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Dementia Mortality in the United States, 2000–2017

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Abstract

Objectives—This report presents data on mortality attributable to dementia. Data for dementia as an underlying cause of death from 2000 through 2017 are shown by selected characteristics such as age, sex, race and Hispanic origin, and state of residence. Trends in dementia deaths overall and by specific cause are presented. The reporting of dementia as a contributing cause of death is also described.

Methods—Data in this report are based on information from all death certificates filed in the 50 states and the District of Columbia. Using multiple cause-of-death data files, dementia is considered to include deaths attributed to unspecified dementia; Alzheimer disease; vascular dementia; and other degenerative diseases of nervous system, not elsewhere classified.

Results—In 2017, a total of 261,914 deaths attributable to dementia as an underlying cause of death were reported in the United States. Forty-six percent of these deaths were due to Alzheimer disease. In 2017, the age-adjusted death rate for dementia as an underlying cause of death was 66.7 deaths per 100,000 U.S. standard population. Age-adjusted death rates were higher for females (72.7) than for males (56.4). Death rates increased with age from 56.9 deaths per 100,000 among people aged 65–74 to 2,707.3 deaths per 100,000 among people aged 85 and over. Age-adjusted death rates were higher among the non-Hispanic white population (70.8) compared with the non-Hispanic black population (65.0) and the Hispanic population (46.0). Age-adjusted death rates for dementia varied by state and urbanization category. Overall, age-adjusted death rates for dementia increased from 2000 to 2017. Rates were steady from 2013 through 2016, and increased from 2016 to 2017. Patterns of reporting the individual dementia causes varied across states and across time.

Conclusions—Death rates due to dementia varied by age, sex, race and Hispanic origin, and state. In 2017, Alzheimer disease accounted for almost one-half of all dementia deaths. The proportion of dementia deaths attributed to Alzheimer disease varies across states.

Keywords: Alzheimer disease • vital statistics • death rates • cause of death

Introduction

Dementia, including Alzheimer disease and other dementias, presents a major public health challenge in the United States. Dementia is characterized by memory impairment and cognitive decline. Alzheimer disease is the most common cause of dementia. Other dementias, including Lewy body dementia, frontotemporal degeneration, vascular dementia, and mixed dementias, are often indistinguishable from Alzheimer disease in their symptoms and outcomes and may coexist with Alzheimer disease (1,2).

Identifying causes of death for people with dementia is challenging. In addition to the complexity of diagnosing Alzheimer disease and other dementias before death, determining the underlying cause of death can be affected by the completeness and accuracy of cause-of-death statements recorded on death certificates and the increasing number of conditions present at death as the population ages (3). Most cases of dementia are found in older adults, and a large portion of older adults have multiple chronic conditions (4). Therefore, dementias at the end of life often co-occur with other chronic conditions that can lead to death. Many conditions can be present at death but not be the cause of death.

Ranking causes of death is a useful tool to present mortality statistics and to illustrate the relative burden of specific causes (5). In 2017, Alzheimer disease was the sixth leading cause of death among people of all ages and the fifth leading cause among people aged 65 and over. While in some other countries (e.g., Australia and the United Kingdom), Alzheimer disease is considered together with unspecified dementia and vascular dementia when ranking causes of death (6,7), in the United States, Alzheimer disease alone is a rankable cause in determining leading causes of death. Some recent studies have suggested that the number of deaths in the United States due

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to Alzheimer disease may be higher than the number reported in official mortality statistics (8,9). The discrepancy between diagnoses of Alzheimer disease and other types of dementia and the listing of these causes on death certificates has been noted in previous reports (10), studies in other countries (11–13), as well as in personal narratives (14).

This report presents data on mortality attributable to dementia, defined as unspecified dementia; Alzheimer disease; vascular dementia; and other degenerative diseases of nervous system, not elsewhere classified. These causes of death have similar physical signs and symptoms and are considered together as an indicator of dementia mortality in the World Health Organization (WHO) Mortality Database (15). Data for dementia as an underlying cause of death from 2000 through 2017 are shown by selected characteristics such as age, sex, race and Hispanic origin, and state of residence. Trends in dementia deaths overall and by specific cause are presented. The reporting of dementia as a contributing cause of death is also described.

Methods

Data presented in this report are based on information from all death certificates filed in the 50 states and the District of Columbia, processed by NCHS. Mortality data are from the NCHS 2000–2017 multiple cause-of-death mortality files (16). Cause-of-death statistics presented are classified in accordance with the *International Classification of Diseases, 10th Revision* (ICD–10). The underlying cause is defined by WHO as the "disease or injury which initiated the train of events leading directly to death, or the circumstances of the accident or violence which produced the fatal injury" (17). The underlying cause is selected from the conditions entered by the medical certifier in the cause-of-death section of the death certificate. When more than one cause or condition is entered by the medical examiners, physicians, or coroners, the underlying cause is determined by the sequence of conditions on the certificate, provisions of ICD, and associated selection rules and modifications (18,19). Generally, more medical information is reported on death certificates than is directly reflected in the underlying cause of death. Death certificates also contain information on conditions that might contribute to or were associated with the underlying cause of death. This is captured in NCHS multiple cause-of-death statistics. Multiple-cause data provide information on diseases or conditions that are a factor in death whether or not they are the underlying cause of death, on associations among diseases, and on injuries leading to death (20–22).

The four causes of dementia mortality examined in this report, along with their ICD–10 codes, are the following: unspecified dementia (F03); Alzheimer disease (G30); vascular dementia (F01); and other degenerative diseases of nervous system, not elsewhere classified (G31), a category that includes Lewy body disease and frontotemporal dementia. The Technical Notes contain a listing of the detailed ICD codes for the four causes. These four causes accounted for nearly all of the reported dementia deaths in the United States in 2017, with the exception of rare causes of death such as Huntington disease (1,108 deaths in 2017) and Creutzfeldt-Jakob disease (458 deaths in 2017). NCHS implementation of ICD–10 coding rules provides guidance for the selection of underlying causes of death where dementia is mentioned on the death certificate. In general, unspecified dementia (F03) is not selected if the underlying physical condition is known (19). In addition, checks are conducted for consistency of information on the death certificate. For example, unspecified dementia (F03) as a cause of death to persons under age 55 is considered highly improbable, as is vascular dementia (F01) to anyone under age 20. Death certificates with these combinations of information would be sent back to the jurisdiction of origin for review (23).

The populations used to calculate death rates shown in this report were produced under a collaborative arrangement with the U.S. Census Bureau. Bridged-race estimates of the U.S. resident population were used. See the Technical Notes for details on the populations used to calculate death rates. Age-specific death rates are calculated per 100,000 population in the specified age group. Age-adjusted rates shown in this report were calculated by the direct method, applying age-specific death rates to the 2000 U.S. standard population age distribution (24).

Death rates are shown for the Hispanic, non-Hispanic white, non-Hispanic black, non-Hispanic American Indian or Alaska Native (AIAN), and non-Hispanic Asian or Pacific Islander (API) populations. Because of net misclassification of race and Hispanic origin on the death certificate, deaths for the non-Hispanic AIAN are underreported by 33%, and the non-Hispanic API and Hispanic-origin populations by 3% (25). Consequently, data for these groups should generally be interpreted with caution. However, racial or ethnic misclassification should not prevent comparisons of relative mortality burden across groups, because there is no reason to expect that racial or ethnic misclassification varies by cause of death. Details on race and ethnicity reporting in mortality data are described in the Technical Notes and elsewhere (26). Place of death is reported on the death certificate by selecting one response from the following: hospital (inpatient, emergency room or outpatient, or dead on arrival), hospice facility, nursing home or long-term care facility, decedent's home, or other.

The data are presented by state and by urbanization level. Urbanization categories are derived from a six-level urban-rural classification scheme for the 3,143 U.S. counties and county-equivalents developed by NCHS. Each death is associated with a category based on the county of the person's legal residence. Metropolitan areas include counties in metro areas with 50,000 or greater population, including surrounding areas with strong economic ties to the central county (27).

Differences in death rates are tested for statistical significance at the 0.05 level by calculation of a *z* score. Joinpoint regression methodology was used to test the significance of death rate trends across the period (28). In this report, rates described as higher or lower and changes in rates over time have been tested for statistical significance.

Results

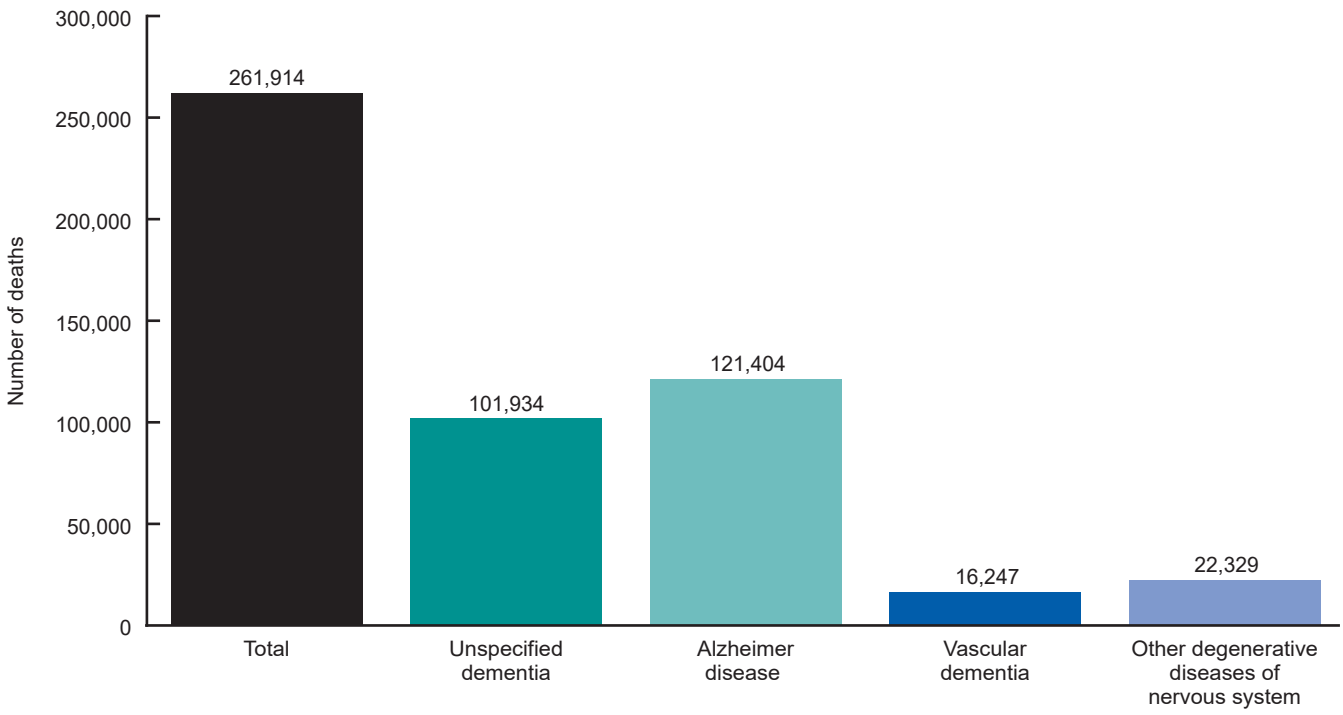
Number of deaths attributed to dementia as an underlying cause of death

In 2017, 261,914 deaths were attributed to dementia as an underlying cause. Unspecified dementia (F03) was the underlying cause in 101,934 deaths, and Alzheimer disease (G30) was the underlying cause of death in 121,404 deaths. For the other dementia causes, 16,247 deaths were attributed to vascular dementia (F01) and 22,329 deaths were attributed to other degenerative diseases of nervous system, not elsewhere classified (G31) (Figure 1).

Percentage of dementia deaths by cause of death, 2000–2017

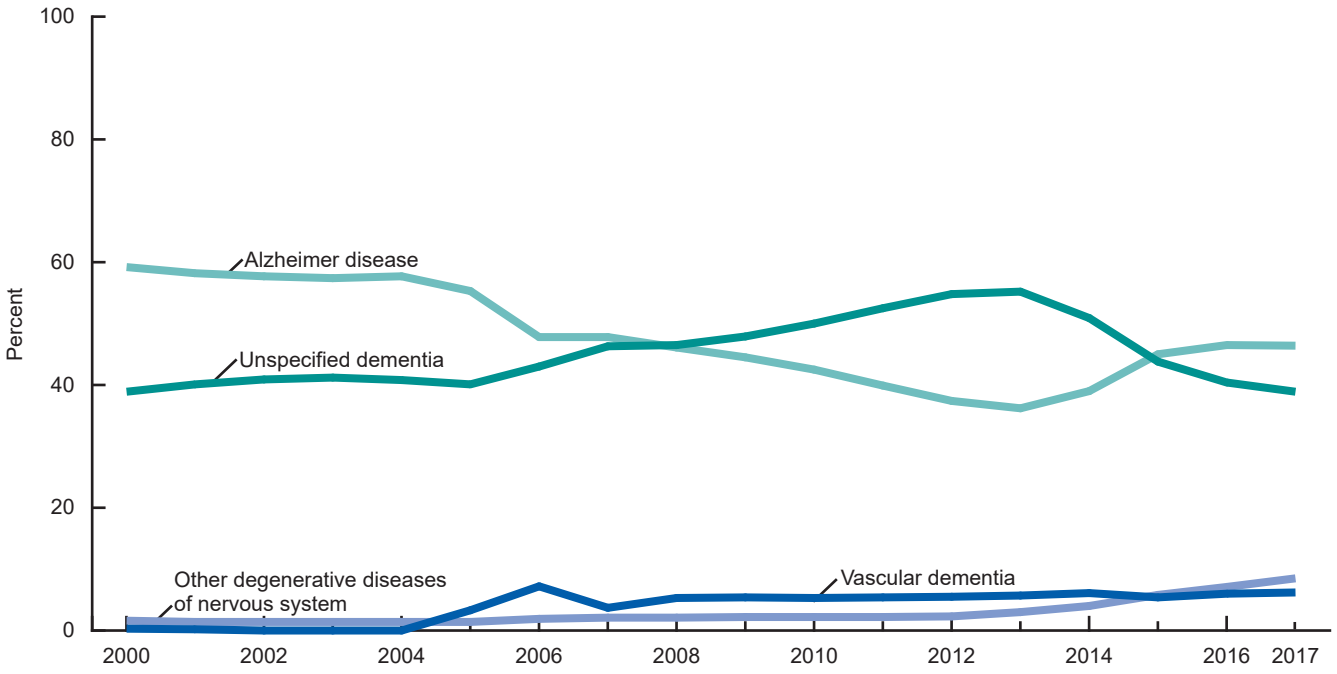
The percent distribution of dementia deaths by the individual causes changed over time (Figures 2–4, Table 1). Some of these changes, including specific increases in the number of deaths, can be attributed to changes in coding rules used by NCHS. For example, the increase in number of deaths due to unspecified dementia from 2005 to 2006 can be attributed to coding changes in 2006 affecting which cause was selected as the underlying cause of death when combinations of conditions were reported together on the death certificate. These changes resulted in a decrease in deaths due to anemias, nutritional deficiencies, heart disease, and essential hypertension and a subsequent increase in unspecified dementia. These changes were implemented to increase consistency and international comparability in coding these causes. In addition, vascular dementia has a unique pattern, and the increase in the number of these deaths from 2004 through 2006 corresponds to coding changes in 2005 and 2006 that were instituted to resolve inconsistencies in instructions for the coding of vascular dementia in volumes 1–3 of ICD–10. These changes resulted in a decrease in the number of deaths from cerebrovascular disease and an increase in the number of deaths due to vascular dementia (29,30).

Overall, in 2017 in the United States, a higher percentage of dementia deaths were attributed to Alzheimer disease than to unspecified dementia. However, this was not the case throughout the period from 2000 through 2017. In 2000, the percentage of dementia deaths attributed to Alzheimer disease was 59.2%, and the percentage attributed to unspecified dementia was 38.9%. As noted above, a coding rule change resulted in more deaths being coded as unspecified dementia beginning in 2006, with a subsequent decrease in nondementia causes of death, such as anemias, nutritional deficiencies, heart disease, and essential hypertension (29). In 2008, the percentage attributed to Alzheimer disease was 46.1% compared with 46.5% for unspecified dementia. In 2014, the percentage of dementia deaths attributed to Alzheimer disease was 39.0%, and the percentage attributed to unspecified dementia was 50.9%. Beginning in 2015, Alzheimer disease deaths again outnumbered deaths from unspecified



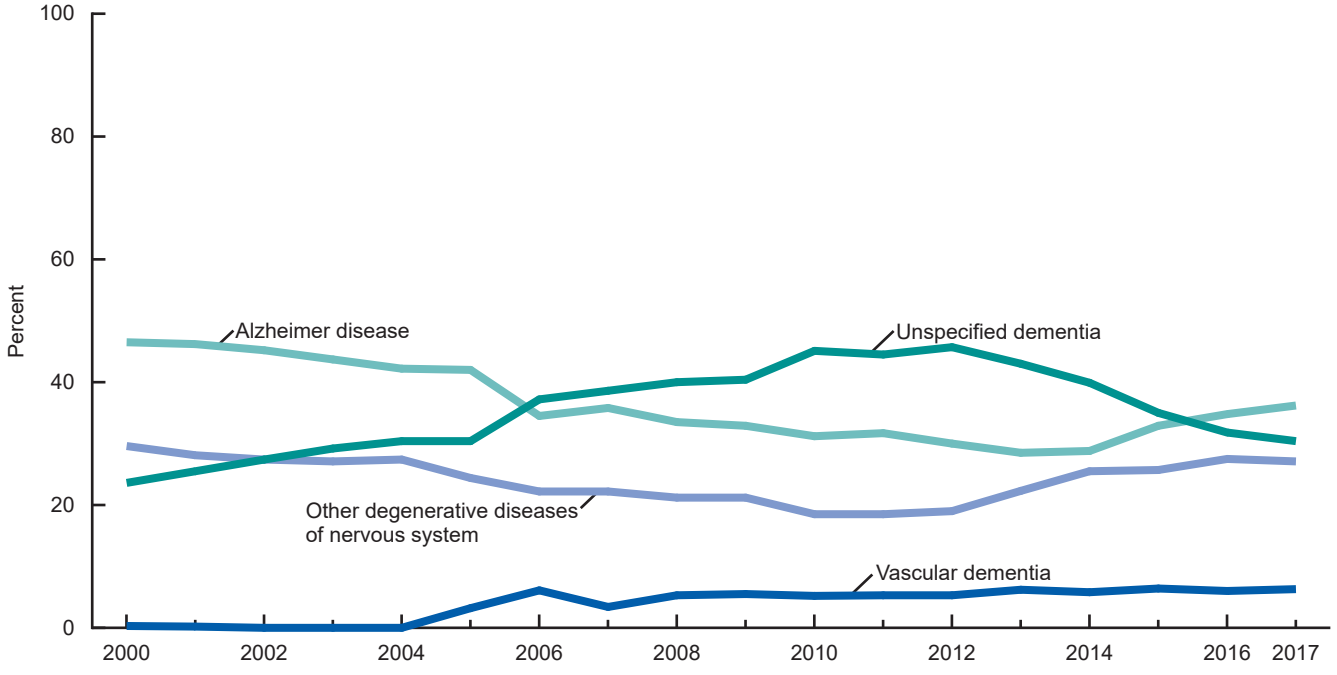
NOTE: Dementia deaths are identified according to the *International Classification of Diseases, 10th Revision* underlying cause-of-death codes: F03 (unspecified dementia), G30 (Alzheimer disease), F01 (vascular dementia), and G31 (other degenerative diseases of nervous system).
SOURCE: NCHS, National Vital Statistics System, Mortality.

Figure 1. Number of deaths attributed to dementia and specific types of dementia as an underlying cause of death: United States, 2017



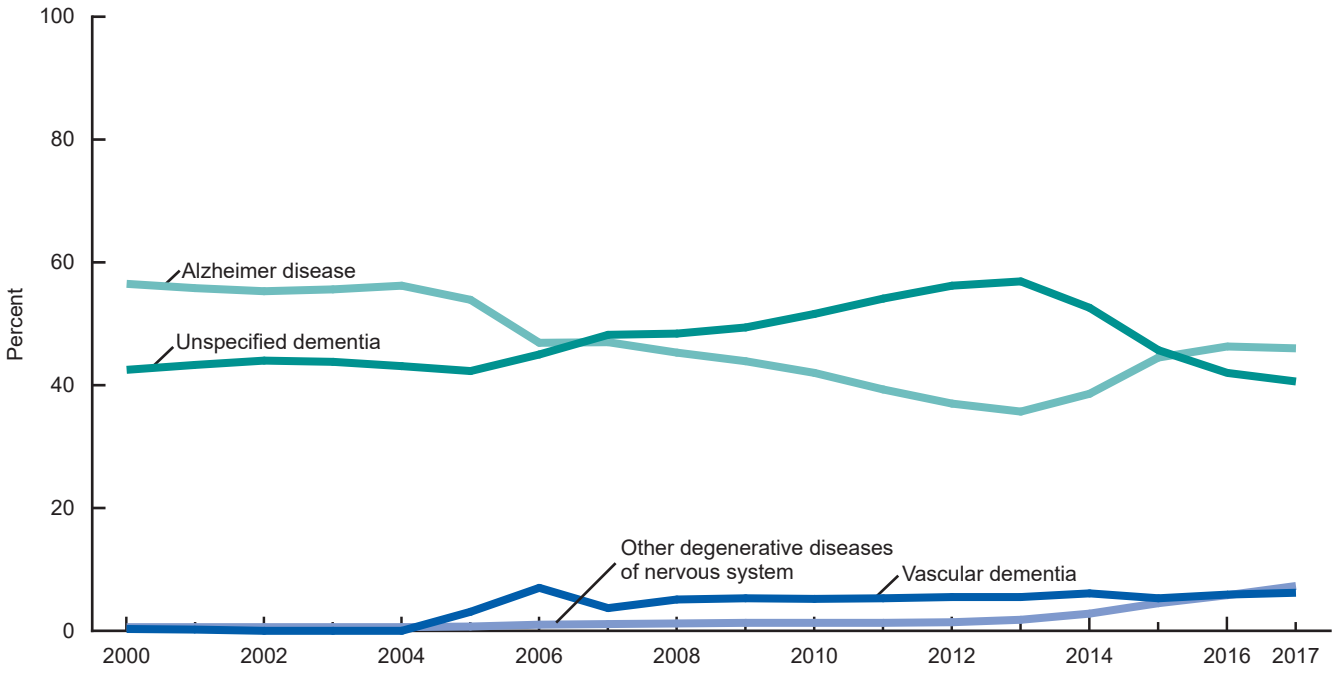
NOTE: Dementia deaths are identified according to the *International Classification of Diseases, 10th Revision* underlying cause-of-death codes: F03 (unspecified dementia), G30 (Alzheimer disease), F01 (vascular dementia), and G31 (other degenerative diseases of nervous system).
SOURCE: NCHS, National Vital Statistics System, Mortality.

Figure 2. Percentage of dementia deaths of persons of all ages, by cause of death: United States, 2000–2017



NOTE: Dementia deaths are identified according to the *International Classification of Diseases, 10th Revision* underlying cause-of-death codes: F03 (unspecified dementia), G30 (Alzheimer disease), F01 (vascular dementia), and G31 (other degenerative diseases of nervous system).
SOURCE: NCHS, National Vital Statistics System, Mortality.

Figure 3. Percentage of dementia deaths of persons under age 65, by cause of death: United States, 2000–2017



NOTE: Dementia deaths are identified according to the *International Classification of Diseases, 10th Revision* underlying cause-of-death codes: F03 (unspecified dementia), G30 (Alzheimer disease), F01 (vascular dementia), and G31 (other degenerative diseases of nervous system).
SOURCE: NCHS, National Vital Statistics System, Mortality.

Figure 4. Percentage of dementia deaths of persons aged 85 and over, by cause of death: United States, 2000–2017

dementia, and in 2017, the percentage attributed to Alzheimer disease was 46.4% and the percentage attributed to unspecified dementia was 38.9%. This crossover pattern is evident for males and females; age groups under 65 and over 65, including ages 85 and over; and for the non-Hispanic white, non-Hispanic black, and Hispanic populations, although the exact years of crossover vary slightly by group.

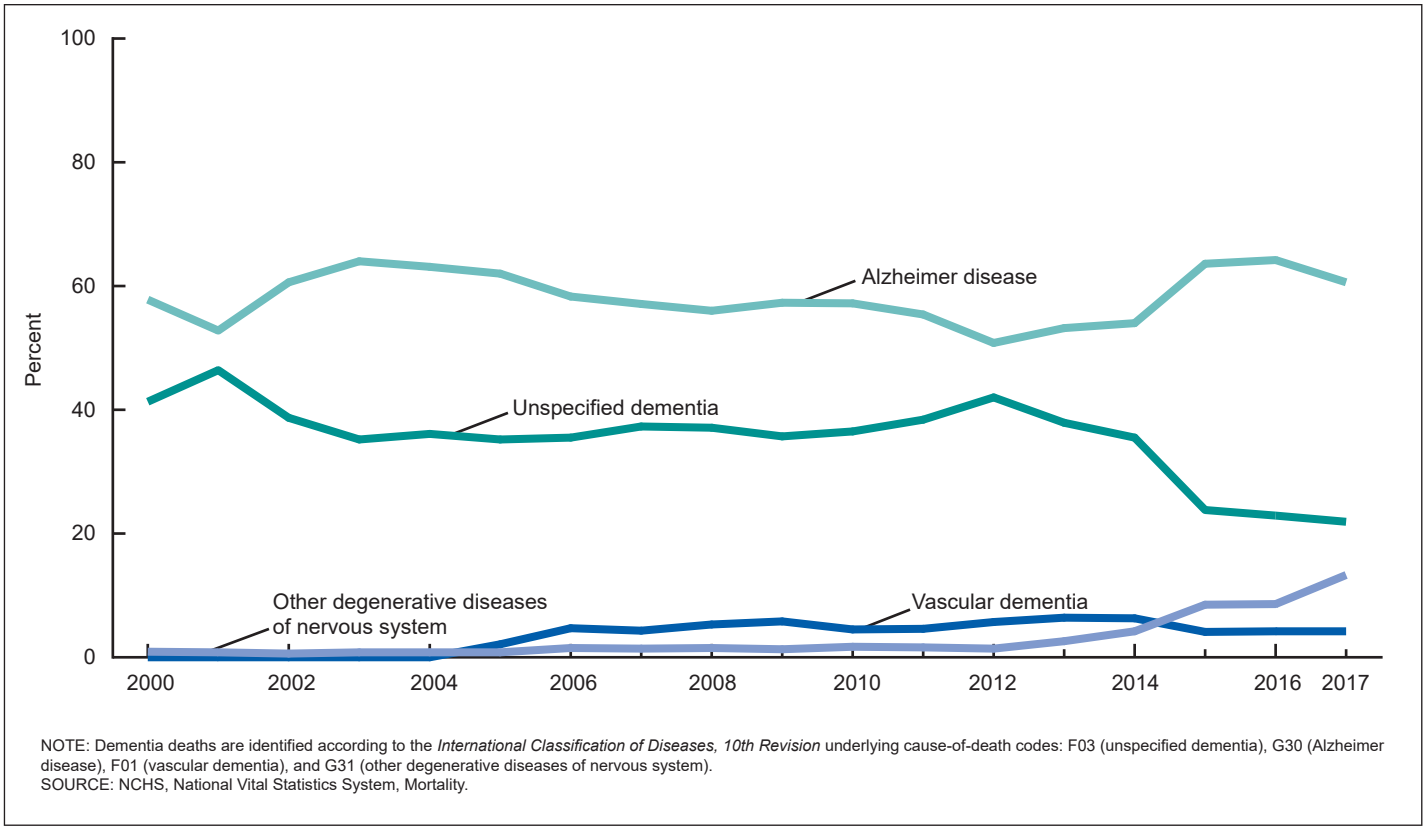
Dementia deaths attributed to other degenerative diseases of nervous system, not elsewhere classified, were more prevalent among decedents under age 65 compared with decedents aged 65 and over in 2017 (27.1% compared with 8.3%). The percentage of dementia deaths in all ages due to this cause increased from 2.3% in 2012 to 8.5% in 2017. Overall, the percentage of dementia deaths due to vascular dementia declined from 6.1% in 2014 to 5.4% in 2015 and then increased to 6.2% in 2017. In 2017, a higher proportion of dementia deaths were attributed to vascular dementia among the non-Hispanic black population (7.4%) compared with the non-Hispanic white population (6.0%).

Percentage of dementia deaths by cause of death and state, 2017

The percent distribution of dementia deaths attributed to the four dementia causes varied by state in 2017 (Table 2). For the United States, 46.4% of dementia deaths were attributed to Alzheimer disease; 38.9% of dementia deaths were attributed to unspecified dementia; 8.5% to other degenerative diseases of nervous system, not elsewhere classified; and 6.2% to vascular dementia. In Mississippi, 66.4% of dementia deaths were attributed to Alzheimer disease, while 26.1% were attributed to unspecified dementia. In contrast, 24.3% of dementia deaths in Massachusetts were attributed to Alzheimer disease and 67.2% of dementia deaths were attributed to unspecified dementia. The percentage of deaths attributed to vascular dementia ranged from 1.3% of all dementia causes in Mississippi to 12.3% in North Dakota. Variation in reporting of other degenerative diseases of nervous system, not elsewhere classified, was also observed, from 2.8% of all dementia deaths in Delaware to 21.3% of all dementia deaths in Nevada.

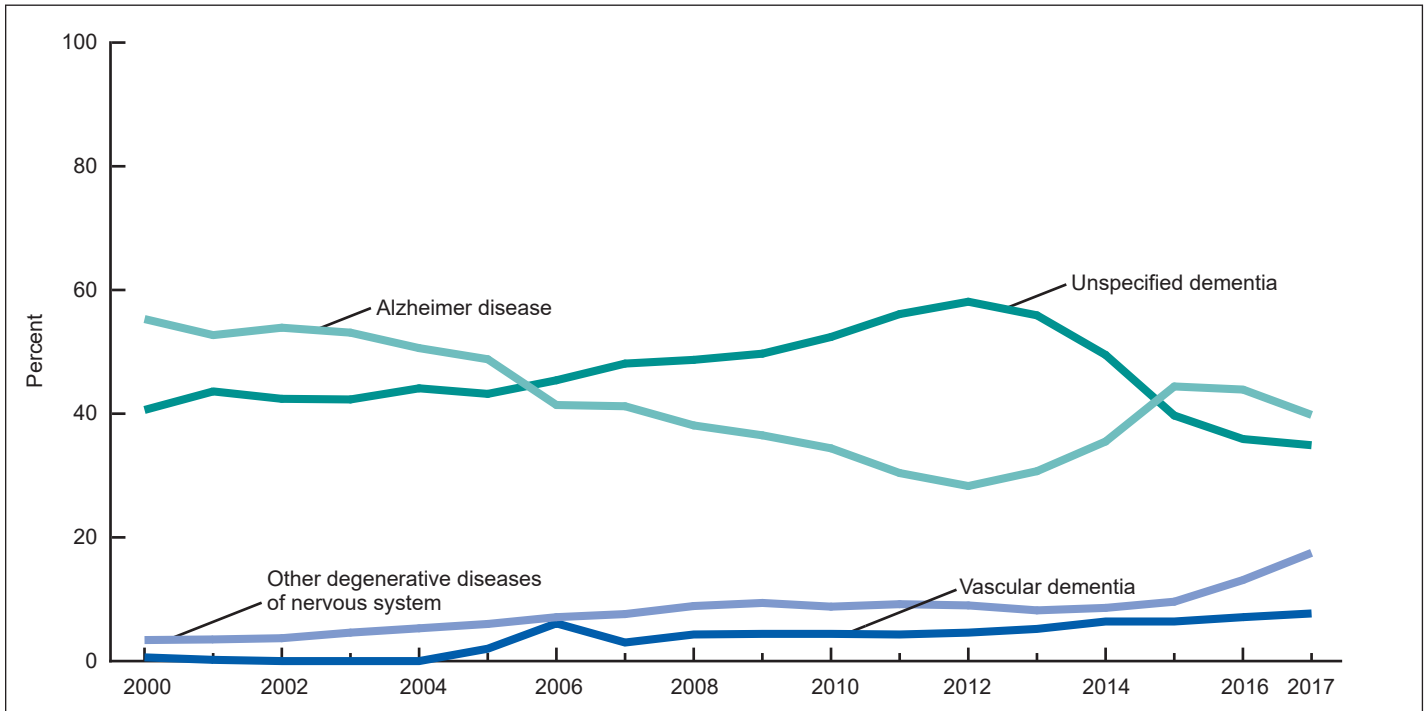
Trends in the percentage of dementia deaths by cause of death, selected states, 2000–2017

Trends in the percent distribution of the four dementia causes of death varied by state. Table 3 and Figures 5–10 show trends from selected states with different patterns of dementia mortality. Three of the selected states had a higher proportion of dementia deaths attributed to Alzheimer disease compared with unspecified dementia in 2017 (Arizona, Florida, and Washington). The other three selected states (Connecticut, Maryland, and Massachusetts) had a higher proportion of deaths attributed to unspecified dementia relative to Alzheimer disease in 2017. In Arizona and Washington, the percentage of deaths attributed to Alzheimer disease was higher than unspecified dementia over the whole period, 2000–2017. In Arizona, the ratio of the reporting of Alzheimer disease and unspecified dementia widened during the period (from 1.4 in 2000 to 2.8 in 2017), while in Washington



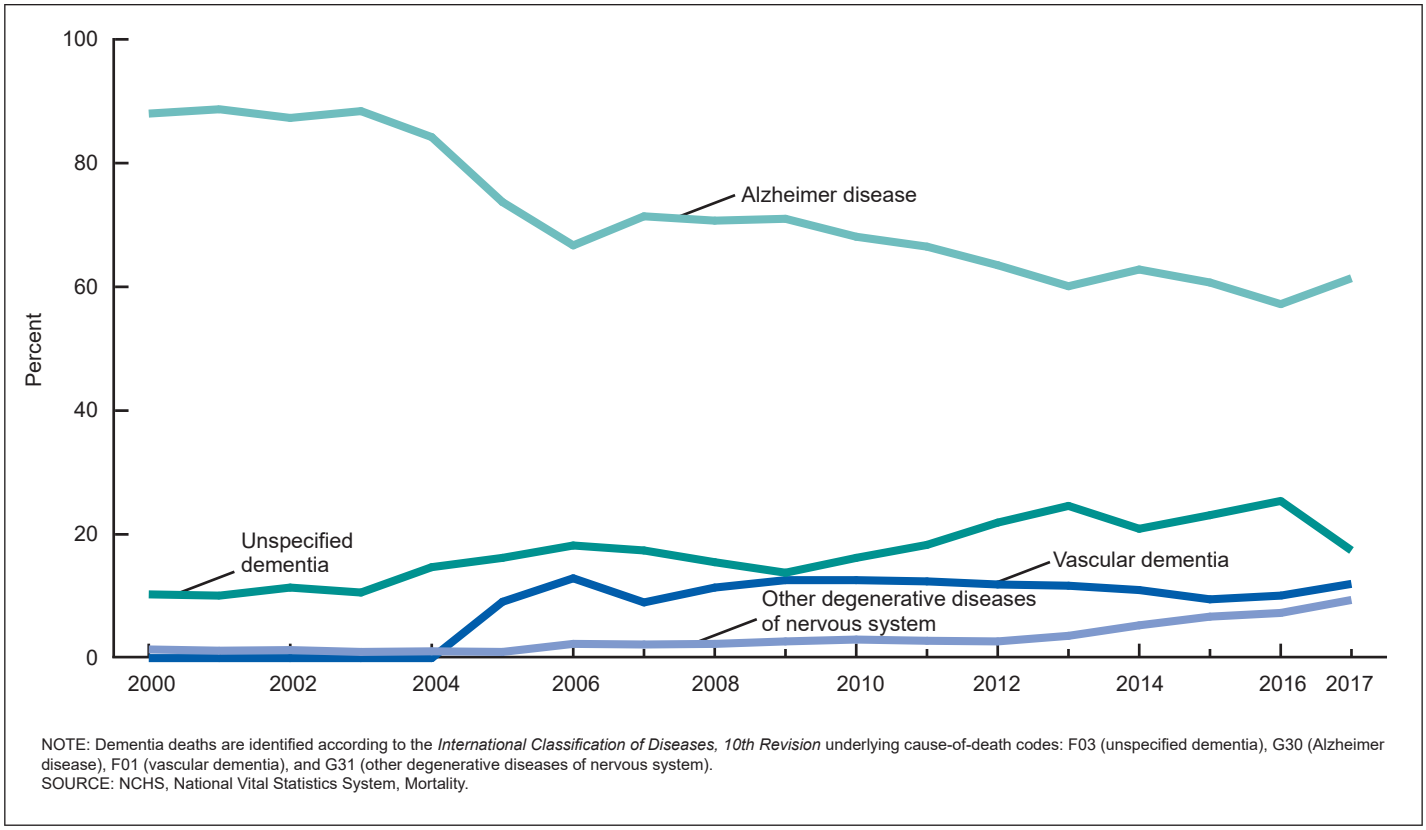
NOTE: Dementia deaths are identified according to the *International Classification of Diseases, 10th Revision* underlying cause-of-death codes: F03 (unspecified dementia), G30 (Alzheimer disease), F01 (vascular dementia), and G31 (other degenerative diseases of nervous system).
SOURCE: NCHS, National Vital Statistics System, Mortality.

Figure 5. Percentage of dementia deaths, by cause of death: Arizona, 2000–2017



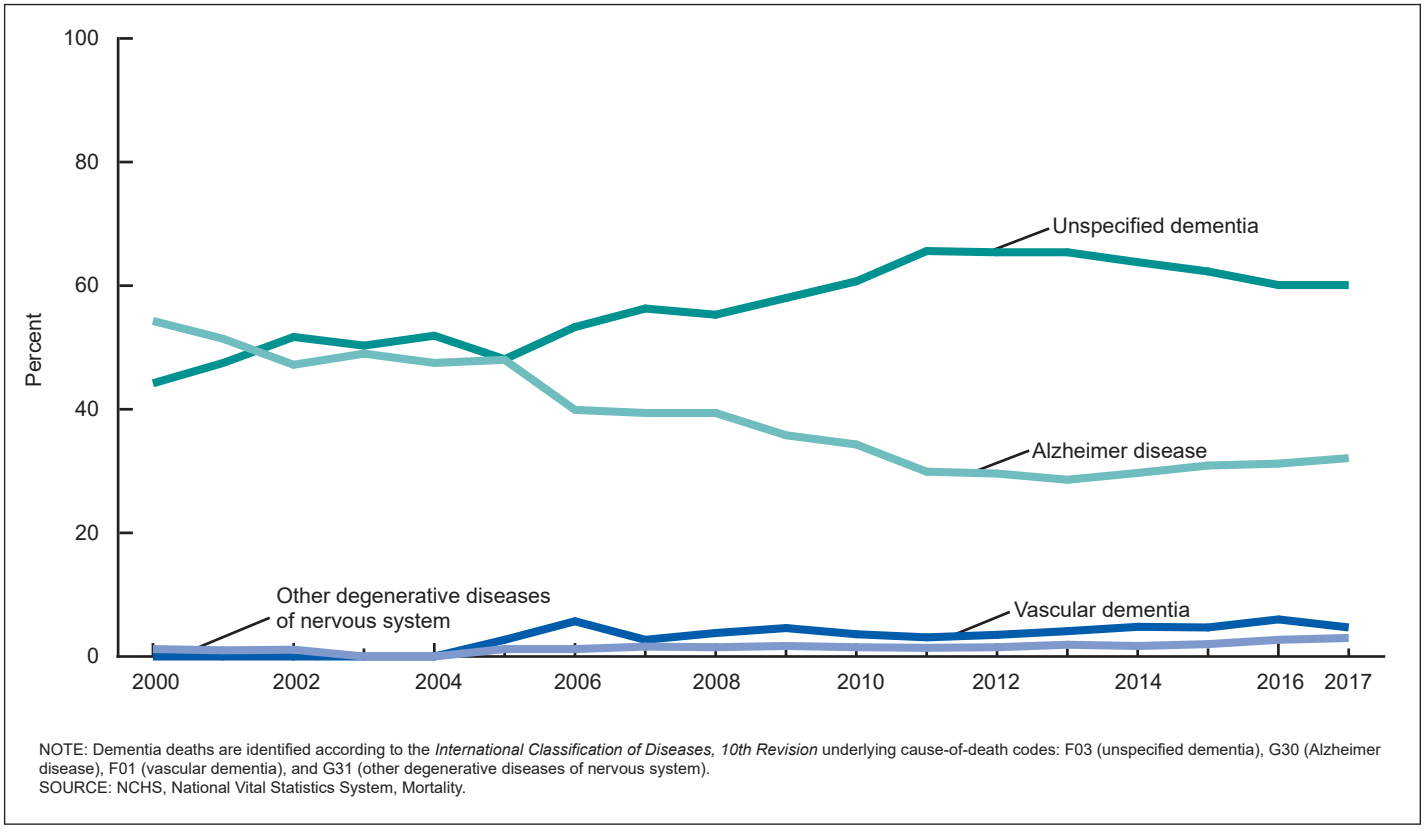
NOTE: Dementia deaths are identified according to the *International Classification of Diseases, 10th Revision* underlying cause-of-death codes: F03 (unspecified dementia), G30 (Alzheimer disease), F01 (vascular dementia), and G31 (other degenerative diseases of nervous system).
SOURCE: NCHS, National Vital Statistics System, Mortality.

Figure 6. Percentage of dementia deaths, by cause of death: Florida, 2000–2017



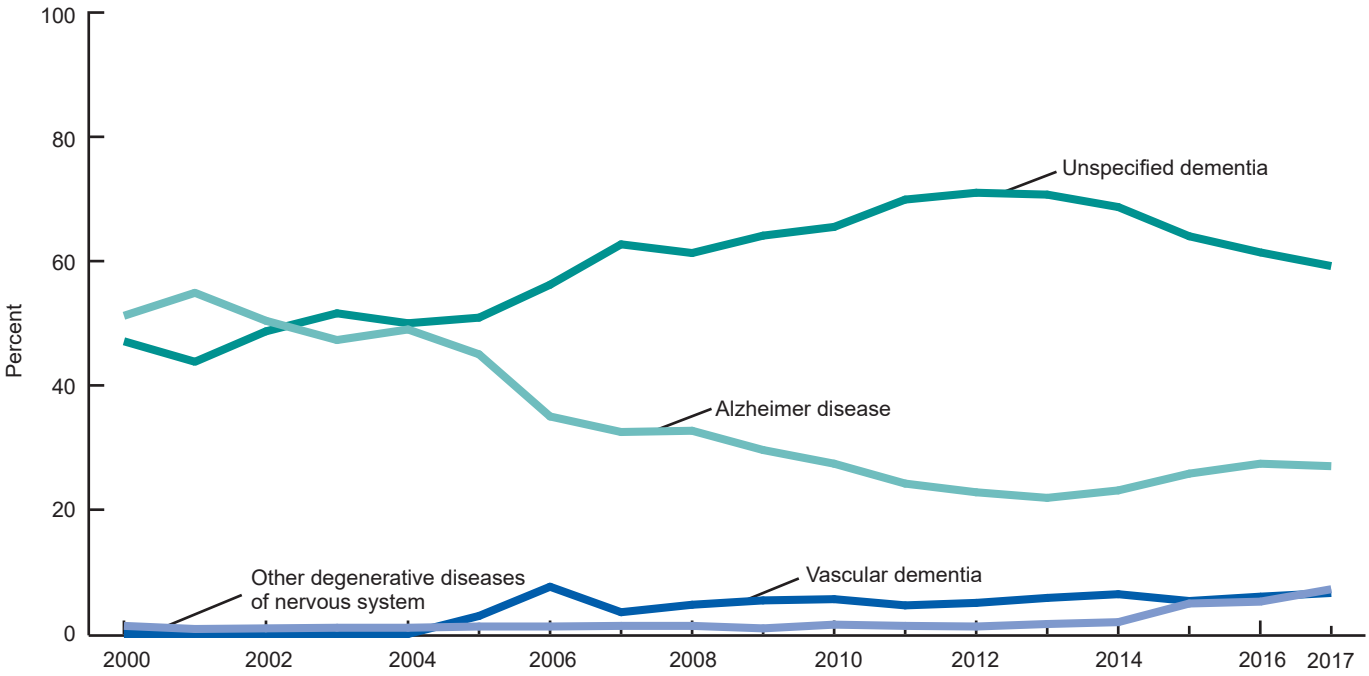
NOTE: Dementia deaths are identified according to the *International Classification of Diseases, 10th Revision* underlying cause-of-death codes: F03 (unspecified dementia), G30 (Alzheimer disease), F01 (vascular dementia), and G31 (other degenerative diseases of nervous system).
SOURCE: NCHS, National Vital Statistics System, Mortality.

Figure 7. Percentage of dementia deaths, by cause of death: Washington, 2000–2017



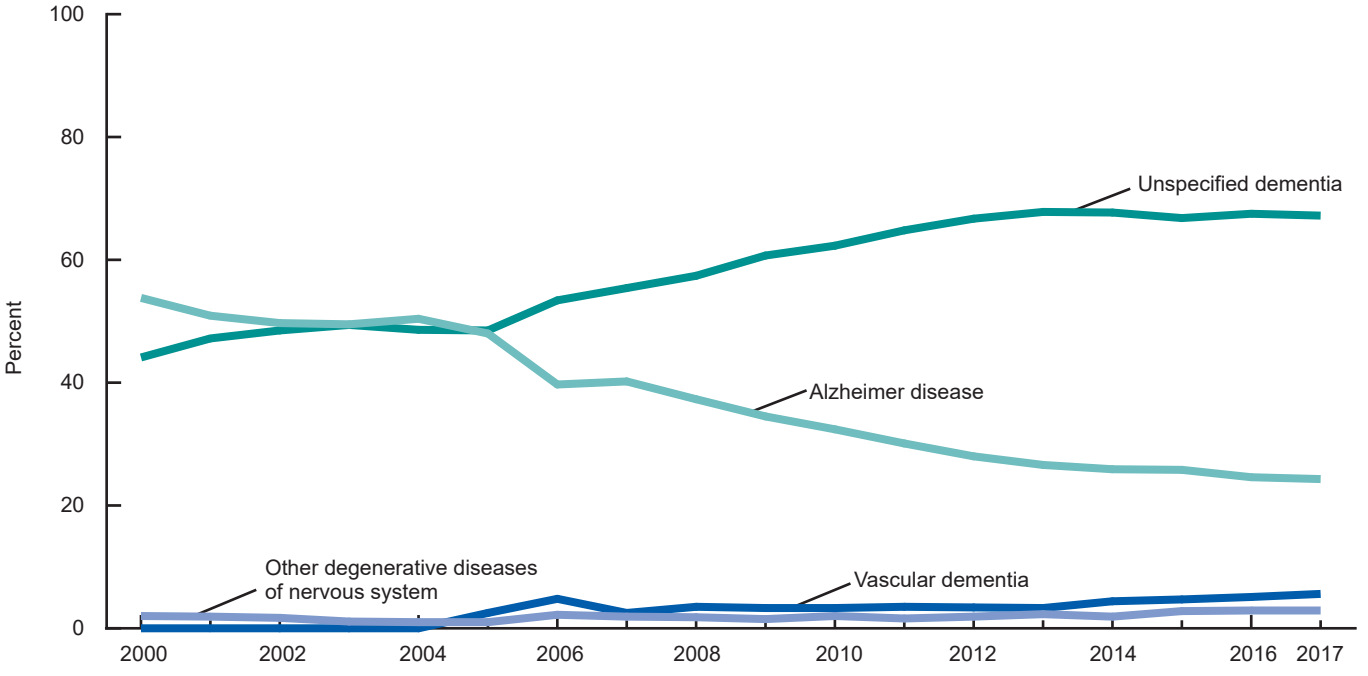
NOTE: Dementia deaths are identified according to the *International Classification of Diseases, 10th Revision* underlying cause-of-death codes: F03 (unspecified dementia), G30 (Alzheimer disease), F01 (vascular dementia), and G31 (other degenerative diseases of nervous system).
SOURCE: NCHS, National Vital Statistics System, Mortality.

Figure 8. Percentage of dementia deaths, by cause of death: Connecticut, 2000–2017



NOTE: Dementia deaths are identified according to the *International Classification of Diseases, 10th Revision* underlying cause-of-death codes: F03 (unspecified dementia), G30 (Alzheimer disease), F01 (vascular dementia), and G31 (other degenerative diseases of nervous system).
SOURCE: NCHS, National Vital Statistics System, Mortality.

Figure 9. Percentage of dementia deaths, by cause of death: Maryland, 2000–2017



NOTE: Dementia deaths are identified according to the *International Classification of Diseases, 10th Revision* underlying cause-of-death codes: F03 (unspecified dementia), G30 (Alzheimer disease), F01 (vascular dementia), and G31 (other degenerative diseases of nervous system).
SOURCE: NCHS, National Vital Statistics System, Mortality.

Figure 10. Percentage of dementia deaths, by cause of death: Massachusetts, 2000–2017

the ratio narrowed from 8.5 in 2000 to 3.5 in 2017. In Florida, the percent distribution of causes of death shows the crossover between Alzheimer disease and unspecified dementia that is seen in the national data.

In the three selected states where the percentage of deaths attributed to unspecified dementia was higher than the percentage attributed to Alzheimer disease in 2017 (Connecticut, Maryland, and Massachusetts), the percentage of dementia deaths attributed to unspecified dementia was lower than Alzheimer disease in 2000 in all three states. In Connecticut, the ratio of unspecified dementia to Alzheimer disease increased from 0.8 in 2000 to 1.0 in 2005, to 2.3 in 2013, and then declined to 1.9 in 2017. In Maryland, the ratio increased from 0.9 in 2000 to 1.1 in 2005, to 3.2 in 2013, and then declined to 2.2 in 2017. In Massachusetts, the ratio increased from 0.8 in 2000 to 1.0 in 2005, to 2.5 in 2013, and then to 2.8 in 2017.

Place of dementia deaths by cause, 2017

In 2017, 60.4% of deaths attributed to dementia occurred in nursing homes, long-term care facilities, or hospice facilities. Medical facilities were the location of 8.7% of deaths, and 22.9% took place in the decedent's home (Table 4). There were differences in location of death by cause of death. In 2017, when the underlying cause of death was unspecified dementia, 65.4% occurred in a nursing home, long-term care facility, or hospice facility, compared with 61.4% of vascular dementia deaths, 57.7% of Alzheimer disease deaths; and 51.5% of deaths attributed to other degenerative diseases of nervous system, not elsewhere classified. A higher percentage of deaths occurred in the home if the cause of death was other degenerative diseases of nervous system, not elsewhere classified, compared with Alzheimer disease, vascular dementia, and unspecified dementia (33.9% compared with 27.6%, 22.4%, and 15.1%, respectively).

Dementia death rates by age, sex, and race and Hispanic origin, 2017

In 2017, the age-adjusted death rate for dementia was 66.7 deaths per 100,000 standard population. Age is the most widely recognized risk factor for dementia. The rate was 56.9 among people aged 65–74, 450.9 among people aged 75–84, and 2,707.3 among those aged 85 and over. Death rates also increased after age 85, with death rates more than doubling from ages 85–89 to ages 90–94 (1,691.8 compared with 3,495.0) and continuing to rise at age 95 and over. Among all dementia deaths reported in 2017, 1.4% (3,577) occurred among persons under age 65, while 66.9% (175,128) occurred among people aged 85 and over. The deaths of people aged 95 and over accounted for 16.0% (42,018) of all dementia deaths in 2017 (Table 5).

Females accounted for 67.5% (176,785) of all dementia deaths in 2017. Age-adjusted death rates for dementia were higher for females compared with males (72.7 compared with 56.4) (Table 5).

In 2017, age-adjusted death rates for dementia were higher for the non-Hispanic white population (70.8), compared with the non-Hispanic black population (65.0) and the Hispanic population (46.0). The death rates for the non-Hispanic AIAN and API populations were lower (41.6 and 31.4, respectively). Death rates for Hispanic, AIAN, and API persons are affected by inconsistencies in reporting Hispanic origin or race on the death certificate compared with censuses, surveys, and birth certificates. The effects are large for the AIAN population, but relatively small for the Hispanic and API populations (25) (Table 5).

Dementia death rates by urbanization and state, 2017

Age-adjusted death rates for dementia were higher in nonmetropolitan areas than in metropolitan areas (69.6 per 100,000 compared with 66.2) (Table 5).

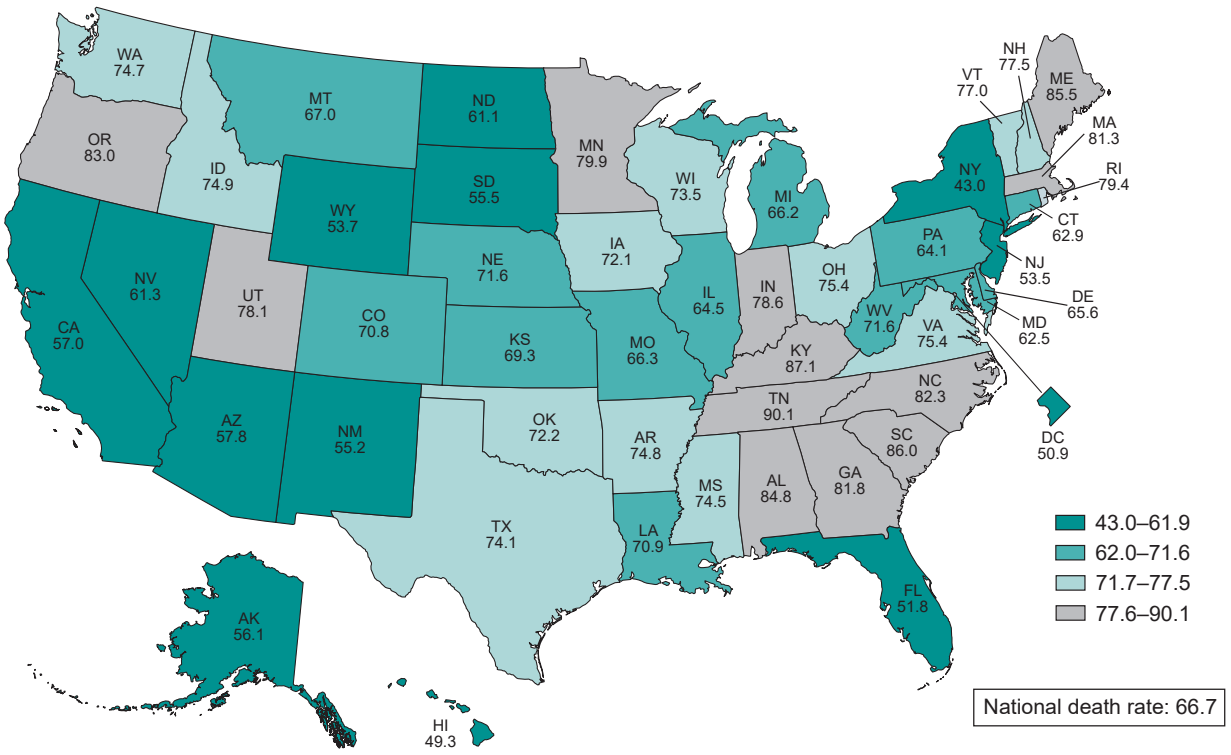
Death rates for dementia varied across states. In 2017, the age-adjusted death rate for dementia in the United States was 66.7. Tennessee had the highest death rate (90.1). In addition, several states with age-adjusted death rates for dementia in the highest quartile were located in the South: Kentucky (87.1), South Carolina (86.0), Alabama (84.8), North Carolina (82.3), and Georgia (81.8). Florida, however, had the fourth lowest age-adjusted death rate for dementia in 2017 (51.8). New York had the lowest age-adjusted death rate for dementia (43.0). Several states with age-adjusted death rates for dementia in the lowest quartile were located in the West: Nevada (61.3), Arizona (57.8), California (57.0), Alaska (56.1), New Mexico (55.2), Wyoming (53.7), and Hawaii (49.3) (Table 6 and Figure 11).

Trends in dementia death rates from 2000 through 2017

Overall, age-adjusted death rates for dementia increased from 30.5 deaths per 100,000 in 2000 to 66.7 in 2017. Age-adjusted death rates for all ages were steady from 2013 through 2016 and increased from 2016 to 2017. Increases were seen in dementia death rates from 2016 to 2017 for age groups 65–74, 75–84, and 85 and over. Increases were also seen from 2016 to 2017 in age-adjusted dementia death rates for the Hispanic, non-Hispanic white, and non-Hispanic black populations (Table 7 and Figure 12).

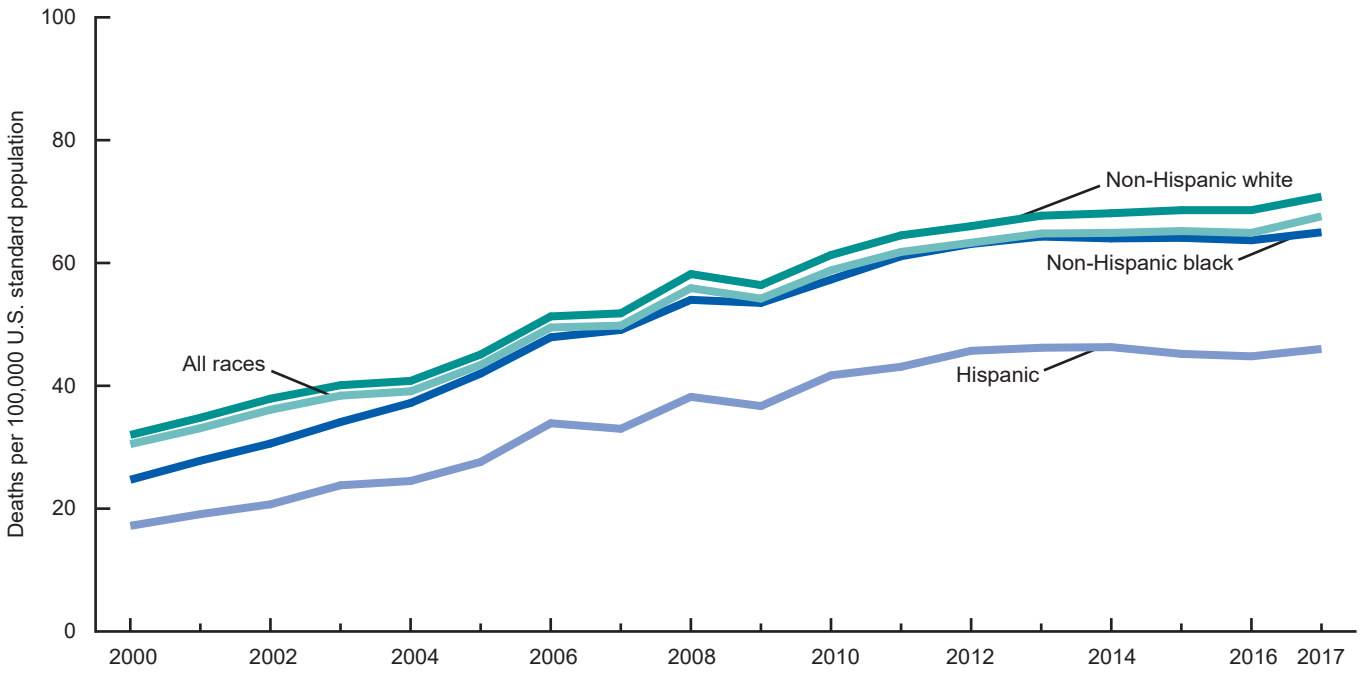
Dementia as a contributing cause of death, 2017

In 2017, dementia was mentioned as a contributing cause of death on a total of 129,700 death certificates in the United States. Unspecified dementia was mentioned in 96,591 deaths, while Alzheimer disease was mentioned in 25,490 deaths. The number of deaths where vascular dementia was listed as a contributing cause was 14,866, and 5,118 deaths listed other degenerative diseases of nervous system, not elsewhere classified. Because some death certificates mentioned more than one type of dementia as contributing causes, the total number of deaths with dementia as a contributing cause is less than the sum of the four causes combined (Figure 13).



NOTES: Dementia deaths are identified according to the *International Classification of Diseases, 10th Revision* underlying cause-of-death codes: F03 (unspecified dementia), G30 (Alzheimer disease), F01 (vascular dementia), and G31 (other degenerative diseases of nervous system). Age-adjusted death rate per 100,000 U.S. standard population.
SOURCE: National Vital Statistics System, Mortality.

Figure 11. Age-adjusted death rates for dementia: United States, 2017



NOTES: Dementia deaths are identified according to the *International Classification of Diseases, 10th Revision* underlying cause-of-death codes: F03 (unspecified dementia), G30 (Alzheimer disease), F01 (vascular dementia), and G31 (other degenerative diseases of nervous system). Age-adjusted death rate per 100,000 U.S. standard population.
SOURCE: NCHS, National Vital Statistics System, Mortality.

Figure 12. Age-adjusted death rates for dementia, by race and Hispanic origin: United States, 2000–2017

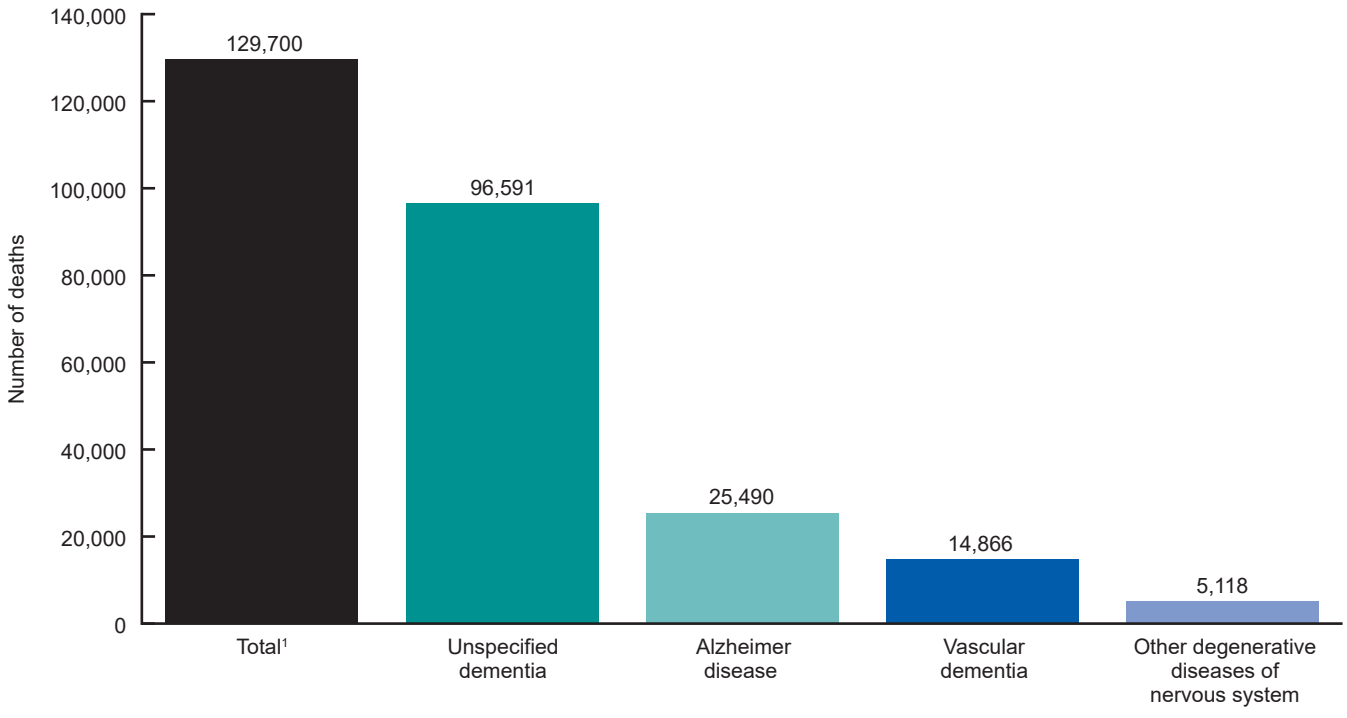
Underlying cause of death among deaths where dementia is a contributing cause, 2017

Table 8 identifies the underlying causes of death when dementia is mentioned on the death certificate but is not the underlying cause of death. Overall, heart disease is most commonly mentioned (31.2%), followed by stroke (cerebrovascular disease) (12.5%). Parkinson disease is the fourth most commonly recorded underlying cause of death, representing 7.1% of deaths. However, there are differences in the rank order of underlying causes of death according to which dementia cause is mentioned as a contributing cause. If Alzheimer disease is the only one of the four dementia causes listed as a contributing cause, then 35.5% of deaths in 2017 were attributed to heart disease, followed by 11.6% of deaths attributed to cancer, and 10.5% of deaths attributed to cerebrovascular disease. Only 1.3% of those deaths were attributed to Parkinson disease. When unspecified dementia is the only dementia cause mentioned as a contributing cause of death, Parkinson disease is the fourth leading underlying cause of death representing 8.6% of deaths. Among deaths where vascular dementia was a contributing cause, 29.7% of deaths were attributed to heart disease and 30.5% of deaths were attributed to stroke. Only 1.5% of those deaths had Parkinson disease as the underlying cause of death. When other degenerative diseases of nervous system, not elsewhere classified (G31) is listed as the only dementia contributing cause, the most commonly recorded underlying cause of death was Parkinson disease, representing 24.8% of the deaths.

Summary and Discussion

This report examines dementia mortality in the United States. Deaths due to dementia are not limited to Alzheimer disease but include also unspecified dementia; vascular dementia; and other degenerative diseases of nervous system, not elsewhere classified. Considering these four causes together provides a more comprehensive estimate of the burden of dementia mortality than reporting only death rates due to Alzheimer disease.

Dementia death rates varied by age, sex, race and Hispanic origin, and geographic location. In 2017, the majority of deaths attributed to dementia occurred in nursing homes or other long-term care facilities. Overall, age-adjusted death rates for dementia increased from 2000 to 2017. Rates were steady from 2013 through 2016, and increased from 2016 to 2017. In addition to the 261,914 deaths in 2017 where dementia was reported as an underlying cause of death, an additional 129,700 deaths had dementia listed as a contributing cause of death on the death certificate. Alzheimer disease was the sixth leading cause of death in 2017. If all four dementia causes were counted together, dementia would have been the third leading cause of death in the United States in 2017.



[1]The total number of deaths with any mention of dementia from contributing causes (129,700) is less than the sum of the four contributing causes because some death certificates contain mentions of more than one type of dementia, and these are reflected in more than one category.
NOTE: Dementia deaths are identified according to the *International Classification of Diseases, 10th Revision* cause-of-death codes: F03 (unspecified dementia), G30 (Alzheimer disease), F01 (vascular dementia), and G31 (other degenerative diseases of nervous system).
SOURCE: NCHS, National Vital Statistics System, Mortality.

Figure 13. Number of deaths attributed to dementia and specific types of dementia as a contributing cause of death: United States, 2017

Dementia mortality varied across states. Geographic differences in death rates for dementia could be due to factors such as variation in practices of certifiers of death (including specialized guidelines for coding dementia identified in some locations), differing awareness of Alzheimer disease and other dementias as chronic diseases that can lead to death, and differences in socioeconomic status and racial and ethnic distributions across states (31–35).

The distribution of dementia deaths across the four causes changed over time. There are likely many overlapping factors for these changes, and death certificate data alone are not sufficient to provide a comprehensive explanation. These changes have coincided with ongoing research and evolving scientific understanding of dementia. Recent research and the availability of new methods of screening (e.g., imaging and measurement of certain proteins in cerebrospinal fluid) have shown that some people with cognitive decline do not show Alzheimer disease brain changes, while others have evidence of Alzheimer disease (either postmortem or identified by biomarkers before death) without showing clinical symptoms of cognitive decline. In addition, studies have found that many cases of suspected Alzheimer disease actually are either non-Alzheimer dementias or mixed dementias, for example, where evidence of stroke or Lewy body disease is seen along with the signs of Alzheimer disease (36–40). It is difficult to identify reasons for changes in reporting of dementia causes of death when there are simultaneous changes in the scientific understanding of these causes. It is not known whether changes in practices of diagnosing Alzheimer disease and other dementias have an effect on the reporting of dementia as a cause of death. While the coding rules for these causes have remained largely constant in ICD–10, it is unknown whether certifiers of death interpret the concepts differently in light of new scientific information.

As the population ages and mortality due to other chronic diseases (e.g., heart disease) declines, a larger proportion survives to ages where the risk for dementia is highest. This may explain, in part, the observed increase since 2000. In 2060, it is estimated that 23.5% of the U.S. population will be aged 65 and over (41). Projections of the prevalence of dementia suggest that nearly 14 million people could have Alzheimer disease and related dementias in the United States in 2060 (42). Understanding patterns and trends in dementia mortality is an important component of addressing this public health challenge.

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List of Detailed Tables

Table 1. Number and percentage of dementia deaths, by cause of death and selected characteristics: United States, 2000–2017

[Race and Hispanic-origin categories are consistent with 1977 Office of Management and Budget (OMB) standards]

Characteristic and year	Number of total dementia deaths	Percent of all dementia deaths			
		Unspecified dementia (F03)	Alzheimer disease (G30)	Vascular dementia (F01)	Other degenerative diseases of nervous system (G31)
All ages					
2000	83,694	38.9	59.2	0.3	1.6
2001	92,514	40.1	58.2	0.2	1.4
2002	102,105	40.9	57.7	0.0	1.4
2003	110,569	41.2	57.4	0.0	1.4
2004	114,271	40.8	57.7	0.0	1.4
2005	129,573	40.1	55.3	3.3	1.4
2006	151,432	43.0	47.8	7.2	1.9
2007	156,042	46.3	47.8	3.7	2.1
2008	178,960	46.5	46.1	5.3	2.1
2009	177,523	47.9	44.5	5.4	2.2
2010	196,371	50.0	42.5	5.3	2.2
2011	212,876	52.5	39.9	5.4	2.2
2012	223,404	54.8	37.4	5.5	2.3
2013	234,242	55.2	36.2	5.7	3.0
2014	239,753	50.9	39.0	6.1	4.0
2015	245,926	43.8	45.0	5.4	5.8
2016	249,605	40.4	46.5	6.0	7.1
2017	261,914	38.9	46.4	6.2	8.5
Males					
2000	24,568	38.3	58.8	0.4	2.5
2001	27,315	39.7	57.7	0.3	2.3
2002	29,891	41.0	56.8	0.1	2.1
2003	32,246	41.0	56.9	0.0	2.1
2004	33,467	41.0	56.7	0.0	2.2
2005	38,024	39.9	54.1	4.0	2.1
2006	45,937	42.8	46.0	8.1	3.1
2007	47,537	46.2	45.9	4.5	3.5
2008	54,893	46.0	44.7	6.0	3.4
2009	55,553	47.3	43.0	6.1	3.5
2010	61,961	49.9	40.9	5.9	3.3
2011	67,053	52.3	38.3	6.0	3.4
2012	71,158	54.3	36.1	6.1	3.5
2013	74,656	54.7	34.6	6.4	4.3
2014	76,911	50.9	36.9	6.7	5.5
2015	79,113	43.8	42.6	6.0	7.6
2016	80,680	40.5	43.8	6.8	8.9
2017	85,129	39.0	43.8	6.9	10.2
Females					
2000	59,126	39.1	59.4	0.3	1.2
2001	65,199	40.3	58.4	0.2	1.1
2002	72,214	40.9	58.0	0.0	1.1
2003	78,323	41.2	57.6	0.0	1.1
2004	80,804	40.7	58.2	0.0	1.1
2005	91,549	40.2	55.8	3.0	1.1
2006	105,495	43.1	48.6	6.8	1.4
2007	108,505	46.4	48.7	3.4	1.5
2008	124,067	46.8	46.7	4.9	1.6
2009	121,970	48.1	45.2	5.1	1.6
2010	134,410	50.0	43.2	5.1	1.6
2011	145,823	52.7	40.7	5.1	1.6
2012	152,246	55.0	38.1	5.2	1.7
2013	159,586	55.4	36.9	5.4	2.3
2014	162,842	50.9	40.0	5.8	3.3
2015	166,813	43.9	46.1	5.1	4.9
2016	168,925	40.4	47.8	5.6	6.3
2017	176,785	38.9	47.6	5.8	7.7

See footnotes at end of table.

Table 1. Number and percentage of dementia deaths, by cause of death and selected characteristics: United States, 2000–2017—Con.

[Race and Hispanic-origin categories are consistent with 1977 Office of Management and Budget (OMB) standards]

Characteristic and year	Number of total dementia deaths	Percent of all dementia deaths			
		Unspecified dementia (F03)	Alzheimer disease (G30)	Vascular dementia (F01)	Other degenerative diseases of nervous system (G31)
Under age 65					
2000	1,211	23.6	46.5	0.3	29.6
2001	1,315	25.5	46.2	0.2	28.1
2002	1,276	27.4	45.2	–	27.4
2003	1,470	29.2	43.7	–	27.1
2004	1,546	30.4	42.2	–	27.4
2005	1,764	30.4	42.0	3.2	24.4
2006	2,238	37.2	34.5	6.1	22.2
2007	2,321	38.6	35.8	3.4	22.2
2008	2,573	40.0	33.5	5.3	21.2
2009	2,535	40.4	32.9	5.5	21.2
2010	2,816	45.1	31.2	5.2	18.5
2011	2,967	44.5	31.7	5.3	18.5
2012	3,144	45.7	30.0	5.3	19.0
2013	3,436	43.0	28.5	6.2	22.3
2014	3,256	39.9	28.8	5.8	25.5
2015	3,242	35.0	32.9	6.4	25.7
2016	3,509	31.8	34.8	6.0	27.5
2017	3,577	30.4	36.2	6.3	27.1
65 and over					
2000	82,481	39.1	59.4	0.3	1.2
2001	91,199	40.3	58.4	0.2	1.1
2002	100,829	41.1	57.8	0.0	1.0
2003	109,098	41.3	57.6	0.0	1.1
2004	112,725	40.9	57.9	0.0	1.1
2005	127,808	40.2	55.4	3.3	1.1
2006	149,194	43.1	48.0	7.2	1.6
2007	153,717	46.4	48.0	3.8	1.8
2008	176,386	46.6	46.2	5.2	1.9
2009	174,986	48.0	44.7	5.4	2.0
2010	193,555	50.1	42.7	5.3	1.9
2011	209,907	52.6	40.0	5.4	2.0
2012	220,253	54.9	37.5	5.5	2.0
2013	230,805	55.3	36.3	5.7	2.7
2014	236,495	51.0	39.2	6.1	3.7
2015	242,681	44.0	45.1	5.4	5.5
2016	246,093	40.5	46.7	6.0	6.8
2017	258,335	39.0	46.5	6.2	8.3
65–74 years					
2000	5,405	31.1	63.5	0.4	5.0
2001	5,616	33.9	60.9	0.3	4.9
2002	5,862	33.9	61.4	0.1	4.5
2003	6,317	34.4	60.7	0.0	4.9
2004	6,177	36.3	58.9	0.0	4.7
2005	6,859	35.2	55.6	4.4	4.8
2006	8,148	38.7	46.8	8.2	6.3
2007	8,328	41.7	47.8	4.0	6.4
2008	9,516	41.6	45.5	6.0	6.9
2009	9,607	43.9	42.8	6.3	6.9
2010	10,498	46.6	40.9	5.8	6.8
2011	11,327	48.9	38.2	6.2	6.7
2012	12,059	51.3	35.7	6.1	6.9
2013	13,171	49.5	34.6	6.8	9.1
2014	13,924	46.0	37.1	6.6	10.3
2015	14,599	39.1	42.2	6.2	12.5
2016	15,668	36.1	43.2	6.7	14.0
2017	16,893	35.1	43.1	7.0	14.8

See footnotes at end of table.

Table 1. Number and percentage of dementia deaths, by cause of death and selected characteristics: United States, 2000–2017—Con.

[Race and Hispanic-origin categories are consistent with 1977 Office of Management and Budget (OMB) standards]

Characteristic and year	Number of total dementia deaths	Percent of all dementia deaths			
		Unspecified dementia (F03)	Alzheimer disease (G30)	Vascular dementia (F01)	Other degenerative diseases of nervous system (G31)
75–84 years					
2000	27,012	34.4	63.9	0.4	1.4
2001	29,549	35.8	62.8	0.3	1.1
2002	32,540	36.9	61.9	0.0	1.2
2003	34,755	37.9	60.9	0.0	1.2
2004	35,772	37.5	61.2	0.0	1.3
2005	39,500	36.8	58.6	3.4	1.2
2006	45,331	40.0	50.6	7.4	2.0
2007	45,808	43.5	50.2	3.8	2.5
2008	51,874	43.6	48.5	5.4	2.5
2009	49,913	45.3	46.7	5.3	2.6
2010	53,828	47.2	44.8	5.4	2.6
2011	57,527	49.8	42.1	5.4	2.7
2012	59,086	52.4	39.4	5.4	2.8
2013	60,464	52.5	38.2	5.9	3.4
2014	61,659	48.2	41.2	6.0	4.6
2015	62,262	40.6	47.4	5.4	6.6
2016	62,849	37.8	48.5	5.9	7.8
2017	66,314	36.0	48.7	6.0	9.2
85 years and over					
2000	50,064	42.5	56.5	0.3	0.6
2001	56,034	43.3	55.8	0.2	0.6
2002	62,427	44.0	55.3	0.0	0.6
2003	68,026	43.8	55.6	0.0	0.6
2004	70,776	43.1	56.2	0.0	0.6
2005	81,449	42.3	53.9	3.1	0.7
2006	95,715	45.0	46.9	7.0	1.0
2007	99,581	48.2	47.0	3.7	1.1
2008	114,996	48.4	45.3	5.1	1.2
2009	115,466	49.4	43.9	5.3	1.3
2010	129,229	51.6	42.0	5.2	1.3
2011	141,053	54.1	39.3	5.3	1.3
2012	149,108	56.2	37.0	5.5	1.4
2013	157,170	56.9	35.7	5.5	1.8
2014	160,912	52.6	38.6	6.1	2.8
2015	165,820	45.7	44.5	5.3	4.5
2016	167,576	42.0	46.3	5.9	5.8
2017	175,128	40.6	46.0	6.2	7.3
Hispanic					
2000	1,867	35.6	60.4	0.5	3.5
2001	2,184	40.0	56.7	0.0	3.2
2002	2,461	36.9	59.9	0.0	3.2
2003	3,001	35.4	61.1	0.0	3.5
2004	3,244	37.4	58.5	0.0	4.1
2005	3,876	35.4	56.8	4.4	3.5
2006	5,076	39.1	47.3	8.6	5.0
2007	5,198	42.5	47.5	4.8	5.2
2008	6,378	41.2	47.1	6.4	5.3
2009	6,535	42.8	45.7	6.8	4.7
2010	7,744	45.2	44.3	5.8	4.8
2011	8,793	47.6	40.9	5.9	5.5
2012	9,943	50.2	37.9	6.4	5.5
2013	10,767	49.5	38.3	6.5	5.6
2014	11,583	43.7	42.6	7.3	6.4
2015	12,104	33.3	53.2	6.4	7.0
2016	12,687	31.4	53.9	6.5	8.3
2017	13,820	30.6	53.4	6.1	9.9

See footnotes at end of table.

Table 1. Number and percentage of dementia deaths, by cause of death and selected characteristics: United States, 2000–2017—Con.

[Race and Hispanic-origin categories are consistent with 1977 Office of Management and Budget (OMB) standards]

Characteristic and year	Number of total dementia deaths	Percent of all dementia deaths			
		Unspecified dementia (F03)	Alzheimer disease (G30)	Vascular dementia (F01)	Other degenerative diseases of nervous system (G31)
Non-Hispanic white[1]					
2000	75,801	38.5	59.7	0.3	1.5
2001	83,610	39.8	58.6	0.2	1.4
2002	92,088	40.6	58.1	0.0	1.3
2003	99,127	40.9	57.8	0.0	1.3
2004	101,794	40.5	58.1	0.0	1.3
2005	114,857	39.9	55.7	3.1	1.3
2006	133,436	42.8	48.5	6.9	1.9
2007	137,396	45.9	48.4	3.6	2.1
2008	157,050	46.3	46.6	5.0	2.1
2009	155,021	47.7	45.0	5.2	2.2
2010	171,009	49.8	43.0	5.1	2.1
2011	184,605	52.5	40.3	5.1	2.1
2012	191,951	54.7	37.9	5.3	2.1
2013	200,665	55.2	36.5	5.4	2.8
2014	204,418	51.1	39.1	5.8	3.9
2015	208,681	44.3	44.7	5.2	5.8
2016	211,237	40.8	46.3	5.8	7.1
2017	220,841	39.3	46.1	6.0	8.5
Non-Hispanic black[1]					
2000	5,123	44.4	53.1	0.8	1.7
2001	5,773	44.0	53.8	0.5	1.8
2002	6,342	46.5	52.1	0.1	1.4
2003	7,131	46.6	51.8	–	1.6
2004	7,857	45.0	53.4	0.1	1.6
2005	9,148	44.3	50.1	4.0	1.6
2006	10,655	47.6	41.5	9.4	1.5
2007	11,205	52.0	42.2	4.3	1.5
2008	12,669	51.8	39.7	7.0	1.5
2009	12,925	52.6	39.0	6.8	1.6
2010	14,219	55.3	36.4	6.7	1.6
2011	15,686	56.5	34.7	7.0	1.8
2012	16,914	59.4	31.9	6.6	2.1
2013	17,875	58.9	31.7	7.4	2.0
2014	18,403	53.8	35.3	7.9	3.0
2015	19,106	46.6	42.2	6.6	4.5
2016	19,533	43.3	43.9	7.3	5.5
2017	20,655	42.0	43.5	7.4	7.1

– Quantity zero.
0.0 Quantity more than zero but less than 0.05.
[1]Multiple-race data reported according to the 1997 OMB standards were bridged to single-race cateories of the 1977 OMB standards. For more information, see Technical Notes.

NOTE: Dementia deaths are identified according to the *International Classification of Diseases, 10th Revision* underlying cause-of-death codes: F03 (unspecified dementia), G30 (Alzheimer disease), F01 (vascular dementia), and G31 (other degenerative diseases of nervous system).

SOURCE: NCHS, National Vital Statistics System, Mortality.

Table 2. Number and percentage of dementia deaths, by cause of death and state: United States, 2017

State	Number of total dementia deaths	Percent of all dementia deaths			
		Unspecified dementia (F03)	Alzheimer disease (G30)	Vascular dementia (F01)	Other degenerative diseases of nervous system (G31)
United States	261,914	38.9	46.4	6.2	8.5
Alabama	4,815	34.2	53.2	4.1	8.4
Alaska	253	43.9	38.7	10.7	6.7
Arizona	5,045	21.9	60.6	4.2	13.3
Arkansas	2,735	27.5	52.5	2.7	17.3
California	25,017	16.0	64.9	9.1	10.0
Colorado	3,806	35.8	48.1	9.5	6.7
Connecticut	3,351	60.1	32.1	4.7	3.0
Delaware	811	47.3	46.5	3.3	2.8
District of Columbia	358	40.2	34.9	6.7	18.2
Florida	17,523	34.9	39.8	7.7	17.5
Georgia	7,659	29.0	56.0	3.5	11.5
Hawaii	1,151	46.7	40.4	9.4	3.6
Idaho	1,371	35.9	49.0	4.6	10.5
Illinois	10,147	49.9	39.6	5.4	5.2
Indiana	6,190	44.2	44.8	4.4	6.7
Iowa	3,270	41.7	48.8	4.3	5.2
Kansas	2,590	50.2	34.5	6.3	9.0
Kentucky	4,404	48.3	40.1	3.9	7.7
Louisiana	3,564	29.2	61.4	2.6	6.7
Maine	1,705	52.5	35.2	9.0	3.2
Maryland	4,403	59.2	27.0	6.6	7.2
Massachusetts	7,584	67.2	24.3	5.6	2.9
Michigan	8,523	34.0	52.0	6.8	7.3
Minnesota	5,672	45.0	43.6	6.2	5.1
Mississippi	2,449	26.1	66.4	1.3	6.2
Missouri	5,217	39.8	48.8	6.0	5.5
Montana	925	59.5	30.8	6.1	3.7
Nebraska	1,771	45.2	39.4	6.3	9.0
Nevada	1,751	30.1	44.5	4.1	21.3
New Hampshire	1,395	58.9	31.3	5.7	4.2
New Jersey	6,422	49.4	44.1	3.2	3.3
New Mexico	1,394	40.5	41.0	8.9	9.5
New York	11,520	56.4	30.6	5.4	7.7
North Carolina	9,503	42.7	45.1	6.5	5.7
North Dakota	641	23.4	60.4	12.3	3.9
Ohio	11,542	43.6	44.3	7.2	4.9
Oklahoma	3,222	34.3	54.4	5.6	5.8
Oregon	4,274	39.0	43.3	11.0	6.7
Pennsylvania	12,538	56.2	33.6	5.2	5.0
Rhode Island	1,270	55.7	34.3	5.7	4.3
South Carolina	4,885	34.2	52.2	5.4	8.2
South Dakota	667	15.7	66.6	11.7	6.0
Tennessee	6,812	33.4	51.7	7.4	7.5
Texas	18,427	27.7	51.8	4.1	16.4
Utah	1,844	31.3	53.7	8.1	6.9
Vermont	666	31.4	55.6	9.5	3.6
Virginia	6,985	49.3	36.5	5.6	8.6
Washington	6,040	17.4	61.4	12.0	9.2
West Virginia	1,805	45.2	42.7	4.8	7.4
Wisconsin	5,653	45.9	43.0	6.5	4.7
Wyoming	349	29.5	60.7	6.6	3.2

NOTE: Dementia deaths are identified according to the *International Classification of Diseases, 10th Revision* underlying cause-of-death codes: F03 (unspecified dementia), G30 (Alzheimer disease), F01 (vascular dementia), and G31 (other degenerative diseases of nervous system).

SOURCE: NCHS, National Vital Statistics System, Mortality.

Table 3. Number and percentage of dementia deaths for selected states, by cause of death: United States, 2000–2017

State and year	Number of total dementia deaths	Percent of all dementia deaths			
		Unspecified dementia (F03)	Alzheimer disease (G30)	Vascular dementia (F01)	Other degenerative diseases of nervous system (G31)
Arizona					
2000	1,808	41.3	57.8	---	0.9
2001	2,098	46.4	52.8	---	0.8
2002	2,363	38.7	60.6	---	0.6
2003	2,661	35.2	64.0	---	0.8
2004	2,656	36.1	63.1	---	0.8
2005	2,955	35.2	62.0	2.1	0.8
2006	3,543	35.5	58.3	4.7	1.5
2007	3,594	37.3	57.1	4.3	1.4
2008	3,745	37.1	56.0	5.3	1.5
2009	3,661	35.7	57.3	5.8	1.3
2010	4,066	36.5	57.2	4.5	1.7
2011	4,235	38.4	55.4	4.6	1.6
2012	4,250	42.0	50.8	5.7	1.4
2013	4,478	37.9	53.2	6.4	2.6
2014	4,606	35.5	54.0	6.3	4.2
2015	4,624	23.8	63.6	4.1	8.5
2016	4,801	22.9	64.2	4.2	8.6
2017	5,045	21.9	60.6	4.2	13.3
Florida					
2000	5,899	40.6	55.3	0.6	3.4
2001	6,910	43.6	52.7	0.2	3.5
2002	7,518	42.4	53.9	---	3.7
2003	8,125	42.3	53.1	---	4.6
2004	8,518	44.1	50.6	---	5.3
2005	9,448	43.2	48.8	2.0	6.0
2006	11,331	45.4	41.4	6.1	7.1
2007	11,267	48.1	41.2	3.0	7.6
2008	12,454	48.7	38.1	4.3	8.9
2009	12,635	49.7	36.5	4.4	9.4
2010	14,051	52.4	34.4	4.4	8.8
2011	14,838	56.1	30.4	4.3	9.2
2012	15,653	58.1	28.3	4.6	9.0
2013	16,616	55.9	30.7	5.2	8.2
2014	16,534	49.5	35.5	6.4	8.6
2015	15,836	39.7	44.4	6.4	9.6
2016	16,315	35.9	43.9	7.1	13.1
2017	17,523	34.9	39.8	7.7	17.5
Washington					
2000	2,044	10.3	88.0	---	1.4
2001	2,312	10.1	88.7	---	1.2
2002	2,515	11.4	87.3	---	1.3
2003	2,692	10.6	88.4	---	1.0
2004	2,651	14.7	84.2	---	1.1
2005	3,133	16.2	73.7	9.1	1.0
2006	3,704	18.2	66.7	12.9	2.3
2007	3,766	17.4	71.4	9.0	2.2
2008	4,391	15.5	70.7	11.4	2.3
2009	4,242	13.8	71.0	12.6	2.7
2010	4,442	16.2	68.1	12.6	3.0
2011	4,717	18.3	66.5	12.4	2.8
2012	5,072	21.9	63.5	11.9	2.7
2013	5,451	24.6	60.1	11.7	3.6
2014	5,322	20.9	62.8	11.0	5.3
2015	5,748	23.1	60.7	9.5	6.7
2016	5,715	25.4	57.2	10.1	7.3
2017	6,040	17.4	61.4	12.0	9.2

See footnotes at end of table.

Table 3. Number and percentage of dementia deaths for selected states, by cause of death: United States, 2000–2017—Con.

State and year	Number of total dementia deaths	Percent of all dementia deaths			
		Unspecified dementia (F03)	Alzheimer disease (G30)	Vascular dementia (F01)	Other degenerative diseases of nervous system (G31)
Connecticut					
2000	969	44.2	54.3	---	1.2
2001	1,115	47.5	51.4	---	1.0
2002	1,207	51.7	47.2	---	1.1
2003	1,249	50.3	49.0	---	---
2004	1,439	51.9	47.5	---	---
2005	1,619	48.1	48.0	2.7	1.2
2006	1,825	53.3	39.9	5.7	1.2
2007	1,940	56.3	39.4	2.7	1.6
2008	2,130	55.3	39.4	3.8	1.5
2009	2,175	58.0	35.8	4.6	1.7
2010	2,393	60.7	34.3	3.6	1.5
2011	2,717	65.6	29.9	3.1	1.4
2012	2,847	65.4	29.6	3.5	1.5
2013	2,885	65.4	28.6	4.1	1.9
2014	3,105	63.8	29.7	4.8	1.7
2015	3,126	62.3	30.9	4.7	2.0
2016	3,313	60.1	31.2	6.0	2.7
2017	3,351	60.1	32.1	4.7	3.0
Maryland					
2000	1,585	47.1	51.2	---	1.3
2001	1,727	43.8	54.9	---	0.8
2002	1,718	48.7	50.4	---	0.9
2003	1,830	51.6	47.3	---	1.0
2004	1,847	50.0	49.0	---	1.0
2005	2,129	50.9	45.0	2.9	1.2
2006	2,616	56.2	35.0	7.6	1.2
2007	2,714	62.7	32.5	3.5	1.3
2008	3,108	61.3	32.7	4.7	1.3
2009	3,166	64.1	29.6	5.4	0.9
2010	3,603	65.5	27.4	5.6	1.5
2011	3,808	69.9	24.2	4.6	1.3
2012	3,971	71.0	22.8	5.0	1.2
2013	4,192	70.7	21.9	5.8	1.6
2014	4,046	68.7	23.1	6.4	1.9
2015	4,243	64.0	25.8	5.3	4.9
2016	4,305	61.4	27.4	6.0	5.2
2017	4,403	59.2	27.0	6.6	7.2
Massachusetts					
2000	2,666	44.1	53.8	---	2.0
2001	3,012	47.2	50.9	---	1.9
2002	3,162	48.5	49.7	---	1.7
2003	3,250	49.4	49.5	---	1.1
2004	3,320	48.6	50.4	---	1.0
2005	3,416	48.5	48.0	2.5	1.0
2006	3,934	53.4	39.7	4.8	2.2
2007	4,216	55.4	40.2	2.5	1.9
2008	4,908	57.4	37.3	3.5	1.8
2009	4,932	60.7	34.5	3.3	1.5
2010	5,466	62.3	32.4	3.3	2.0
2011	6,043	64.8	30.1	3.5	1.6
2012	6,126	66.7	28.0	3.4	1.9
2013	6,379	67.8	26.6	3.3	2.3
2014	6,505	67.7	25.9	4.4	1.9
2015	7,047	66.8	25.8	4.7	2.8
2016	6,935	67.5	24.6	5.1	2.9
2017	7,584	67.2	24.3	5.6	2.9

--- Data not available. Subnational data representing fewer than 10 persons (0–9) are suppressed for years 1989 and later. Additional information is available from: https://wonder.cdc.gov/wonder/help/ucd.html#Assurance%20of%20Confidentiality.

NOTE: Dementia deaths are identified according to the *International Classification of Diseases, 10th Revision* underlying cause-of-death codes: F03 (unspecified dementia), G30 (Alzheimer disease), F01 (vascular dementia), and G31 (other degenerative diseases of nervous system).

SOURCE: NCHS, National Vital Statistics System, Mortality.

Table 4. Number and percentage of deaths for dementia, by place of death and cause of death: United States, 2017

Cause and place of death	Number	Percent
Dementia (F03, G30, F01, G31)		
Total	261,914	100.0
Medical facility	22,791	8.7
Hospice, nursing home, or long-term care facility	158,117	60.4
Decedent's home	60,064	22.9
Other	20,942	8.0
Unspecified dementia (F03)		
Total	101,934	100.0
Medical facility	13,881	13.6
Hospice, nursing home, or long-term care facility	66,626	65.4
Decedent's home	15,381	15.1
Other	6,046	5.9
Alzheimer disease (G30)		
Total	121,404	100.0
Medical facility	6,609	5.4
Hospice, nursing home, or long-term care facility	70,003	57.7
Decedent's home	33,476	27.6
Other	11,316	9.3
Vascular dementia (F01)		
Total	16,247	100.0
Medical facility	1,219	7.5
Hospice, nursing home, or long-term care facility	9,979	61.4
Decedent's home	3,637	22.4
Other	1,412	8.7
Other degenerative diseases of nervous system (G31)		
Total	22,329	100.0
Medical facility	1,082	4.8
Hospice, nursing home, or long-term care facility	11,509	51.5
Decedent's home	7,570	33.9
Other	2,168	9.7

NOTE: Dementia deaths are identified according to the *International Classification of Diseases, 10th Revision* underlying cause-of-death codes: F03 (unspecified dementia), G30 (Alzheimer disease), F01 (vascular dementia), and G31 (other degenerative diseases of nervous system).

SOURCE: NCHS, National Vital Statistics System, Mortality.

Table 5. Number of deaths, death rates, age-adjusted death rates, and percentage of total deaths for dementia, by selected characteristics: United States, 2017

[Age-adjusted rates are per 100,000 U.S. standard population. Rates are based on populations enumerated as July 1, 2017. Race and Hispanic-origin categories are consistent with 1977 Office of Management and Budget (OMB) standards]

Selected characteristic	Number	Death rate[1]	Percent
Age group (years)[2]			
All ages	261,914	66.7	100.0
Under 65	3,577	0.9	1.4
65 and over	258,335	521.9	98.6
65–74	16,893	56.9	6.4
75–84	66,314	450.9	25.3
85 and over	175,128	2707.3	66.9
85–89	65,908	1691.8	25.2
90–94	67,202	3495.0	25.7
95–99	34,460	6111.8	13.2
100 and over	7,558	8763.1	2.9
Sex			
Male	85,129	56.4	32.5
Female	176,785	72.7	67.5
Race and Hispanic origin[3]			
Non-Hispanic white[4]	220,841	70.8	84.3
Non-Hispanic black[4]	20,655	65.0	7.9
Non-Hispanic American Indian or Alaska Native[4]	768	41.6	0.3
Non-Hispanic Asian or Pacific Islander[4]	5,327	31.4	2.0
Hispanic	13,820	46.0	5.3
Urbanization			
Metropolitan[5]	215,857	66.2	82.4
Nonmetropolitan	46,057	69.6	17.6

[1]Rates are age adjusted for all ages, under 65, and 65 and over.
[2]Figures for age not stated are included in "All ages" but not distributed among age groups.
[3]Figures for origin not stated are included in all estimates except those for race and Hispanic origin.
[4]Multiple-race data reported according to the 1997 OMB standards were bridged to single-race cateories of 1977 the OMB standards. For more information, see Technical Notes.
[5]Metropolitan areas include counties in metro areas with 50,000 or greater population, including surrounding areas with strong economic ties to the central county.

NOTE: Dementia deaths are identified according to the *International Classification of Diseases, 10th Revision* underlying cause-of-death codes: F03 (unspecified dementia), G30 (Alzheimer disease), F01 (vascular dementia), and G31 (other degenerative diseases of nervous system).

SOURCE: NCHS, National Vital Statistics System, Mortality.

Table 6. Age-adjusted death rates for dementia, by state: United States, 2017

[Age-adjusted rates are per 100,000 U.S. standard population; see Technical Notes]

Area	Number of deaths	Age-adjusted death rate
United States	261,914	66.7
Alabama	4,815	84.8
Alaska	253	56.1
Arizona	5,045	57.8
Arkansas	2,735	74.8
California	25,017	57.0
Colorado	3,806	70.8
Connecticut	3,351	62.9
Delaware	811	65.6
District of Columbia	358	50.9
Florida	17,523	51.8
Georgia	7,659	81.8
Hawaii	1,151	49.3
Idaho	1,371	74.9
Illinois	10,147	64.5
Indiana	6,190	78.6
Iowa	3,270	72.1
Kansas	2,590	69.3
Kentucky	4,404	87.1
Louisiana	3,564	70.9
Maine	1,705	85.5
Maryland	4,403	62.5
Massachusetts	7,584	81.3
Michigan	8,523	66.2
Minnesota	5,672	79.9
Mississippi	2,449	74.5
Missouri	5,217	66.3
Montana	925	67.0
Nebraska	1,771	71.6
Nevada	1,751	61.3
New Hampshire	1,395	77.5
New Jersey	6,422	53.5
New Mexico	1,394	55.2
New York	11,520	43.0
North Carolina	9,503	82.3
North Dakota	641	61.1
Ohio	11,542	75.4
Oklahoma	3,222	72.2
Oregon	4,274	83.0
Pennsylvania	12,538	64.1
Rhode Island	1,270	79.4
South Carolina	4,885	86.0
South Dakota	667	55.5
Tennessee	6,812	90.1
Texas	18,427	74.1
Utah	1,844	78.1
Vermont	666	77.0
Virginia	6,985	75.4
Washington	6,040	74.7
West Virginia	1,805	71.6
Wisconsin	5,653	73.5
Wyoming	349	53.7

NOTE: Dementia deaths are identified according to the *International Classification of Diseases, 10th Revision* underlying cause-of-death codes: F03 (unspecified dementia), G30 (Alzheimer disease), F01 (vascular dementia), and G31 (other degenerative diseases of nervous system).

SOURCE: NCHS, National Vital Statistics System, Mortality.

Table 7. Age-specific death rates and age-adjusted death rates for dementia, by sex and race and Hispanic origin: United States, 2000–2017

[Age-adjusted rates are per 100,000 U.S. standard pouplation. Rates are based on populations enumerated as of April 1 for census years and estimated as of July 1 for all other years. Race and Hispanic-origin categories are consistent with 1977 Office of Management and Budget (OMB) standards]

Year	All	Under 65 years	65 years and over	65–74 years	75–84 years	85 years and over	Female	Male	Hispanic	Non-Hispanic white[1]	Non-Hispanic black[1]
2000	30.5	0.5	237.8	29.4	218.5	1,180.9	32.4	26.1	17.2	32.0	24.7
2001	33.1	0.5	258.6	30.5	234.6	1,299.3	35.2	28.5	19.1	34.8	27.8
2002	36.1	0.5	282.4	31.9	254.9	1,428.9	38.6	30.6	20.7	37.9	30.6
2003	38.4	0.5	300.3	34.1	269.5	1,523.1	41.4	32.1	23.8	40.1	34.1
2004	39.1	0.5	306.1	33.1	275.4	1,556.9	42.3	32.7	24.5	40.7	37.1
2005	43.4	0.6	339.1	36.3	302.1	1,735.4	46.9	36.1	27.6	45.1	42.0
2006	49.5	0.7	386.4	42.4	346.2	1,967.0	52.9	42.2	33.9	51.3	47.9
2007	49.8	0.7	388.8	42.3	350.0	1,976.0	53.5	42.4	33.0	51.8	49.1
2008	55.9	0.8	436.6	46.4	396.7	2,213.2	60.1	47.5	38.2	58.2	54.0
2009	54.2	0.8	423.6	45.2	383.3	2,151.3	57.9	46.8	36.7	56.4	53.5
2010	58.8	0.8	460.1	48.3	412.1	2,352.4	62.8	51.1	41.7	61.3	57.3
2011	61.8	0.8	482.9	50.4	436.6	2,458.6	66.3	53.1	43.1	64.5	61.1
2012	63.3	0.9	495.0	50.3	445.2	2,532.7	68.0	54.7	45.7	66.0	63.1
2013	64.8	0.9	506.1	52.2	449.7	2,601.8	69.8	55.4	46.2	67.7	64.3
2014	64.9	0.9	507.8	52.7	450.6	2,611.3	70.2	55.5	46.3	68.1	64.0
2015	65.2	0.8	510.0	53.0	447.2	2,637.4	70.7	55.4	45.2	68.6	64.1
2016	64.9	0.9	507.5	54.7	441.6	2,626.4	70.5	55.1	44.8	68.6	63.7
2017	66.7	0.9	521.9	56.9	450.9	2,707.3	72.7	56.4	46.0	70.8	65.0

[1]Multiple-race data reported according to the 1997 OMB standards were bridged to single-race cateories of the 1977 OMB standards. For more information, see Technical Notes.

NOTES: Rates are age adjusted for all groups except 65–74, 75–84, and 85 and over. Dementia deaths are identified according to the *International Classification of Diseases, 10th Revision* underlying cause-of-death codes: F03 (unspecified dementia), G30 (Alzheimer disease), F01 (vascular dementia), and G31 (other degenerative diseases of nervous system).

SOURCE: NCHS, National Vital Statistics System, Mortality.

Table 8. Number and percentage of total deaths, by selected underlying causes of death for deaths with dementia as contributing cause of death: United States, 2017

Underlying cause of death and ICD–10 code	Dementia as contributing cause of death				
	Dementia	Unspecified dementia (F03)[1]	Alzheimer disease (G30)[1]	Vascular Dementia (F01)[1]	Other degenerative diseases of nervous system (G31)[1]
			Number		
All causes	129,700	86,308	24,018	13,573	4,370
			Percent		
Total	100.0	100.0	100.0	100.0	100.0
Diseases of heart (I00–I09,I11,I13,I20–I51)	31.2	30.8	35.5	29.7	20.1
Cerebrovascular diseases (I60–I69)	12.5	10.3	10.5	30.5	8.7
Malignant neoplasms (C00–C97)	9.0	9.0	11.6	4.8	8.2
Parkinson disease (G20–G21)	7.1	8.6	1.3	1.5	24.8
Chronic lower respiratory diseases (J40–J47)	6.9	7.2	7.5	4.6	4.3
Accidents (unintentional injuries) (V01–X59,Y85–Y86)	6.1	7.0	6.0	1.4	4.4
Diabetes mellitus (E10–E14)	4.3	4.1	3.9	6.9	2.9
Essential hypertension and hypertensive renal disease (I10,I12,I15)	3.8	3.2	3.6	7.3	5.1
Pneumonitis due to solids and liquids (J69)	2.0	2.2	2.1	0.8	1.5
Septicemia (A40–A41)	1.5	1.7	1.5	0.6	1.1
Nephritis, nephrotic syndrome and nephrosis (N00–N07,N17–N19,N25–N27)	1.2	1.3	1.1	1.1	0.9
Influenza and pneumonia (J09–J18)	0.9	0.9	1.1	0.6	0.8
In situ neoplasms, benign neoplasms and neoplasms of uncertain or unknown behavior (D00–D48)	0.6	0.6	0.7	0.4	0.7
Congenital malformations, deformations and chromosomal abnormalities (Q00–Q99)	0.5	0.4	1.2	0.1	0.3
Atherosclerosis (I70)	0.5	0.4	0.5	0.5	1.0
Nutritional deficiencies (E40–E64)	0.5	0.3	1.0	0.7	1.5
Enterocolitis due to *Clostridium difficile* (A04.7)	0.4	0.4	0.5	0.2	0.4
Chronic liver disease and cirrhosis (K70,K73–K74)	0.3	0.3	0.2	0.1	1.0
Cholelithiasis and other disorders of gallbladder (K80–K82)	0.3	0.3	0.3	0.2	0.2
Aortic aneurysm and dissection (I71)	0.2	0.2	0.1	0.1	0.1
All other causes	10.5	11.0	9.9	8.1	12.1

[1]Deaths where only one dementia cause was listed in the multiple cause-of-death axis.

NOTES: Dementia deaths are identified according to the *International Classification of Diseases, 10th Revision* cause-of-death codes: F03 (unspecified dementia), G30 (Alzheimer disease), F01 (vascular dementia), and G31 (other degenerative diseases of nervous system). Order of underlying causes of death is based on the rank order of the top 20 rankable causes for the total category. Sum of the four individual dementia causes is less than the total number of deaths with dementia as a contributing cause because the total (129,700) includes deaths where more than one type of dementia was listed in the multiple cause-of-death axis.

SOURCE: NCHS, National Vital Statistics System, Mortality.

Technical Notes

Data

Data presented in this report are based on information from all death certificates that were filed in the 50 states and the District of Columbia in 2000–2017, and processed by the National Center for Health Statistics (NCHS) through the Vital Statistics Cooperative Program. Only deaths occurring to U.S. residents are included in this report. For details about the nature and sources of data and revision of the U.S. Standard Certificate of Death, please see the Technical Notes of "Deaths: Final Data for 2016" (26).

Cause of death

Causes of death are classified according to the *International Classification of Diseases, 10th Revision* (ICD–10) (17). ICD not only details disease classification but also provides definitions, tabulation lists, the format of the death certificate, and the rules for coding cause of death. Cause-of-death data presented in this publication were coded by procedures outlined in annual issues of the NCHS Instruction Manuals (18,19,22,23,43,44). The manuals include rules for selecting the underlying cause of death for tabulation purposes, definitions, tabulation lists, and regulations on the use of the classification. Dementia was defined using the following ICD–10 underlying cause-of-death codes: F01 (vascular dementia), F03 (unspecified dementia), G30 (Alzheimer disease), and G31 (other degenerative diseases of nervous system, not elsewhere classified). See the Table below for the detailed ICD–10 codes for dementia.

Table. Dementia cause of death and ICD–10 codes

Cause of death (based on *International Classification of Diseases, 10th Revision*)	
Vascular dementia	F01
Vascular dementia of acute onset	F01.0
Multi-infarct dementia	F01.1
Subcortical vascular dementia	F01.2
Mixed cortical and subcortical vascular dementia	F01.3
Other vascular dementia	F01.8
Vascular dementia, unspecified	F01.9
Unspecified dementia	F03
Alzheimer disease	G30
Alzheimer disease with early onset	G30.0
Alzheimer disease with late onset	G30.1
Other Alzheimer disease	G30.8
Alzheimer disease, unspecified	G30.9
Other degenerative diseases of nervous system, not elsewhere classified	G31
Circumscribed brain atrophy, including frontotemporal dementia (FTD)	G31.0
Senile degeneration of brain, not elsewhere classified	G31.1
Degeneration of nervous system due to alcohol	G31.2
Other specified degenerative diseases of nervous system, including Lewy body dementia	G31.8
Degenerative disease of nervous system, unspecified	G31.9

SOURCE: World Health Organization, *International Statistical Classification of Diseases, 10th Revision* (https://apps.who.int/classifications/icd10/browse/2016/en).

Race and Hispanic origin

The 2003 revision of the U.S. Standard Certificate of Death allows the reporting of more than one race (multiple races) (45). The race and ethnicity items on the revised certificate are compliant with the 1997 "Revisions to the Standards for the Classification of Federal Data on Race and Ethnicity," issued by the Office of Management and Budget (OMB) (46). This revision replaced standards that were issued in 1977 (47). Some death certificates currently collect only one race for the decedent in the same categories as specified in the 1977 OMB guidelines. Therefore, death certificate data by race—the source of the numerators for death rates—are currently incompatible with the population data collected in the 2000 and 2010 censuses, intercensal estimates for 2001–2009, and postcensal estimates for 2011–2017—the denominators for the rates. To produce death rates by race, the reported population data for multiple-race persons had to be "bridged" to single-race categories. To provide uniformity and comparability of data during the transition period, before all or most of the data become available in the multiple-race format, the responses of those for whom more than one race was reported (multiple race) must be bridged to a single race. The bridging procedure is similar to that used to bridge multiracial population estimates (48,49). Multiracial decedents are imputed to a single race (white, black, American Indian or Alaska Native [AIAN], or Asian or Pacific Islander [API]) according to their combination of races, Hispanic origin, sex, and age indicated on the death certificate. The imputation procedure is described in detail at: https://www.cdc.gov/nchs/data/dvs/Multiple_race_documentation_5-10-04.pdf.

Race and Hispanic origin are two distinct attributes and are reported separately on the death certificate. Therefore, data shown by Hispanic origin and race are based on a combination of the two attributes for the non-Hispanic population. Data shown for the Hispanic population includes persons of any race. Hispanic origin is not imputed if it was not reported.

Death rates for Hispanic, non-Hispanic AIAN, and non-Hispanic API persons should be interpreted with caution because of inconsistencies in reporting Hispanic origin or race on the death certificate compared with censuses, surveys, and birth certificates. Studies have shown underreporting on death certificates of non-Hispanic AIAN, non-Hispanic API, and Hispanic decedents, as well as undercounts of these groups in censuses (25,50–52). For more details about race and Hispanic origin, including changes in the standards for classifying race and ethnicity, race bridging of deaths, and the quality of reporting on death certificates and surveys, see the Technical Notes of "Deaths: Final Data for 2016" (26).

Population for death rates

Death rates for each year were calculated as the number of deaths per 100,000 population residing in the United States or in the specified state and the District of Columbia. Bridged-race estimates of the U.S. resident population were used to compute death rates in this report. For 2001–2009, they are July 1 intercensal estimates; for 2011–2017, they are July 1

postcensal estimates based on the 2010 U.S. Census; and for 2000 and 2010, they are April 1 census counts. Populations used for computing death rates by state are based on state postcensal population estimates based on the 2010 census, estimated as of July 1, 2017 (53). All age-adjusted rates shown in this report are based on the 2000 U.S. standard population.

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Contents

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