



Center for Health Statistics



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This Data Summary is one of a series of leading cause of death reports.

Alzheimer's Disease Deaths California 2001

By Steven Shippen

Introduction

Alzheimer's disease is a progressive, degenerative disease of the brain, and the most common form of dementia. Approximately 4 million Americans have this disease. No one knows yet exactly what causes Alzheimer's disease. Researchers are learning about what happens to the brain as we grow older, what happens to brain cells in Alzheimer's disease, genes associated with Alzheimer's, and many other factors that may be important. Most researchers agree that the cause may be a complex set of factors.¹

Studies have shown that the greatest known risk for developing Alzheimer's is increasing age. As many as 10 percent of all people 65 years of age and older have Alzheimer's. As many as 50 percent of all people 85 and older have the disease. A family history of the disease is another known risk. Having a parent or sibling with the disease increases an individual's chances of developing Alzheimer's.¹

Since 1999 Alzheimer's disease has ranked eighth among the leading causes of death in California and in the United States.^{2,3,4} Nationally, the age-adjusted death rate for Alzheimer's increased 5.0 percent from 2000 to 2001 and increased 9.1 percent from 1999 to 2000.^{3,4} In California, the age-adjusted death rate for Alzheimer's increased 7.9 percent each period.²

Beginning in 1999 Alzheimer's is defined in accord with the International Classification of Diseases, Tenth Revision (ICD-10). Transitioning from the International Classification of Diseases, Ninth Revision (ICD-9) to ICD-10 brought about substantial changes to the coding and rules for selecting the underlying cause of death and created a major discontinuity in the time series trend for Alzheimer's disease between 1998 and 1999.^{3,5}

Highlights

- Alzheimer's disease is the eighth leading cause of death in California and in the United States.
- People aged 65 and older comprised 99.0 percent of Alzheimer's deaths among California residents in 2001.
- In 2001 California's age-adjusted death rate of 16.3 was lower than the U.S. rate of 19.0.
- San Diego (29.3) and Tulare (5.9) Counties had the highest and lowest Alzheimer's age-adjusted death rates, respectively.

¹ Alzheimer's Association website, www.alz.org, *Alzheimer's Disease Statistics*.

² State of California, Department of Health Services, Death Records, 1999, 2000, and 2001.

³ National Center for Health Statistics. *Final Data for 2000. National Vital Statistics Reports*; Vol 50, No 15. Hyattsville, Maryland: National Center for Health Statistics. 2002.

⁴ National Center for Health Statistics. *Deaths: Preliminary data for 2001. National Vital Statistics Reports*; Vol. 51, No. 5. Hyattsville, Maryland: National Center for Health Statistics, 2003.

⁵ National Center for Health Statistics. *Vital Statistics, Instructions for Classifying the Underlying Cause of Death*. NCHS Instruction Manual, Part 9. Hyattsville, Maryland: Public Health Service, 1999.

An overview of [data limitations and qualifications](#) is provided at the end of this report.

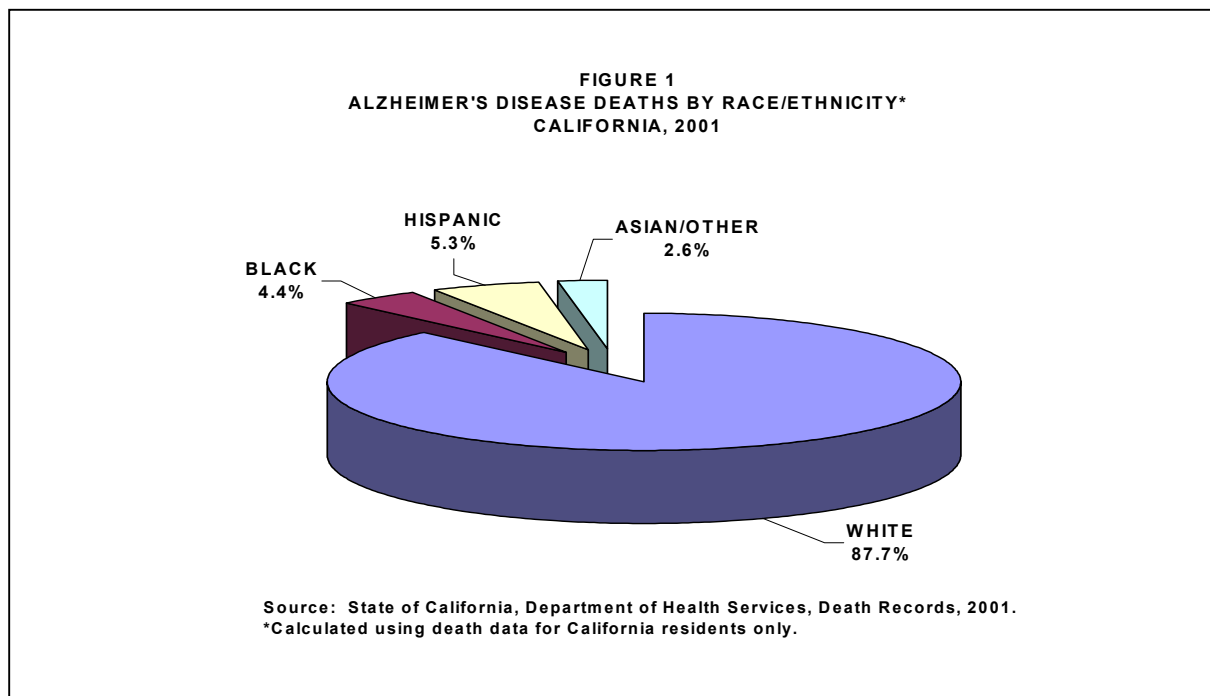
This report presents data on California's Alzheimer's disease deaths for 2001 and provides analysis of crude and age-adjusted death rates for California residents by sex, age, and race/ethnicity. Alzheimer's disease data are extracted from vital statistics records with death attributed to Alzheimer's disease as defined by ICD-10 code G30 in accordance with the National Center for Health Statistics (NCHS).⁵

Alzheimer's Disease Deaths

Table 1 (page 9) shows Alzheimer's disease death data for 2001 among California residents by race/ethnicity, age, and sex. In 2001 there were 4,897 deaths due to Alzheimer's disease of which 3,370 or 68.8 percent occurred among females and 1,527 or 31.2 percent occurred among males. The ratio of male to female deaths in 2001 was unchanged from the 1 to 2.2 ratio in 2000.⁶

Overall, 99.0 percent of 2001 Alzheimer's disease deaths occurred among residents aged 65 to 74 (5.7 percent), 75 to 84 (34.7 percent), and 85 and older (58.5 percent). These proportions were comparable to Alzheimer's disease deaths in 2000.⁶ Percentages may not add due to rounding.

Among the major race/ethnic groups, Whites had the highest number of Alzheimer's disease deaths (4,295) followed by Hispanics (259), Blacks (214), and Asian/Other (129). As shown in **Figure 1**, the percentage of Alzheimer's disease deaths among Whites (87.7 percent) was higher than Hispanics (5.3 percent), Blacks (4.4 percent), and Asian/Other (2.6 percent). In 2000, similar percentages occurred among Whites (86.9 percent), Hispanics (6.0 percent), Blacks (4.5 percent) and Asian/Other (2.5 percent).⁶



⁶Cynthia Schmidt. *Alzheimer's Disease Deaths California 1999-2000*. Center for Health Statistics, California Department of Health Services, July 2003.

See the [Methodological Approach](#) Section later in this report for an explanation of crude and age-specific death rates.

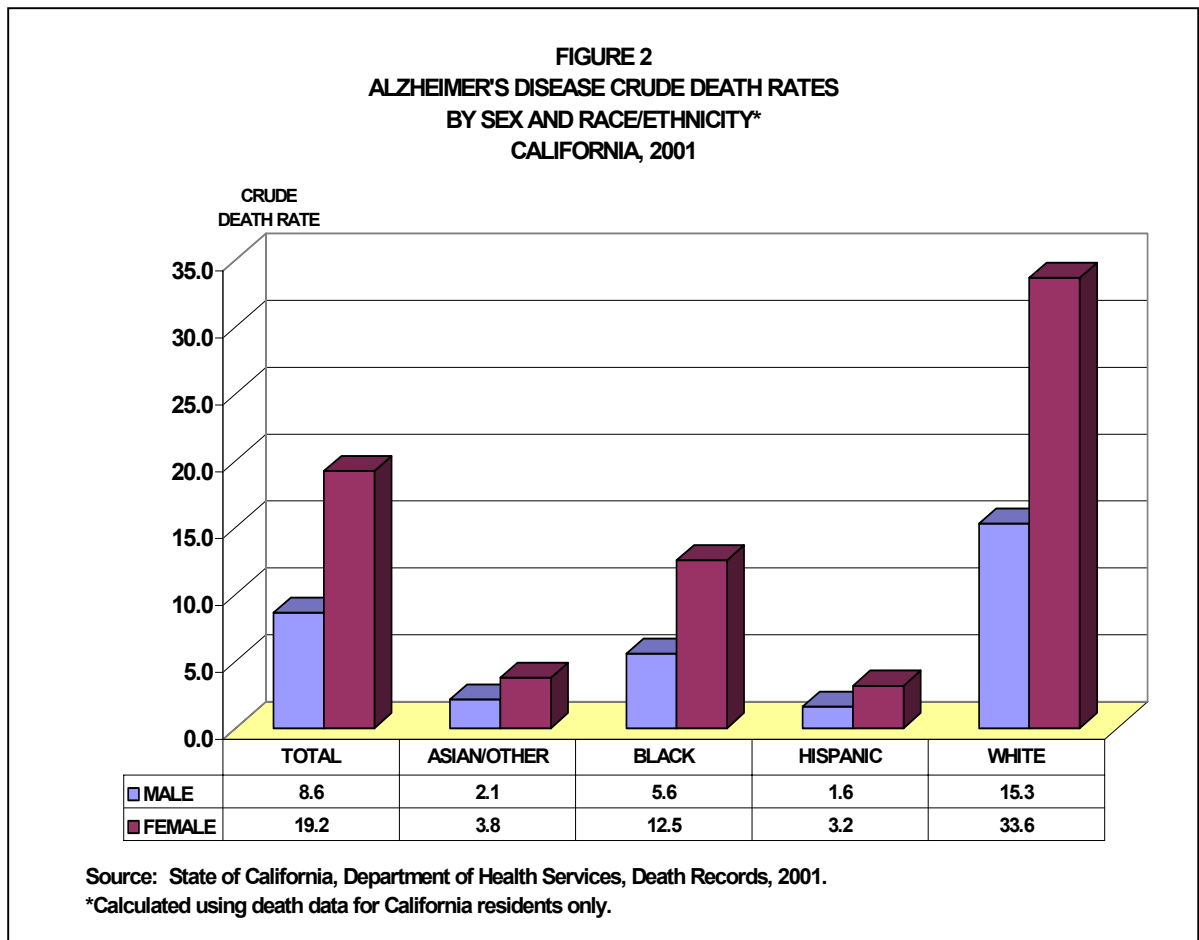
Alzheimer's Disease Crude Death Rates

As shown in **Table 1** (page 9), California's Alzheimer's disease crude death rate in 2001 was 13.9 per 100,000 population, an increase of 9.4 percent over the 12.7 rate in 2000.⁶ Among the race/ethnic groups, Whites had the highest crude rate (24.5) followed by Blacks (9.1), Asian/Other (3.0), and Hispanics (2.4).

Figure 2 shows males had an overall crude death rate of 8.6 per 100,000 population and females had a rate of 19.2. The crude death rates for females were higher than the male rates in each race/ethnic group and the differences between the male and female crude death rates within each race/ethnic group were statistically significant.

In 2001 the crude death rates for White males (15.3) and White females (33.6) were significantly higher than the corresponding rates in each of the other race/ethnic groups. The crude rate for Black males (5.6) was significantly higher than the rates for Asian/Other males (2.1) and Hispanic males (1.6). The crude death rate for Black females (12.5) was significantly higher than the rates for Hispanic females (3.2) and Asian/Other females (3.8).

Among reliable crude death rates in 2001, California residents aged 85 and older had an Alzheimer's rate 4.8 times higher than did residents aged 75 to 84. Compared with residents aged 65 to 74, the crude rate for persons aged 75 to 84 was 8.9 times higher while the crude death rate for persons aged 85 and older was 43.1 times higher.



See the Vital Statistics Query System (VSQ) at our Web site www.dhs.ca.gov/hisp/Applications/vsq/vsq.cfm to create your own vital statistics tables.

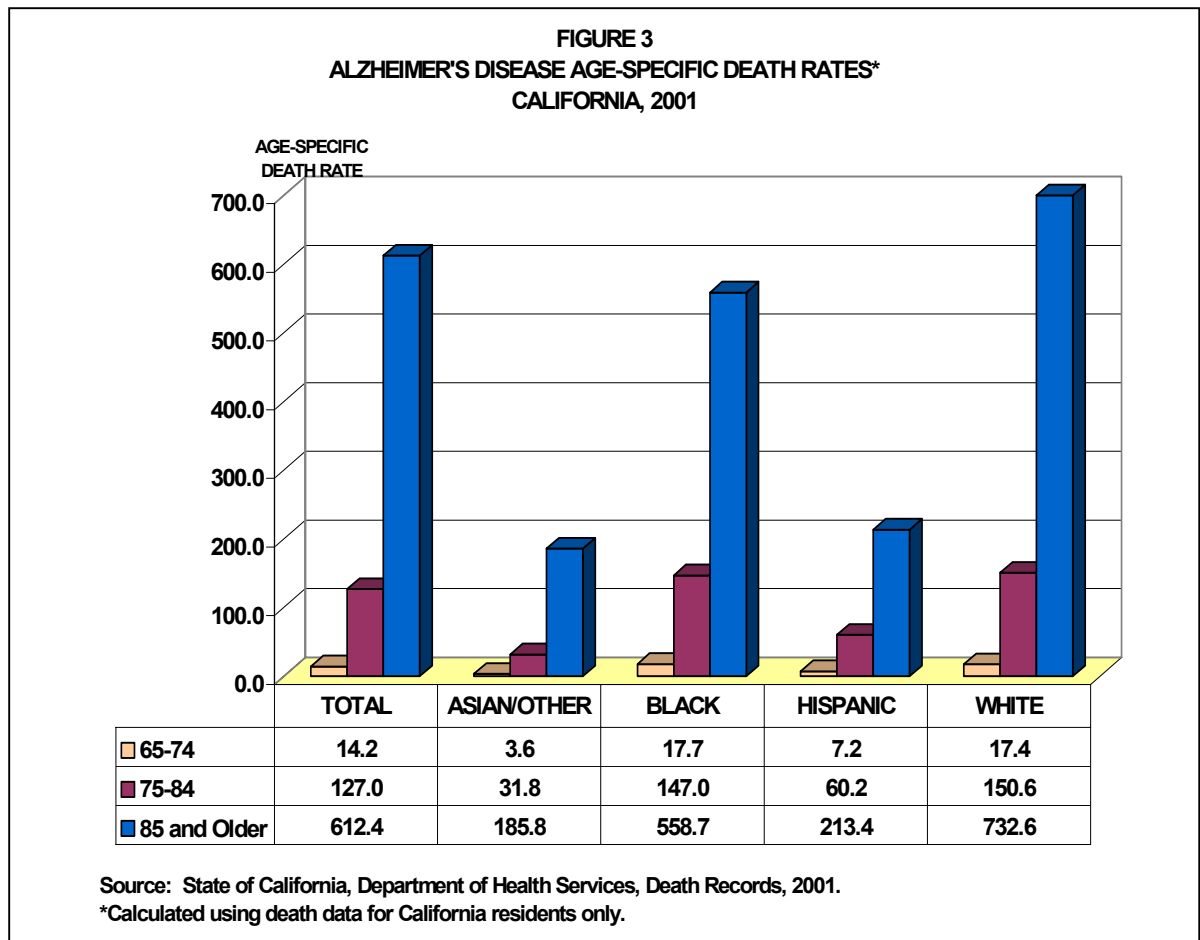
Alzheimer's Disease Age-Specific Death Rates

Table 1 (page 9) shows 2001 reliable age-specific death rates for California residents increased with age overall and within the major race/ethnic groups.

Because of the small numbers of Alzheimer's disease deaths occurring among persons under age 65, age-specific death rates for the younger age groups are not statistically reliable. Therefore, **Figure 3** shows age-specific death rates for only age groups 65 to 74, 75 to 84, and 85 and older.

In general and within age group, Whites had the highest age-specific death rates followed by Blacks, Hispanics, and Asian/Other. The exception was age group 65 to 74 where Black rates were slightly higher than for Whites. Hispanic and Asian/Other age-specific death rates were significantly lower than rates for Whites and Blacks. Age-specific death rates for Hispanics were significantly higher than Asian/Other rates in age group 75 to 84. There was no significant difference between Hispanics and Asian/Other rates in age groups 65 to 74 and 85 and older.

In California, reliable age-specific death rates were higher for females than corresponding rates for males in their age groups. The pattern was consistent among the four major race/ethnic groups, except for Hispanics aged 75 to 84. Differences between male and female rates for residents aged 85 and older were statistically significant for Whites, Hispanics, and Blacks, and among Whites aged 75 to 84.



For more data, see DHS Center for Health Statistics, Home Page at www.dhs.ca.gov/org/hisp/chs/chsindex.htm

Alzheimer's Disease Age-Adjusted Death Rates

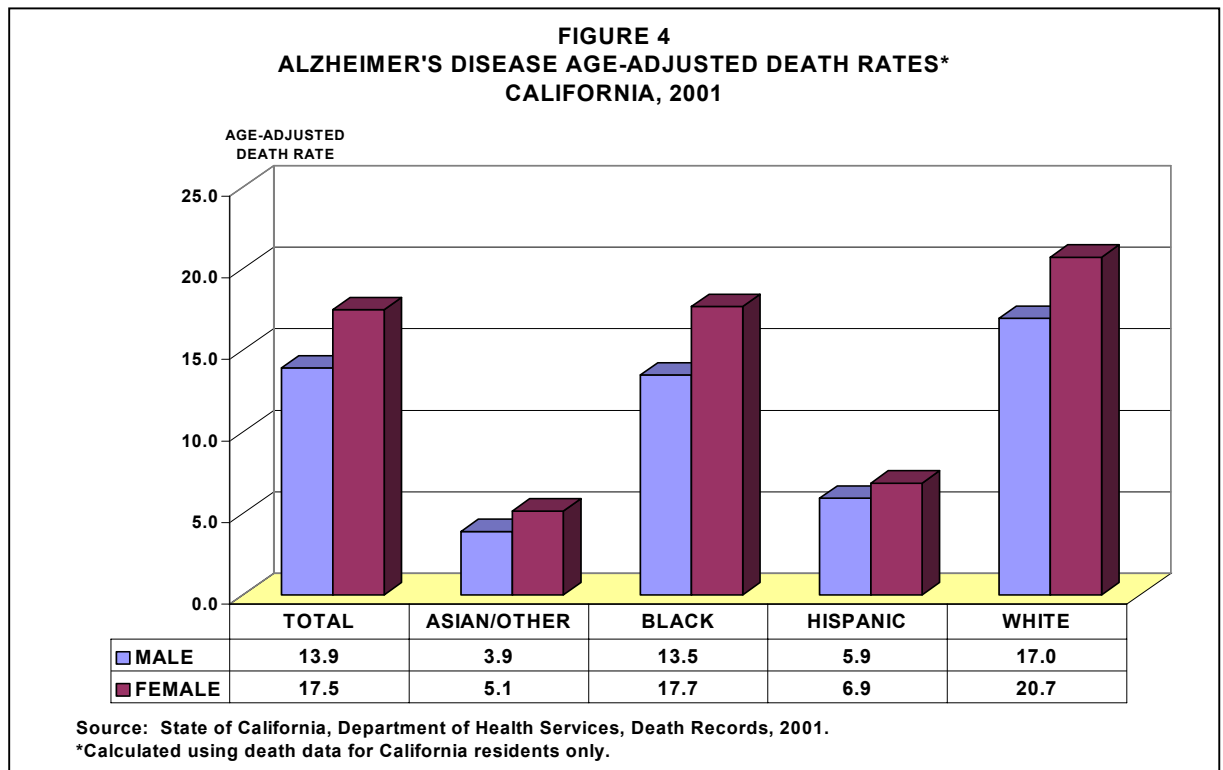
In 2001 California's age-adjusted death rate increased 7.9 percent from 15.1 in 2000 to 16.3 deaths per 100,000 population.⁶ For the second consecutive year California experienced identical rate increases, yet remained below the U. S. age-adjusted death rate in 2001 of 19.0 deaths per 100,000 population.⁴ The difference between California's male (13.9) and female (17.5) age-adjusted death rates in 2001 was statistically significant.

Overall and by gender, White and Black age-adjusted death rates were significantly higher than corresponding rates for Hispanic and Asian/Other. Conversely, Hispanic rates were significantly higher than Asian/Other rates. Age-adjusted death rates for Whites were significantly higher than corresponding rates for Blacks, except for males.

Figure 4 shows age-adjusted Alzheimer's disease death rates for 2001 among California residents by race/ethnicity and sex. Female age-adjusted death rates were higher than corresponding male rates among the major race/ethnic groups. Among females, Whites had the highest age-adjusted rate (20.7) followed by Blacks (17.7), Hispanics (6.9), and Asian/Other (5.1). Among males, Whites had the highest age-adjusted rate (17.0) followed by Blacks (13.5), Hispanics (5.9), and Asian/Other (3.9).

Compared with 2000, White females were the only gender specific race/ethnic group for which the differences between the age-adjusted death rates were statistically significant. Also significant in comparison with 2000 were age-adjusted death rates for all Whites, all females, and California overall.⁶

Whites were the only race/ethnic group in which the difference between the male and female age-adjusted death rate was statistically significant.



You can read more about crude and age-adjusted rates on the National Center for Health Statistics Web site at www.cdc.gov/nchs/

Alzheimer's Disease Death Rates for California Counties

Table 2 (page 10) shows the average number of Alzheimer's disease deaths during 1999-2001 with crude and age-adjusted death rates for California and its 58 counties.

California's crude and age-adjusted Alzheimer's disease death rates were 12.7 and 15.1, respectively. The rates were calculated using 2000 mid-year denominators per 100,000 population.

Los Angeles County had the highest average number of deaths (832.3) accounting for 18.9 percent of the three-year average Alzheimer's disease deaths in California (4,409.7). San Diego County had the next highest average number of deaths (756.7) followed by Orange County (311.7). Alpine County was the only county without a death attributed to Alzheimer's disease in 1999 to 2001.

Of the thirty-three counties with reliable crude death rates, Napa County had the highest rate (35.9) followed by San Diego County (25.7) and Placer County (23.5).

Of the thirty-three counties with reliable age-adjusted death rates, San Diego County had the highest rate (29.3) followed by Placer County (25.1) and Napa County (24.8).

Tulare County had the lowest reliable crude (5.1) and age-adjusted (5.9) death rates.

Alzheimer's Disease Deaths among the Three City Health Jurisdictions

Table 3 shows the 1999-2001 average numbers of Alzheimer's disease deaths and crude death rates for California's three city health jurisdictions.

Age-adjusted death rates were not calculated for the city health jurisdictions because city population data by age are not available.

TABLE 3
DEATHS DUE TO ALZHEIMER'S DISEASE
AMONG THE CITY HEALTH JURISDICTIONS
CALIFORNIA, 1999-2001*

CITY HEALTH JURISDICTION	NUMBER OF DEATHS (Average)	2000 POPULATION	CRUDE DEATH RATE
BERKELEY	16.0	102,500	15.6 **
LONG BEACH	43.0	459,900	9.3
PASADENA	21.7	133,600	16.2

Note: Rates are per 100,000 population; ICD-10 code G30.

* Calculated using death data for California residents only.

** Death rate unreliable (relative standard error is greater than or equal to 23 percent)

Sources: State of California, Department of Finance, E-4 Historical City/County Population Estimates 1991-2000, with 1990 Census Counts, March 2002.

State of California, Department of Health Services, Death Records.

Long Beach had the highest average number of deaths (43.0) followed by Pasadena (21.7) and Berkeley (16.0). Crude death rates per 100,000 population were 16.2 for Pasadena, 15.6 for Berkeley, and 9.3 for Long Beach. The crude death rate for Berkeley was unreliable.

Methodological Approach

The methods used to analyze vital statistics data are important. Analyzing only the number of deaths has its disadvantages and can be misleading because the population at risk is not taken into consideration. Crude death rates show the actual rate of dying in a given population, but because of the age compositions of various populations, crude rates do not provide a statistically valid method for comparing geographic areas or multiple reporting periods. Age-specific death rates are the number of deaths per 100,000 population in a specific age group and are used along with standard population proportions to develop a weighted average rate. This rate is referred to as an age-adjusted death rate and removes the effect of different age structures of the populations whose rates are being compared. Age-adjusted death rates, therefore, provide the preferred method for comparing different race/ethnic groups, sexes, and geographic areas, and for measuring death rates over time. The year 2000 population is used as the standard for age-adjustment in this report.

Data Limitations and Qualifications

The Alzheimer's disease death data presented in this report are based on vital statistics records with ICD-10 code G30 as defined by the NCHS.⁵ Place of residence means that the data reflects events occurring for residents of California and its counties, regardless of where the event occurred.

The term "significant" within the text means that the variance is statistically significant based on the difference between two independent rates ($p < .05$).

As with any vital statistics data, caution needs to be exercised when analyzing small numbers, including the rates derived from them. Death rates calculated from a small number of deaths and/or population tend to be unreliable and subject to significant variation from one year to the next. To assist the reader, 95 percent confidence intervals are provided in the data tables as a tool for measuring the reliability of death rates. Rates with a relative standard error (coefficient of variation) greater than or equal to 23 percent are indicated with an asterisk (*).

Beginning in 1999, cause of death was reported in the United States using the ICD-10.⁷ Cause of death for 1979 through 1998 was coded using the ICD-9. Depending on the specific cause of death, the number of deaths and death rate are not comparable between ICD-9 and ICD-10. Therefore, our analyses involve only ICD-10 data for this report (1999-2001), and do not combine both ICD-9 and ICD-10 data.

The four race/ethnic groups presented in the tables are mutually exclusive. White, Black, and Asian/Other exclude Hispanic ethnicity, while Hispanic includes any race/ethnic group. In order to remain consistent with the population data obtained from the Department of Finance, the "White race/ethnic group" includes: White, Other (specified), Not Stated, and Unknown, and "Asian/Other race/ethnic group" includes: Aleut, American Indian, Asian Indian, Asian (specified/unspecified), Cambodian, Chinese, Eskimo, Filipino, Guamanian, Hawaiian, Hmong, Japanese, Korean, Laotian, Other Pacific Islander, Samoan, Thai, and Vietnamese.

⁷World Health Organization. International Statistical Classification of Diseases and Related Health Problems. Tenth Revision. Geneva: World Health Organization. 1992.

In addition, caution should be exercised in the interpretation of mortality data by race/ethnicity. Misclassification of race/ethnicity on the death certificate may contribute to death rates that may be underestimated among Hispanics and Asian/Other.⁸

Beginning in 2000, federal race/ethnicity reporting guidelines changed to allow the reporting of up to three races on death certificates. The race/ethnic groups in this report were tabulated based on the first listed race on those certificates where more than one race was listed. Race groups are therefore not strictly comparable with prior years and trends should be viewed with caution.

Effective with 1999 mortality data, the standard population for calculating age-adjustments was changed from the 1940 population standard to the year 2000 population standard, in accordance with new statistical policy implemented by the National Center for Health Statistics. The new population standard affects measurement of mortality trends and group comparisons. Of particular note are the effects on race comparison of mortality.⁹ Age-adjusted rates presented in this report are not comparable to rates calculated with different population standards.

In addition, the population data used to calculate the crude rates in **Table 3** (page 6) differ from the population data used to calculate the crude rates in **Table 2** (page 10). Consequently, caution should be exercised when comparing rates among the three city health jurisdictions with the rates among the 58 California counties. Age-adjusted rates for city health jurisdictions were not calculated due to the unavailability of city population data by age.

For a more complete explanation of the age-adjustment methodology used in this report, see the “Healthy People 2010 Statistical Notes publication.”¹⁰ Detailed information on data quality and limitations is presented in the appendix of the annual report, “Vital Statistics of California.”¹¹ Formulas used to calculate death rates are included in the technical notes of the “County Health Status Profiles” report.¹²

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⁸Rosenberg HM, et al. Quality of Death Rates by Race and Hispanic Origin: A Summary of Current Research, 1999. Vital and Health Statistics, Series 2 No. 128, National Center for Health Statistics, DHHS Pub. No. (PHS) 99-1328, September 1999.

⁹Kochanek KD, Smith BL, Anderson RN. Deaths: Preliminary Data for 1999. National Vital Statistics Reports; Vol. 49, No. 3. Hyattsville, Maryland: National Center for Health Statistics. 2001.

¹⁰Klein RJ, Schoenborn, CA. Healthy People 2010 Statistical Notes: Age Adjustment using the 2000 Projected U.S. Population. National Center for Health Statistics, DHHS Publication, No 20. January 2001.

¹¹Riedmiller K. Bindra K. Vital Statistics of California, 1999. Center for Health Statistics, California Department of Health Services, April 2002.

¹²Schmidt C, Wilson C. County Health Status Profiles 2003. Center for Health Statistics, California Department of Health Services, April 2003.

TABLE 2
DEATHS DUE TO ALZHEIMER'S DISEASE
CALIFORNIA COUNTIES, 1999-2001
(By Place of Residence)

COUNTY	1999 - 2001 DEATHS (AVERAGE)	PERCENT	2000 POPULATION	CRUDE RATE	AGE-ADJUSTED RATE	95% CONFIDENCE LIMITS	
						LOWER	UPPER
CALIFORNIA	4,409.7	100.0	34,653,395	12.7	15.1	14.7	15.6
ALAMEDA	194.7	4.4	1,470,155	13.2	15.8	13.5	18.0
ALPINE	0.0	0.0	1,239	0.0 *	0.0 *	-	-
AMADOR	6.0	0.1	34,853	17.2 *	11.1 *	2.2	20.1
BUTTE	31.3	0.7	207,158	15.1	9.5	6.1	12.8
CALAVERAS	4.3	0.1	42,041	10.3 *	7.1 *	0.4	13.9
COLUSA	1.3	a	20,973	6.4 *	6.0 *	0.0	16.2
CONTRA COSTA	123.0	2.8	931,946	13.2	14.6	12.0	17.2
DEL NORTE	2.0	a	31,155	6.4 *	5.3 *	0.0	12.7
EL DORADO	24.0	0.5	163,197	14.7	16.3	9.7	22.8
FRESNO	98.3	2.2	811,179	12.1	14.6	11.7	17.5
GLENN	3.7	0.1	29,298	12.5 *	10.4 *	0.0	21.1
HUMBOLDT	26.7	0.6	128,419	20.8	20.1	12.5	27.8
IMPERIAL	7.3	0.2	154,549	4.7 *	6.2 *	1.7	10.7
INYO	1.0	a	18,437	5.4 *	3.4 *	0.0	10.2
KERN	56.7	1.3	677,372	8.4	10.2	7.5	12.8
KINGS	8.0	0.2	126,672	6.3 *	10.5 *	3.2	17.7
LAKE	6.7	0.2	60,072	11.1 *	6.1 *	1.5	10.7
LASSEN	4.3	0.1	35,959	12.1 *	13.8 *	0.8	26.8
LOS ANGELES	832.3	18.9	9,838,861	8.5	11.3	10.5	12.0
MADERA	28.7	0.7	126,394	22.7	24.2	15.4	33.1
MARIN	30.7	0.7	248,397	12.3	12.0	7.7	16.2
MARIPOSA	2.3	0.1	16,762	13.9 *	8.9 *	0.0	20.3
MENDOCINO	10.7	0.2	90,442	11.8 *	10.5 *	4.2	16.9
MERCED	23.0	0.5	215,256	10.7	15.0	8.9	21.2
MODOC	4.0	0.1	10,481	38.2 *	25.9 *	0.5	51.3
MONO	0.7	a	10,891	6.1 *	10.1 *	0.0	34.4
MONTEREY	45.0	1.0	401,886	11.2	14.5	10.3	18.8
NAPA	45.7	1.0	127,084	35.9	24.8	17.6	32.1
NEVADA	13.3	0.3	97,020	13.7 *	9.1 *	4.2	14.0
ORANGE	311.7	7.1	2,833,190	11.0	16.1	14.3	17.8
PLACER	57.3	1.3	243,646	23.5	25.1	18.6	31.6
PLUMAS	2.0	a	20,852	9.6 *	6.2 *	0.0	14.9
RIVERSIDE	272.3	6.2	1,570,885	17.3	16.4	14.4	18.3
SACRAMENTO	152.3	3.5	1,212,527	12.6	15.2	12.8	17.6
SAN BENITO	4.7	0.1	51,853	9.0 *	10.8 *	1.0	20.6
SAN BERNARDINO	186.3	4.2	1,727,452	10.8	16.8	14.4	19.2
SAN DIEGO	756.7	17.2	2,943,001	25.7	29.3	27.2	31.3
SAN FRANCISCO	134.7	3.1	792,049	17.0	12.6	10.4	14.7
SAN JOAQUIN	59.0	1.3	579,712	10.2	10.8	8.0	13.5
SAN LUIS OBISPO	46.7	1.1	254,818	18.3	14.6	10.4	18.8
SAN MATEO	120.0	2.7	747,061	16.1	16.1	13.3	19.0
SANTA BARBARA	69.0	1.6	412,071	16.7	16.0	12.2	19.8
SANTA CLARA	171.7	3.9	1,763,252	9.7	14.9	12.6	17.1
SANTA CRUZ	24.3	0.6	260,248	9.4	9.8	5.9	13.7
SHASTA	23.3	0.5	175,777	13.3	11.6	6.9	16.3
SIERRA	0.7	a	3,457	19.3 *	12.0 *	0.0	41.4
SISKIYOU	10.0	0.2	45,194	22.1 *	16.1 *	6.1	26.0
SOLANO	59.3	1.3	399,841	14.8	23.6	17.6	29.7
SONOMA	89.0	2.0	459,258	19.4	17.1	13.5	20.7
STANISLAUS	63.3	1.4	459,025	13.8	16.1	12.1	20.0
SUTTER	5.3	0.1	82,040	6.5 *	6.2 *	0.9	11.5
TEHAMA	6.7	0.2	56,666	11.8 *	8.2 *	2.0	14.4
TRINITY	1.0	a	13,490	7.4 *	5.7 *	0.0	16.9
TULARE	19.3	0.4	379,944	5.1	5.9	3.3	8.6
TUOLUMNE	8.7	0.2	56,125	15.4 *	10.8 *	3.6	18.0
VENTURA	90.0	2.0	753,820	11.9	15.2	12.0	18.3
YOLO	25.3	0.6	164,010	15.4	18.9	11.5	26.3
YUBA	3.3	0.1	63,983	5.2 *	6.7 *	0.0	13.8

Note: ICD-10 code G30; rates are per 100,000 population.
Year 2000 U.S. standard population is used for age-adjusted rates.

* Death rate unreliable (relative standard error is greater than or equal to 23 percent).

a Represents a percentage of more than zero but less than 0.05.
- Confidence limit is not calculated for no (zero) events.

Source: State of California, Department of Finance, 2000 Population Projections with Age, Sex and Race/Ethnic Detail, December 1998.
State of California, Department of Health Services, Death Records.