



ALZHEIMER'S DISEASE TRENDS IN CALIFORNIA

2000-2015

December 2018



At a Glance

- Alzheimer's disease ranked as the third leading cause of death in California in 2015.
- Deaths in California due to Alzheimer's disease increased 243 percent from 2000 to 2015.
- California's age-adjusted Alzheimer's disease mortality rate increased significantly from 2000 (16.0) to 2015 (35.7).
- Females accounted for approximately 68 percent of the 146,121 Alzheimer's disease deaths in California over this period.
- Both males and females exhibited significantly increasing linear trends in their Alzheimer's disease age-adjusted death rates.
- The average age of death in California due to Alzheimer's disease was 86.9 years with a standard deviation of 7.7 years.
- Residents aged 85 years and older accounted for approximately 67 percent of all Alzheimer's disease deaths in California.

Background

Alzheimer's is a progressive, neurodegenerative disease that results in memory loss, impaired cognitive function, and ultimately death. Although the etiology of this disease is not fully understood, it is physically manifested over time by dramatic changes in the size, shape, and neuroplasticity of several structures within the brain.^{1,2} Early onset of the disease is characterized symptomatically by a decline in critical thinking skills, as well as the inability to recall newly learned information.^{1,2} As Alzheimer's advances, these deficits to decision making become more debilitating, and are often accompanied by behavioral changes (e.g., mood swings, general confusion, hallucinations) that, in part, lead to a withdrawal from socialized activities.^{1,2} During late-stage Alzheimer's, significant reductions in both the number and myelination of neuronal tissue, combined with a build-up of neurofibrillary tangles and amyloid-beta protein, render the afflicted unable to communicate with others or to care for themselves.^{1,3} Currently there is no cure for Alzheimer's, and medications developed to combat the disease are designed only to manage the myriad of cognitive and behavioral symptoms resulting from its progression.^{1,2}

Alzheimer's is the sixth leading cause of death nationwide, and is the most common cause of dementia among the elderly.^{1,4} Recent estimates indicate that 630,000 Californians are currently living with this disease,⁵ and that 952 million hours of unpaid care per year, valued at approximately \$10 billion, are required for its treatment.⁶ By the year 2030, over one million California residents are projected to incur this illness, with the cost of formal treatment rising to nearly \$32 billion.⁶ Moreover, California businesses are expected to lose an estimated \$1.4 billion in annual productivity due to employed persons taking leave from work, or quitting their job entirely, in order to care for a relative afflicted with Alzheimer's.⁶ In all, the total cost to treat California residents with Alzheimer's disease is expected to double over the next 20 years to \$99 billion.⁶

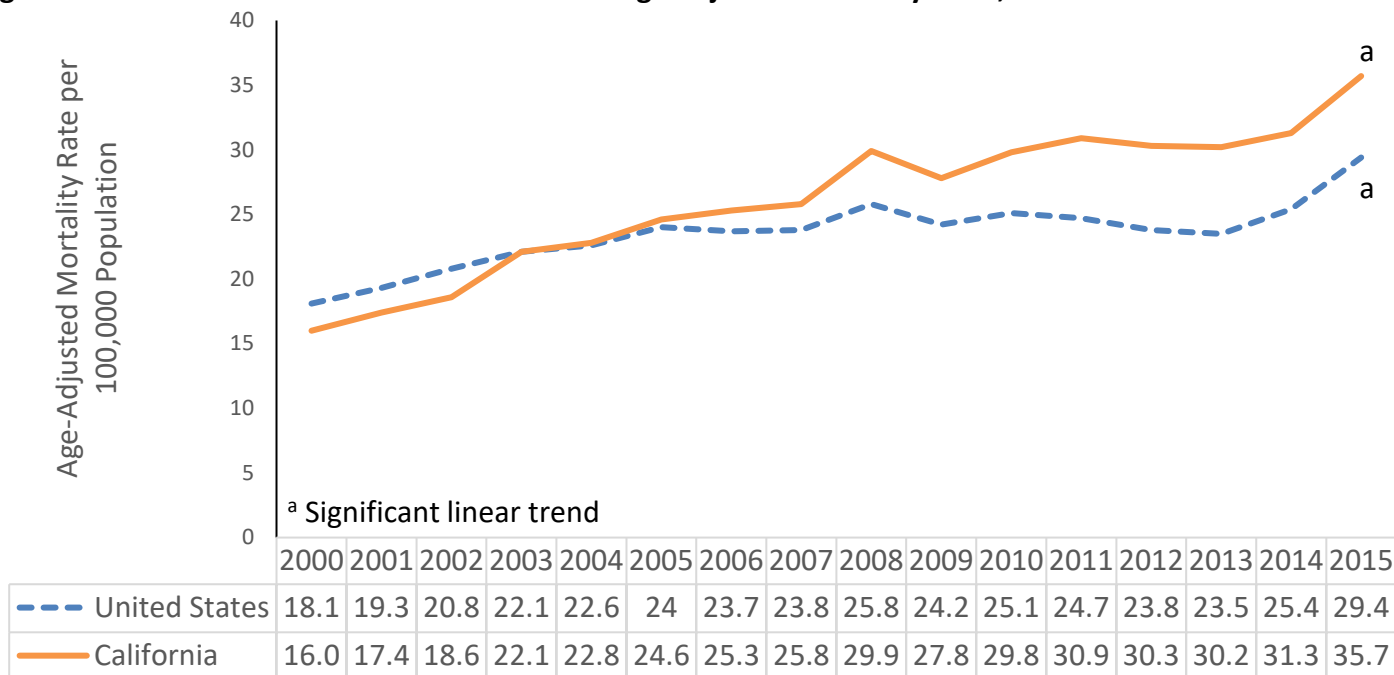
Data Sources and Methods

This report examines Alzheimer’s disease mortality trends in California from 2000 through 2015. Death data used in the analysis of these trends were obtained from the California Department of Public Health’s Death Statistical Master Files (2000-2013), as well as the California Comprehensive Master Death Files (2014, 2015). Decedents were included in the study sample if their underlying cause of death, as defined by the International Classification of Diseases, Tenth Revision (ICD-10), was coded G30 (i.e., Alzheimer’s disease). Population data were extracted from various sources published and maintained by the California Department of Finance.⁷ These mortality and population figures were used in combination to compute crude, age-specific, and age-adjusted mortality rates for males and females of six age cohorts: 35 to 44 years, 45 to 54 years, 55 to 64 years, 65 to 74 years, 75 to 84 years, and 85 years and older. Linear regression was used to analyze mortality trends for each age cohort, and to identify any significant differences ($p < .05$) between males and females.

Alzheimer’s Disease in California

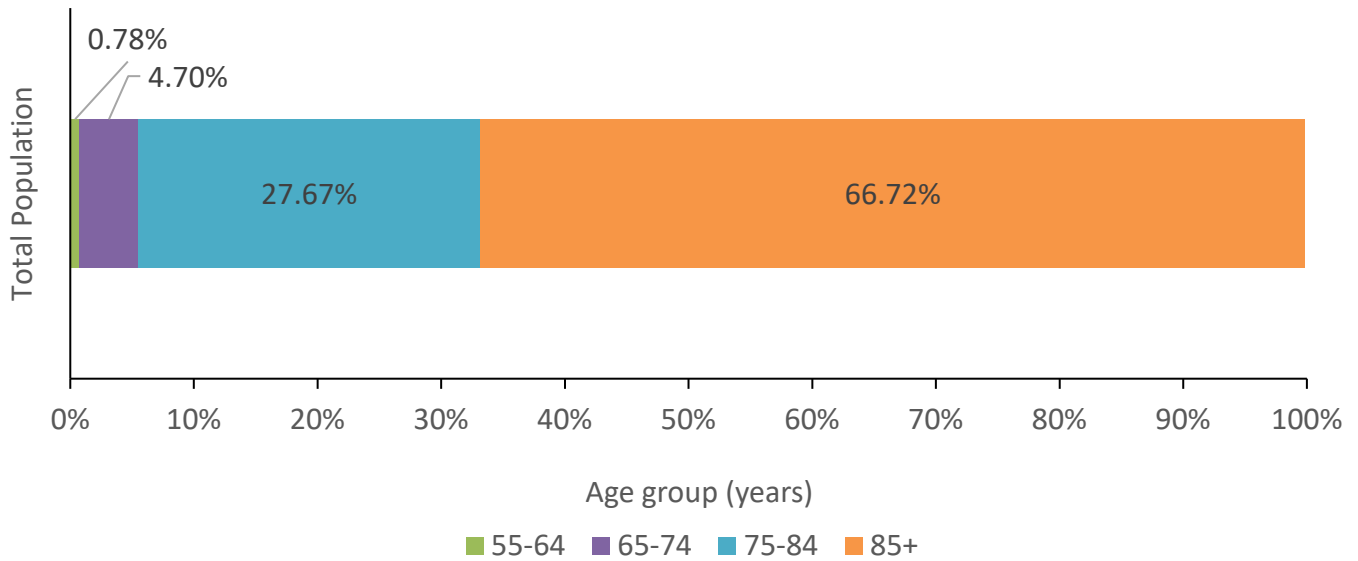
California’s age-adjusted Alzheimer’s disease mortality rate increased 123 percent from 2000 (16.0) to 2015 (35.7). In comparison, the nationwide rate increased by only 62 percent over the same period^{8, 9, 10} (Figure 1).

Figure 1: California and U.S. Alzheimer’s disease age-adjusted mortality rates, 2000-2015.



Of the 146,121 Alzheimer’s disease deaths that occurred in California from 2000 through 2015, the majority (66.7 percent) of decedents were 85 years of age and older (Figure 2).

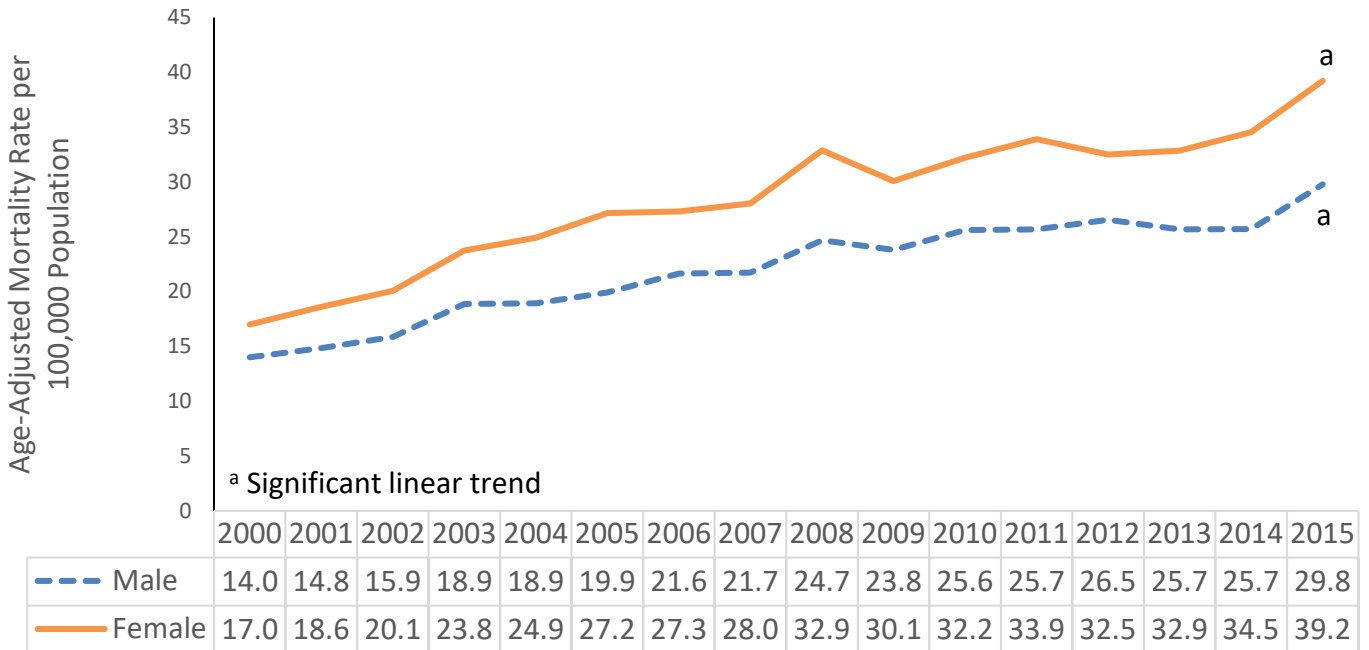
Figure 2: Age distribution of Alzheimer’s disease deaths in California, 2000-2015.



Note: Age-specific results provided in this report do not include data from the two youngest cohorts (35 to 44 years; 45 to 54 years), as each accounted for less than 0.2 percent of the total number of Alzheimer’s deaths in California.

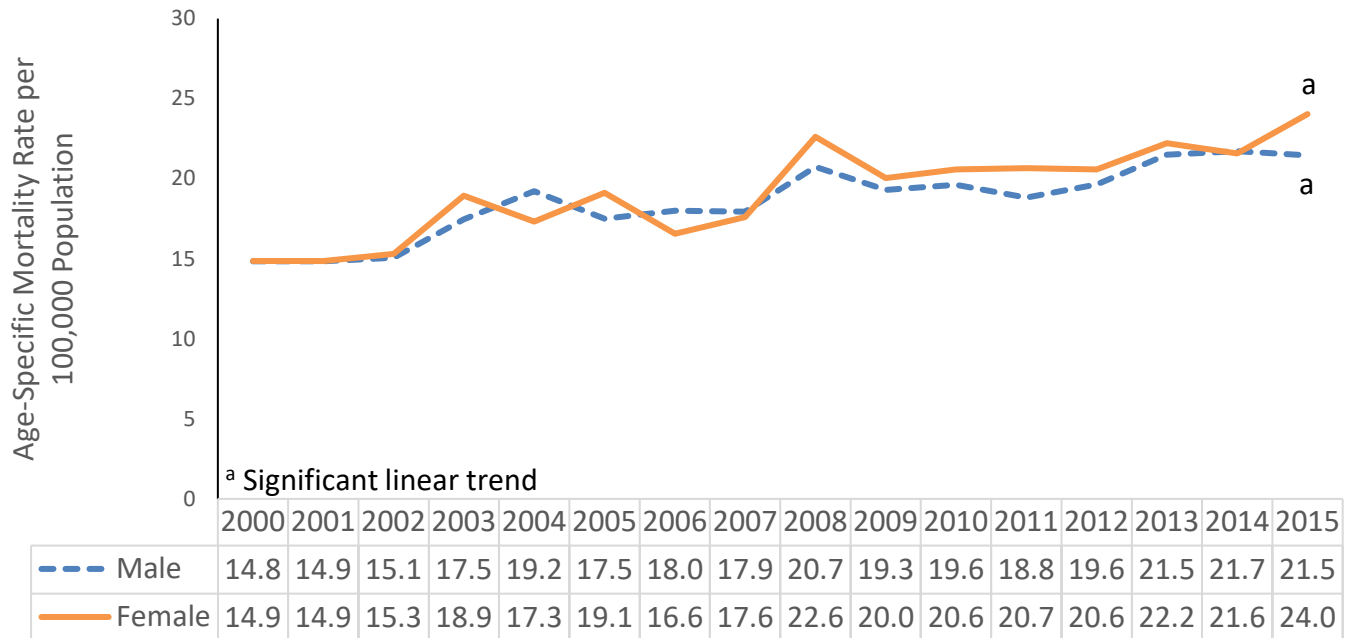
Females represented approximately 68 percent of all Alzheimer’s disease deaths in California from 2000 through 2015. As displayed below in Figure 3, both males and females exhibited significantly increasing linear trends in their age-adjusted Alzheimer’s disease mortality rates over this period, with females, on average, experiencing significantly higher rates than males. This analysis also revealed that the rate of increase in the Alzheimer’s age-adjusted rate for females was significantly greater compared to males.

Figure 3: Alzheimer’s disease age-adjusted mortality rates in California by sex, 2000-2015.



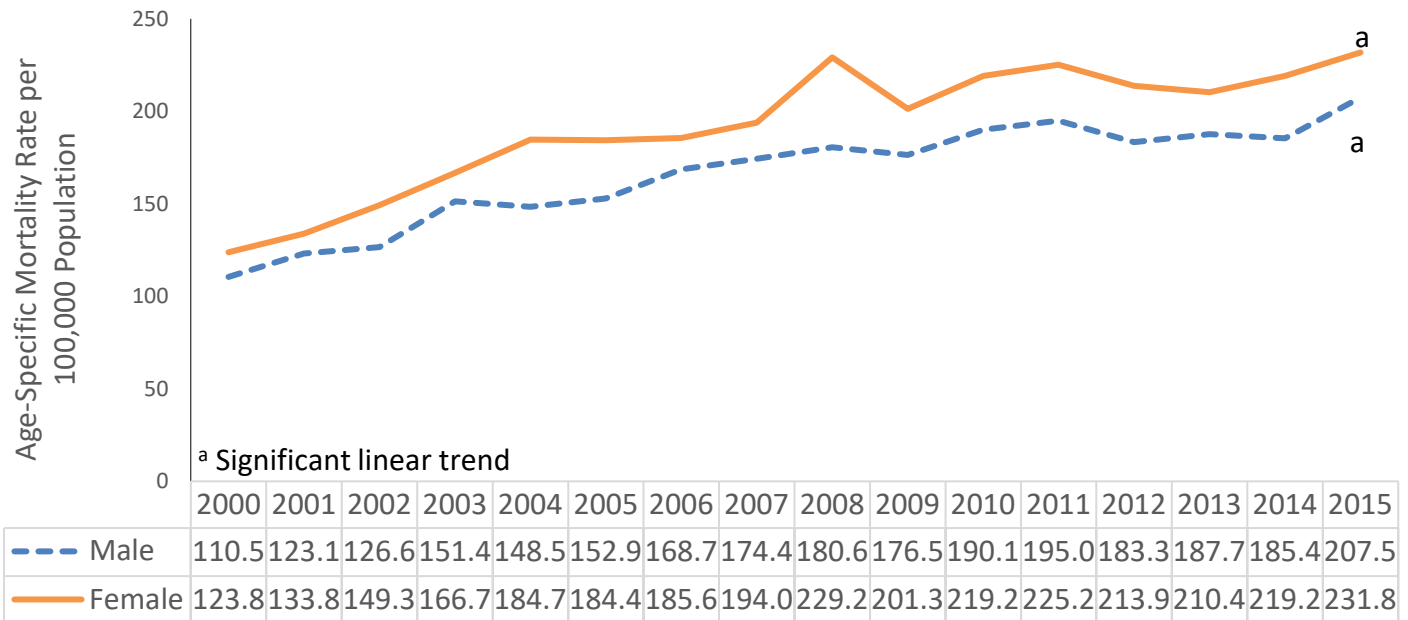
Age-specific death rates for males and females aged 65 to 74 increased significantly from 2000 through 2015, though no statistically significant difference between males and females was found (Figure 4).

Figure 4: Alzheimer’s disease age-specific mortality rates for Californians aged 65 to 74 years by sex, 2000-2015.



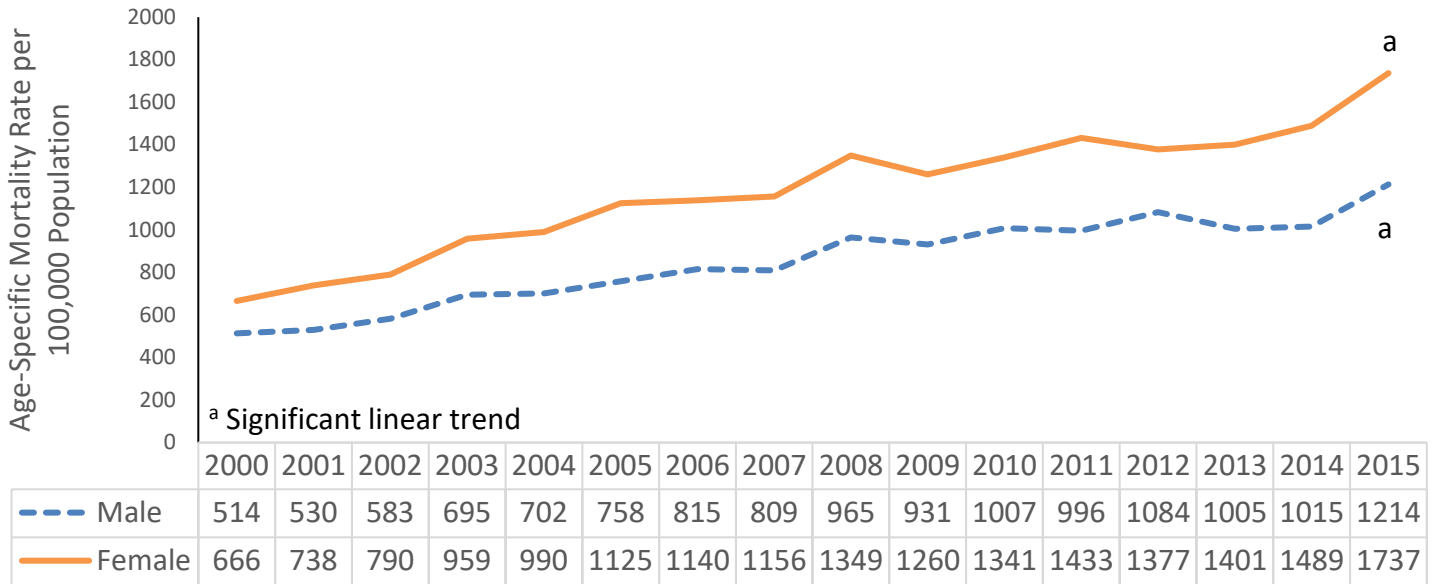
Further analyses revealed similar findings for decedents aged 75 to 84, in that the Alzheimer’s age-specific mortality trend for both males and females increased significantly from 2000 through 2015. However, females of this age cohort were found to have a significantly higher age-specific death rate compared to males (Figure 5).

Figure 5: Alzheimer’s disease age-specific mortality rates for Californians aged 75 to 84 years by sex, 2000-2015.



Data for the oldest cohort (85 years and older) revealed a significant linear increase in the Alzheimer’s age-specific mortality trend for both males and females, with females exhibiting higher rates than males. Analyses of these trends also demonstrated that the rate of increase in Alzheimer’s age-specific mortality from 2000 through 2015 was significantly greater for females than for males (Figure 6).

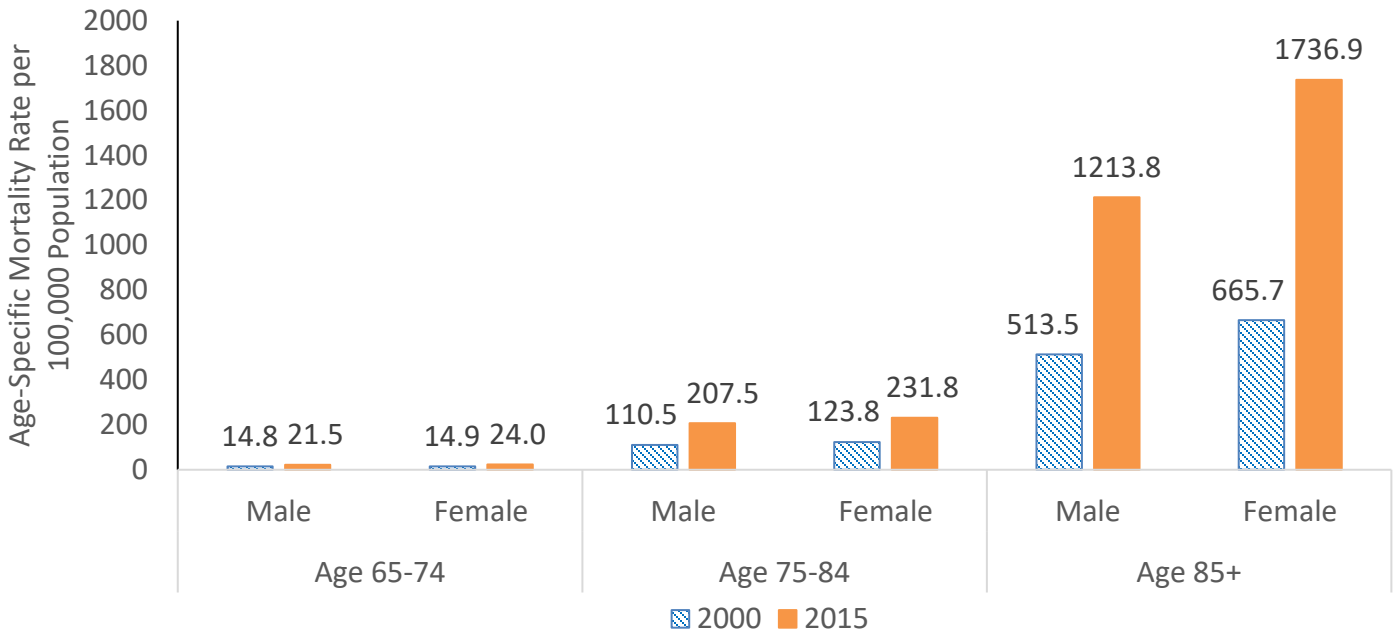
Figure 6: Alzheimer’s disease age-specific mortality rates for Californians aged 85 years and older by sex, 2000-2015.



Note: Values above are rounded to the nearest whole number due to space considerations.

The results presented above indicate that females, particularly those 85 years and older, experienced the greatest increase in Alzheimer’s disease mortality of any demographic identified in this report. This finding becomes even more apparent upon comparing age-specific mortality rates in 2000 to rates established in 2015. These comparisons, depicted below in Figure 7, demonstrate that the Alzheimer’s age-specific mortality rate for females 85 years and older nearly tripled over the course of the study period.

Figure 7: Alzheimer’s disease age-specific mortality rates in California by sex, 2000 vs 2015.



What is California Doing?

California Senate Bill 491 (Chapter 339, Statutes of 2008) formally recognized the need to prepare for the staggering increase in the number of Alzheimer's patients expected over the next 20 years. Through the efforts of various public and private health entities (e.g., State Alzheimer's Disease and Related Disorders Advisory Committee, Alzheimer's Association, California Health and Human Services), a 10-year (2011-2021) state action plan¹¹ was developed to provide recommendations for achieving various goals pertaining to Alzheimer's disease care in California.

Technical Notes

Age-Specific Rate: The number of deaths to occur within a specific age group, divided by the number of individuals who comprise that age group, multiplied by (per) 100,000 population. Age-specific rates allow for comparisons of mortality within a given age group over time, or between different age groups at a particular point in time.

Age-Adjusted Rate: Age-adjustment becomes necessary when one wishes to compare health indicators between groups (e.g., males vs females) or regions (e.g., cities, counties) that may contain disparate age distributions. Age-adjusted rates are computed first by calculating the age-specific rates of each group under investigation. These rates are then weighted (i.e., multiplied) by their respective proportions found within a "standard" population (typically the 2000 U.S. Standard Population). These weighted rates are then summed to produce a single metric (i.e., age-adjusted rate) for the entire group.

References

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