLO	14.5	15.1	14.9	14.6	13.5
YUBA	31.3	30.6	32.5	29.0	26.1
CALIFORNIA	18.2	18.2	18.0	17.8	17.4



ICD-9 Codes 402,
410–414, 429.2

Notes: Statistically
unreliable rates are
in *italics*. Rates are
age-adjusted to the
U.S. Standard Million
population.

Data Sources:
2000–2004
CA Death Statistical
Master Files and
CA Department of
Finance Population
Files.

Appendix B
Age-Adjusted Stroke Mortality Rates (Deaths per 100,000 population)
Both Genders, All Racial/Ethnic Groups

COUNTY	YEAR				
	2000	2001	2002	2003	2004
ALAMEDA	69.6	65.4	57.4	63.4	51.6
ALPINE	0.0	0.0	0.0	286.2	175.9
AMADOR	44.6	71.1	39.8	72.6	55.1
BUTTE	64.7	49.9	54.0	61.3	55.4
CALAVERAS	42.0	54.6	49.2	61.1	55.8
COLUSA	47.3	24.7	16.2	48.5	70.1
CONTRA COSTA	75.1	65.6	62.2	57.1	56.4
DEL NORTE	34.6	46.3	34.1	28.0	48.1
EL DORADO	45.0	40.5	41.6	47.0	46.1
FRESNO	63.0	64.3	62.3	68.2	67.4
GLENN	65.2	54.0	28.5	54.3	28.7
HUMBOLDT	72.8	53.7	66.2	41.3	60.4
IMPERIAL	46.1	45.7	54.5	62.4	50.5
INYO	50.0	50.8	61.0	42.0	27.4
KERN	62.9	48.8	55.1	48.2	44.8
KINGS	61.8	69.5	38.8	58.4	52.5
LAKE	72.2	65.0	34.6	80.0	52.0
LASSEN	35.2	50.8	29.7	23.1	48.3
LOS ANGELES	58.1	54.9	52.7	45.2	44.5
MADERA	41.2	54.6	45.7	40.0	39.1
MARIN	70.2	71.6	61.6	44.2	44.8
MARIPOSA	38.3	45.4	35.9	70.4	29.1
MENDOCINO	62.0	73.2	60.9	60.4	60.4
MERCED	57.0	78.4	62.5	82.8	68.5
MODOC	51.2	61.1	41.9	67.0	55.9
MONO	41.9	35.1	44.1	16.4	28.1
MONTEREY	53.5	69.6	60.0	50.0	51.8
NAPA	78.5	73.1	72.0	63.2	58.1
NEVADA	59.5	65.8	55.6	76.1	68.3
ORANGE	65.8	62.1	64.4	57.0	55.0
PLACER	61.2	67.1	73.8	63.2	65.4
PLUMAS	27.0	45.7	35.1	36.2	61.3
RIVERSIDE	52.6	59.1	52.4	58.0	53.3
SACRAMENTO	71.1	72.6	75.4	63.4	61.9
SAN BENITO	57.8	35.0	49.2	55.1	35.0
SAN BERNARDINO	59.2	60.6	56.1	59.7	53.9
SAN DIEGO	61.5	60.9	53.4	56.8	52.3
SAN FRANCISCO	58.5	52.1	55.3	57.7	54.1
SAN JOAQUIN	67.8	73.0	66.7	72.3	63.0
SAN LUIS OBISPO	53.5	45.5	50.6	53.4	39.5
SAN MATEO	62.9	58.5	54.4	53.1	49.2
SANTA BARBARA	61.5	57.4	55.4	51.5	49.6
SANTA CLARA	59.0	56.9	53.3	46.9	43.2
SANTA CRUZ	48.4	49.1	39.5	50.2	53.0
SHASTA	47.1	62.1	62.8	43.9	40.4
SIERRA	31.2	0.0	37.1	47.5	0.0
SISKIYOU	53.8	51.9	59.4	50.9	43.5
SOLANO	80.3	74.5	81.2	52.4	44.9
SONOMA	70.9	66.8	61.0	62.1	60.2
STANISLAUS	63.1	63.6	55.8	53.7	47.3
SUTTER	86.2	47.2	49.0	67.4	58.8
TEHAMA	43.5	63.7	54.3	58.5	53.9
TRINITY	46.0	72.4	48.7	20.6	30.8
TULARE	64.1	63.5	60.2	64.0	55.6
TUOLUMNE	44.5	43.3	50.8	49.4	53.0
VENTURA	64.5	64.3	50.5	43.7	43.7
YOLO	73.0	56.1	63.6	68.5	56.4
YUBA	97.2	67.6	60.4	67.6	51.1
CALIFORNIA	61.2	59.4	56.3	53.3	50.3



ICD-10 Codes
I60–I69

Notes: Statistically unreliable rates are in *italics*. Rates are age-adjusted to the U.S. Standard Million population.

Data Sources:
2000–2004
CA Death Statistical Master Files and
CA Department of Finance Population Files.

Appendix B

Age-Adjusted Stroke Morbidity Rates (Discharges per 1,000 population) Both Genders, All Racial/Ethnic Groups

COUNTY	YEAR				
	2000	2001	2002	2003	2004
ALAMEDA	7.7	7.1	7.1	6.9	7.3
ALPINE	2.7	2.5	0.0	1.0	0.0
AMADOR	7.9	7.6	6.2	6.4	5.2
BUTTE	6.4	5.9	5.4	5.8	6.4
CALAVERAS	4.8	4.6	4.8	4.7	4.9
COLUSA	4.4	3.5	4.0	3.5	5.8
CONTRA COSTA	6.7	5.9	6.0	5.6	6.0
DEL NORTE	3.9	3.2	3.3	3.8	6.0
EL DORADO	4.9	4.7	4.3	4.5	5.0
FRESNO	5.9	6.2	6.4	6.2	6.4
GLENN	6.1	5.8	5.9	5.3	5.6
HUMBOLDT	6.9	6.7	6.1	5.3	5.4
IMPERIAL	7.0	6.8	6.6	6.7	6.5
INYO	3.9	3.1	2.7	2.9	3.0
KERN	6.9	6.7	6.1	6.1	5.9
KINGS	6.2	5.8	5.1	5.3	4.9
LAKE	7.7	7.1	6.4	7.1	6.7
LASSEN	2.7	2.8	3.3	2.5	3.1
LOS ANGELES	8.3	8.1	7.8	7.6	6.6
MADERA	4.2	5.0	5.0	4.5	4.7
MARIN	5.3	6.0	6.0	6.0	5.2
MARIPOSA	3.8	4.2	6.3	5.5	4.5
MENDOCINO	6.5	5.8	5.9	5.7	6.5
MERCED	5.9	6.4	5.9	5.8	5.7
MODOC	3.3	3.4	2.5	3.8	3.7
MONO	0.6	1.4	1.0	0.7	0.6
MONTEREY	5.8	5.7	5.5	5.2	5.0
NAPA	6.4	6.5	6.9	6.1	6.4
NEVADA	6.0	5.6	5.1	5.3	5.6
ORANGE	7.2	7.1	6.6	6.5	5.8
PLACER	5.6	5.5	5.3	5.3	4.3
PLUMAS	4.0	3.8	4.1	3.3	3.6
RIVERSIDE	6.3	6.2	5.9	5.7	5.5
SACRAMENTO	6.4	5.9	5.8	5.9	5.5
SAN BENITO	4.6	4.5	5.8	5.5	6.0
SAN BERNARDINO	6.8	7.1	6.8	6.8	6.4
SAN DIEGO	6.1	6.0	5.6	5.5	5.3
SAN FRANCISCO	6.5	6.1	6.0	5.9	6.3
SAN JOAQUIN	6.0	6.0	6.0	6.2	6.4
SAN LUIS OBISPO	5.1	4.9	4.8	4.0	3.5
SAN MATEO	5.9	5.3	5.3	5.0	5.5
SANTA BARBARA	5.7	5.5	4.9	4.6	4.4
SANTA CLARA	5.8	5.6	5.3	5.1	5.0
SANTA CRUZ	5.0	5.1	4.8	5.0	5.1
SHASTA	7.8	6.8	6.4	5.6	5.0
SIERRA	3.5	4.2	5.1	6.7	2.9
SISKIYOU	4.2	4.7	4.1	3.7	3.8
SOLANO	7.3	7.6	7.2	7.0	5.7
SONOMA	5.6	5.9	5.6	5.2	4.9
STANISLAUS	6.5	6.0	6.1	6.0	6.0
SUTTER	7.3	6.6	6.1	5.9	5.7
TEHAMA	5.7	5.9	5.5	5.6	4.6
TRINITY	9.0	6.0	6.6	5.4	4.6
TULARE	7.2	6.8	6.7	5.7	7.2
TUOLUMNE	5.4	5.3	5.4	5.3	4.6
VENTURA	6.6	7.0	6.9	6.5	5.8
YOLO	5.4	4.9	5.1	5.1	4.7
YUBA	7.9	7.8	8.6	6.7	6.5
CALIFORNIA	6.8	6.7	6.4	6.2	5.9



ICD-9 Codes
430–438

Notes: Statistically unreliable rates are in *italics*. Rates are age-adjusted to the U.S. Standard Million population.

Data Sources:
2000–2004
CA Death Statistical Master Files and
CA Department of Finance Population Files.

Appendix B

Age-Adjusted Heart Failure Mortality Rates (Deaths per 100,000 population) Both Genders, All Racial/Ethnic Groups

COUNTY	YEAR				
	2000	2001	2002	2003	2004
ALAMEDA	10.2	10.4	8.5	11.2	10.2
ALPINE	0.0	0.0	81.6	0.0	0.0
AMADOR	16.5	28.4	6.7	15.5	20.5
BUTTE	15.7	15.9	13.9	15.5	17.5
CALAVERAS	12.1	9.3	14.0	6.5	25.7
COLUSA	4.2	9.5	4.7	16.1	5.0
CONTRA COSTA	8.6	9.6	12.5	11.8	9.0
DEL NORTE	21.2	28.8	20.6	31.0	18.6
EL DORADO	11.7	22.0	25.1	14.7	23.0
FRESNO	17.3	14.4	18.8	24.9	21.9
GLENN	33.4	8.7	22.2	29.5	37.7
HUMBOLDT	28.0	25.0	21.4	22.2	25.5
IMPERIAL	6.9	6.4	6.8	15.8	7.8
INYO	7.8	3.2	18.8	3.8	5.2
KERN	10.2	15.1	10.7	15.9	16.1
KINGS	25.9	14.7	24.8	39.9	28.6
LAKE	14.8	16.1	12.5	20.1	22.3
LASSEN	25.8	9.0	5.7	10.1	10.5
LOS ANGELES	9.0	9.6	9.5	8.8	8.7
MADERA	13.5	8.9	10.1	7.3	8.4
MARIN	11.7	13.5	8.6	8.8	9.8
MARIPOSA	7.5	10.8	17.3	13.4	21.7
MENDOCINO	6.9	15.3	22.8	25.8	23.3
MERCED	4.6	7.6	10.9	10.6	7.6
MODOC	22.2	20.7	29.7	14.5	49.2
MONO	0.0	0.0	0.0	28.0	12.7
MONTEREY	8.9	10.6	6.8	14.0	8.8
NAPA	9.0	7.8	12.8	13.4	15.7
NEVADA	7.0	10.1	12.8	18.5	14.3
ORANGE	9.3	10.2	11.4	12.6	12.6
PLACER	14.9	11.7	17.6	14.6	16.9
PLUMAS	22.7	23.8	2.7	21.3	11.7
RIVERSIDE	8.7	10.2	10.9	11.9	10.8
SACRAMENTO	13.6	12.1	12.3	13.0	12.6
SAN BENITO	16.1	6.6	6.7	11.2	14.0
SAN BERNARDINO	11.3	13.4	13.2	14.3	17.7
SAN DIEGO	10.8	9.6	12.1	14.8	16.6
SAN FRANCISCO	8.1	7.0	5.9	7.8	9.7
SAN JOAQUIN	11.9	13.2	11.6	14.8	15.3
SAN LUIS OBISPO	12.7	10.0	13.5	15.7	14.4
SAN MATEO	10.2	10.8	8.7	11.7	9.8
SANTA BARBARA	8.0	8.5	9.5	11.6	7.7
SANTA CLARA	11.9	14.7	14.7	12.2	8.6
SANTA CRUZ	16.3	21.4	21.5	26.0	21.6
SHASTA	16.5	13.3	20.9	14.0	15.0
SIERRA	0.0	46.2	14.0	30.1	31.6
SISKIYOU	24.5	32.9	16.3	19.6	15.8
SOLANO	15.5	12.2	14.6	7.8	11.4
SONOMA	6.1	9.6	8.1	8.9	5.7
STANISLAUS	10.4	15.6	13.8	14.3	14.4
SUTTER	19.7	10.9	7.9	15.8	17.7
TEHAMA	11.1	16.8	11.9	21.1	17.5
TRINITY	11.9	11.1	37.4	16.2	14.6
TULARE	27.6	34.7	19.7	23.1	22.5
TUOLUMNE	38.5	13.2	19.6	23.9	28.6
VENTURA	7.6	10.5	8.9	9.9	7.9
YOLO	13.2	14.9	16.2	16.7	16.4
YUBA	22.1	15.2	20.1	20.4	18.4
CALIFORNIA	10.8	11.3	11.5	12.2	12.0



ICD-10 Code I50

Notes: Statistically unreliable rates are in *italics*. Rates are age-adjusted to the U.S. Standard Million population.

Data Sources:
2000–2004
CA Death Statistical Master Files and
CA Department of Finance Population Files.

Appendix B

Age-Adjusted Heart Failure Morbidity Rates (Discharges per 1,000 population) Both Genders, All Racial/Ethnic Groups

COUNTY	YEAR				
	2000	2001	2002	2003	2004
ALAMEDA	10.2	10.2	10.8	11.8	13.1
ALPINE	0.9	3.6	1.7	5.0	2.2
AMADOR	13.0	12.0	11.4	12.8	14.3
BUTTE	10.0	10.3	9.4	10.8	11.9
CALAVERAS	7.6	9.0	9.6	9.4	9.6
COLUSA	8.1	7.5	6.3	8.1	11.4
CONTRA COSTA	9.6	9.2	9.3	10.2	10.5
DEL NORTE	8.6	8.3	9.7	11.3	15.4
EL DORADO	7.4	7.3	7.9	8.2	9.1
FRESNO	9.8	10.3	11.6	12.0	12.8
GLENN	8.4	7.5	7.8	9.0	8.9
HUMBOLDT	8.6	9.6	8.9	8.6	8.0
IMPERIAL	6.4	7.1	7.7	10.8	12.7
INYO	4.9	5.7	5.9	6.4	5.4
KERN	11.8	11.7	12.3	12.3	12.2
KINGS	11.6	11.8	12.5	14.6	14.4
LAKE	8.6	8.3	8.8	10.9	12.0
LASSEN	4.6	5.2	6.0	5.2	6.8
LOS ANGELES	10.3	10.6	10.9	12.3	11.2
MADERA	8.3	8.1	8.8	9.3	10.2
MARIN	6.6	6.9	6.7	7.6	7.7
MARIPOSA	7.9	9.9	10.3	10.7	8.1
MENDOCINO	8.0	8.5	7.6	8.3	9.2
MERCED	10.5	12.0	12.8	13.4	13.3
MODOC	5.2	5.6	5.8	6.1	5.5
MONO	2.2	2.3	2.7	2.1	2.3
MONTEREY	7.3	7.4	7.8	8.8	8.9
NAPA	8.2	7.5	8.7	10.5	10.2
NEVADA	9.0	7.8	7.6	8.4	9.0
ORANGE	9.9	9.9	10.1	10.7	9.9
PLACER	9.5	9.9	9.5	9.5	8.2
PLUMAS	9.8	6.8	7.4	8.3	7.7
RIVERSIDE	8.8	9.5	9.4	9.9	10.2
SACRAMENTO	11.0	10.2	10.6	11.2	11.1
SAN BENITO	6.9	7.4	9.3	10.7	12.5
SAN BERNARDINO	11.5	12.0	12.8	14.1	14.1
SAN DIEGO	8.3	8.4	9.3	10.0	9.9
SAN FRANCISCO	7.9	7.9	8.3	8.8	10.1
SAN JOAQUIN	10.1	10.2	10.7	12.4	14.7
SAN LUIS OBISPO	6.5	6.3	6.0	5.9	5.9
SAN MATEO	7.0	6.8	7.1	8.4	8.9
SANTA BARBARA	7.5	7.7	7.8	8.2	7.6
SANTA CLARA	7.3	7.6	7.7	8.6	8.7
SANTA CRUZ	8.4	8.1	8.8	9.5	10.2
SHASTA	10.5	10.0	10.0	10.8	10.0
SIERRA	5.1	5.5	6.4	7.7	5.3
SISKIYOU	7.7	7.7	7.5	7.7	6.6
SOLANO	10.2	10.4	11.7	13.3	11.6
SONOMA	8.1	7.9	7.8	8.7	8.6
STANISLAUS	12.1	11.6	12.1	12.8	13.4
SUTTER	11.0	9.7	11.4	12.8	12.8
TEHAMA	8.7	10.2	9.4	9.8	8.6
TRINITY	14.3	9.5	8.9	8.8	10.6
TULARE	11.9	11.0	11.8	12.6	14.7
TUOLUMNE	7.7	7.6	8.7	8.5	8.9
VENTURA	8.0	8.6	9.3	10.5	9.5
YOLO	9.2	8.6	8.0	10.0	9.4
YUBA	15.7	14.7	16.6	17.9	15.8
CALIFORNIA	9.4	9.5	9.9	10.9	10.7



ICD-9 Code 428

Notes: Statistically unreliable rates are in *italics*. Rates are age-adjusted to the U.S. Standard Million population.

Data Sources:
2000–2004
CA Death Statistical Master Files and
CA Department of Finance Population Files.

Appendix B

County or County Group Prevalence Estimates for Heart Disease, Stroke, Risk Factors, California Adults

County or County Group	Heart Disease (2003 CHIS)	Stroke (2003 CHIS)	High Cholesterol (2001 CHIS)	High Blood Pressure (2003 CHIS)	Diabetes (2003 CHIS)	Cigarette Smoking (2003 CHIS)	Overweight (2003 CHIS)	Obese (2003 CHIS)	Physical Inactivity (2001 CHIS)
Alameda	5.4	7.3	25.0	21.1	5.1	15.9	33.5	18.4	27.6
Alpine, Amador, Calaveras, Inyo, Mariposa, Mono, Tuolumne	12.7	12.7	29.9	29.9	7.0	18.2	39.9	18.7	20.3
Butte	11.6	5.1	35.4	26.6	4.3	21.2	35.7	21.9	19.6
Colusa, Glenn, Tehama	10.9	7.2	31.1	28.1	7.6	17.0	41.9	23.8	31.0
Contra Costa	7.6	8.5	31.7	26.5	5.8	15.1	34.5	20.5	26.5
Del Norte, Humboldt	11.7	14.6	33.9	25.0	6.0	19.1	30.6	22.2	22.2
El Dorado	6.9	10.2	26.9	25.7	4.3	16.3	38.8	16.0	17.8
Fresno	7.4	19.5	32.0	25.1	7.6	18.6	36.5	26.1	30.9
Imperial	6.8	NA	30.0	24.3	10.9	19.6	36.5	32.8	37.0
Kern	11.2	3.6	32.8	27.5	7.3	22.4	37.7	27.3	31.2
Kings	6.7	11.5	38.7	21.6	8.1	21.1	36.1	30.5	31.6
Lake, Mendocino	8.9	16.7	30.2	32.9	6.3	26.1	34.6	26.2	24.1
Lassen, Modoc, Siskiyou, Trinity	10.8	12.5	34.8	30.0	6.7	25.4	36.5	22.8	23.4
Los Angeles	6.9	8.6	34.0	23.5	6.9	16.5	34.7	21.0	33.4
Madera	8.2	7.7	29.4	26.9	9.8	16.6	39.4	23.4	34.4
Marin	6.3	7.9	29.3	21.6	3.7	10.7	32.4	9.3	13.6
Merced	8.7	12.3	35.3	26.1	9.7	22.6	37.4	26.1	32.9
Monterey, San Benito	8.3	5.7	28.7	21.4	6.2	16.5	32.7	24.9	31.9
Napa	9.5	10.5	28.7	22.7	5.1	14.5	39.6	19.3	23.1
Nevada, Plumas, Sierra	9.0	4.1	30.4	25.7	3.9	19.0	32.3	16.6	16.9
Orange	5.9	11.1	34.3	20.6	6.6	15.3	35.3	15.0	25.3
Placer	7.7	12.9	29.7	20.8	5.5	15.4	41.5	15.3	16.9
Riverside	6.9	7.2	32.8	24.6	6.1	18.1	38.1	23.2	28.4
Sacramento	6.4	8.0	34.2	21.9	8.2	16.2	34.3	21.1	22.2
San Bernardino	7.2	11.1	31.7	25.9	8.5	18.9	37.0	28.0	30.4
San Diego	6.6	8.4	32.0	22.9	6.0	16.8	35.7	18.2	25.6
San Francisco	6.4	6.0	26.4	22.1	6.5	14.6	28.7	10.6	27.9
San Joaquin	4.5	9.9	33.2	29.1	7.6	16.4	33.5	27.1	29.3
San Luis Obispo	6.9	9.8	30.2	26.0	4.2	16.0	37.0	17.9	19.2
San Mateo	6.0	7.7	32.2	23.3	5.4	15.5	35.8	16.4	30.5
Santa Barbara	5.4	7.7	32.6	20.2	5.4	14.3	32.5	15.8	25.6
Santa Clara	5.8	6.1	30.4	21.6	5.5	11.7	34.0	17.5	25.7
Santa Cruz	7.6	9.6	29.9	19.3	4.1	13.8	32.2	18.3	19.1
Shasta	11.4	14.7	31.1	25.9	9.0	23.8	33.2	26.9	20.1
Solano	7.1	9.2	31.8	31.0	6.5	15.8	40.8	24.3	25.3
Sonoma	8.5	11.7	29.5	23.9	5.2	15.0	34.8	16.7	21.3
Stanislaus	5.6	5.9	32.2	21.4	5.9	21.5	42.0	23.5	32.0
Sutter, Yuba	11.9	8.2	35.0	23.6	8.7	23.8	37.1	20.5	30.5
Tulare	6.6	6.6	34.4	25.9	8.7	19.3	35.2	32.1	36.5
Ventura	5.6	8.9	31.5	22.5	5.1	13.4	30.6	19.6	27.3
Yolo	6.4	9.6	21.6	19.7	6.2	11.2	37.5	18.4	23.1
California	6.9	8.8	32.2	23.5	6.6	16.5	35.2	20.4	28.5

Note: Statistically unreliable prevalence estimates are in *italics*.

Data Sources:
California Health Interview Survey (CHIS)



Appendix C

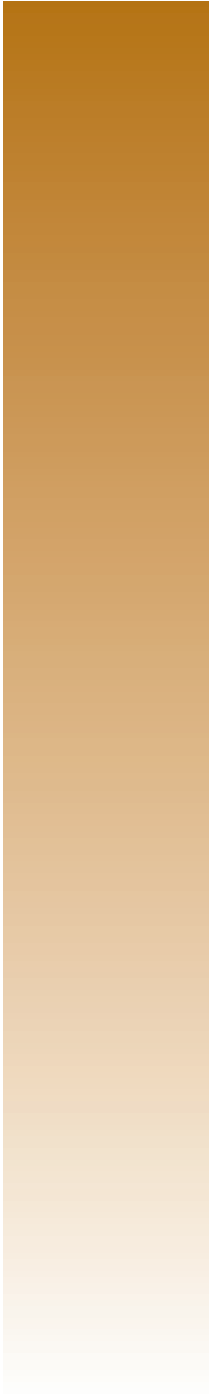
Age-Specific Heart Failure Morbidity Data



Since heart failure morbidity data are also often reported using age-specific rates, the following 2004 data are included in this report: For Californians under 45 years of age, there were 14,266 heart-failure-related discharges (corresponding to an age-specific rate of 0.6 discharges per 1,000 population); for those 45 through 64 years of age, there were 70,578 discharges (8.6 per 1,000); for those 65 through 84 years of

age, there were 191,064 discharges (55.4 per 1,000); and for those 85 years of age and older, there were 82,201 discharges (150.3 per 1,000). Note that these age-specific heart failure discharge counts (and corresponding rates) were generated using a methodology consistent with that used to generate the age-adjusted heart failure morbidity data presented above.





The mission of the California Heart Disease and Stroke Prevention Program is to reduce premature death and disability from heart disease and stroke among Californians.



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