2026
ALZHEIMER'S DISEASE FACTS AND FIGURES

Special Report

Brain Health in America: Understanding and Supporting Lifelong Cognitive Health

ALZHEIMER'S ASSOCIATION®

About this report

2026 Alzheimer's Disease Facts and Figures is a statistical resource for U.S. data related to Alzheimer's disease, the most common type of dementia. Background and context for interpretation of the data are contained in the Overview. Additional sections address prevalence, mortality and morbidity, caregiving, the dementia care workforce, and the use and costs of health care and services. A Special Report examines how Americans understand, prioritize and act on the desire to sustain brain health across the lifespan.

The statistics, facts, figures, interpretations, opinions, recommendations and descriptions made in this report are based on currently available data and information as cited in this report, all of which are subject to revision as new data and information become available.

Alzheimer's Association. 2026 Alzheimer's Disease Facts and Figures. Alzheimers Dement 2026;22. https://doi.org/10.1002/alz.71345.

Specific information in this year's *Alzheimer's Disease Facts and Figures* includes:

- Brain changes that occur with Alzheimer's disease (page 5).
- Treatments for Alzheimer's (page 13).
- Risk factors for Alzheimer's dementia (page 16).
- Number of Americans with clinical Alzheimer's dementia nationally (page 27) and for each state (page 32).
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- Proportion of women and men with clinical Alzheimer's and other dementias (page 34).
- Number of deaths due to Alzheimer's disease nationally (page 41) and for each state (page 43), and death rates by age (page 45).
- Number of family caregivers, hours of care provided, and economic value of unpaid care nationally and for each state (page 51).
- The impact of caregiving on caregivers (page 52).
- The importance of the paid workforce that diagnoses, treats, cares for and supports people with Alzheimer's or other dementias (page 63).
- National cost of care for individuals with Alzheimer's or other dementias, including costs paid by Medicare and Medicaid and costs paid out of pocket (page 74).
- Medicare payments for people with dementia compared with people without dementia (page 75).
- Americans' views on brain health, the habits they link to it, their current practices and how they want to receive support (page 98).

The Appendices detail sources and methods used to derive statistics in this report.

When possible, specific information about Alzheimer's disease is provided; in other cases, the reference may be a more general one of "Alzheimer's or other dementias." This report keeps the racial and ethnic identifiers used in source documents when describing study findings.[A1]

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OVERVIEW

ALZHEIMER'S BEGINS 20 YEARS OR MORE BEFORE MEMORY LOSS AND OTHER SYMPTOMS DEVELOP.

Alzheimer's disease is a condition that gradually damages and destroys nerve cells (called neurons) in the brain. Researchers believe these and other changes in the brain may result in symptoms of Alzheimer's such as problems with memory and language. This section of *2026 Alzheimer's Disease Facts and Figures* discusses the continuum of Alzheimer's disease from brain changes to severe dementia, treatments, risk factors and future areas of research to better understand and treat Alzheimer's.

Alzheimer's Disease Continuum

The Alzheimer's disease continuum represents the progression of Alzheimer's disease from brain changes that are unnoticeable by the person affected to brain changes and symptoms that severely impair daily function.[1] How long individuals living with Alzheimer's spend in each part of the continuum varies and is influenced by age, genetics and other factors.[2] Alzheimer's disease is progressive, meaning the brain changes increase and symptoms worsen with time. How quickly it progresses from year to year and what abilities are affected vary from person to person.

Like all people, individuals living with Alzheimer's have good days and bad days. On good days, their cognitive skills may be markedly improved and they may be better able to carry out routine tasks. On bad days, their cognitive skills may be worse and they may have more difficulty with routine tasks. Each day may be quite different. Family members, friends and professional caregivers play critical roles in keeping individuals living with Alzheimer's safe, healthy and engaged in the activities that are most meaningful to them (see the Caregiving and Workforce sections). Increased help from caregivers is needed as the disease progresses.

There is no proven way to prevent Alzheimer's disease, and there is currently no cure. However, several treatments are available to help with symptoms, and two are available that change the underlying biology of Alzheimer's and slow disease progression (see Treatments, page 13). Many studies are underway to expand and diversify available treatments as well as improve the quality of life of individuals living with Alzheimer's. In addition, several modifiable risk factors for dementia have been identified that if addressed may delay the onset of symptoms and result in more years lived in good health.

Alzheimer's disease is ultimately fatal, although many people with Alzheimer's die of other common, coexisting conditions of older age. Studies indicate that people 65 and older survive an average of four to eight years after a diagnosis of Alzheimer's dementia, yet some live as long as 20 years.[3-11] Many factors influence this. They include age at diagnosis, how far the disease has progressed at diagnosis, and whether individuals have other health conditions that may shorten lifespan or complicate care.

Brain Changes

The symptoms of Alzheimer's disease are associated with specific changes in the brain. In Alzheimer's, the brain's neurons are especially affected. A healthy adult brain has billions of neurons, each with long, branching extensions. These extensions enable individual neurons to form connections with other neurons. At such connections, called synapses, information flows in tiny bursts of chemicals that are released by one neuron and taken up by another neuron. The brain contains trillions of synapses. They allow signals to travel rapidly through the brain. These signals form the cellular basis of memories, thoughts, sensations, emotions, movements and skills.

Researchers have identified many brain changes that may interfere with communication at the synapses and contribute to the neuronal damage and death seen in Alzheimer's. Two of the most prominent brain changes are (1) the accumulation of the protein fragment beta-amyloid into clumps (called beta-amyloid plaques) *outside* neurons and other brain cells and (2) the accumulation of an abnormal form of the protein tau (called tau tangles) *inside* neurons. Other changes include inflammation, decreased ability of the brain to metabolize glucose (the brain's main fuel) and brain atrophy (decreased brain volume). While some degree of brain atrophy is common in older age, even in people who are cognitively healthy, atrophy is accelerated in people with Alzheimer's disease.[12]

It is important to note that individuals can have the brain changes of Alzheimer's disease but not develop symptoms of Alzheimer's dementia in their lifetime. That is, they can remain cognitively normal despite brain changes such as elevated levels of beta-amyloid and abnormal tau. Why some individuals with Alzheimer's brain changes develop dementia and others do not is the subject of much research.

TABLE 1

Common Types of Dementia

Type	Brain changes
Alzheimer's disease	Accumulation of the protein beta-amyloid outside neurons and twisted strands of the protein tau inside neurons are hallmarks. They are accompanied by the death of neurons and damage to brain tissue. Inflammation and atrophy of brain tissue are other changes.
Cerebrovascular disease	Blood vessels in the brain are damaged and/or brain tissue is injured from not receiving enough blood, oxygen or nutrients. People with these changes who develop dementia symptoms are said to have vascular dementia.
Frontotemporal degeneration (FTD)	Nerve cells in the front and temporal (side) lobes of the brain die and the lobes shrink. Upper layers of the cortex soften. Abnormal amounts or forms of tau or transactive response DNA-binding protein (TDP-43) are present. Subtypes include behavioral variant FTD, primary progressive aphasia and progressive supranuclear palsy.
Hippocampal sclerosis (HS)	HS is the shrinkage and hardening of tissue in the hippocampus of the brain. The hippocampus plays a key role in forming memories. HS brain changes are often accompanied by accumulation of the misfolded protein TDP-43.
Lewy body	Lewy bodies are abnormal aggregations (or clumps) of the protein alpha-synuclein in neurons. When they develop in a part of the brain called the cortex, dementia can result. This is called dementia with Lewy bodies or DLB.
Limbic-predominant age-related TDP-43 encephalopathy (LATE)	The protein TDP-43 accumulates, usually in parts of the brain involved in memory, emotion, behavior and mood (limbic system).
Mixed pathologies	When an individual shows the brain changes of more than one type of dementia, "mixed pathologies" are considered the cause. When these pathologies result in dementia symptoms during life, the person is said to have mixed dementia or mixed etiology dementia.
Parkinson's disease (PD)	Clumps of the protein alpha-synuclein appear in an area deep in the brain called the substantia nigra. These clumps are thought to cause degeneration of the nerve cells that produce the chemical dopamine.[36] As PD progresses, alpha-synuclein can also accumulate in the cortex.

Percentage of dementia cases	Symptoms
Alzheimer's is the most common type of dementia, accounting for an estimated 60% to 80% of cases.[38] Most individuals also have the brain changes of one or more other types of dementia.[18,25] This is called mixed pathology, and if recognized during life is called mixed dementia.	Difficulty remembering recent conversations, names or events; apathy; and depression are often early symptoms. Communication problems, confusion, poor judgment and behavioral changes may occur next. Difficulty walking, speaking and swallowing are common in the late stages of the disease.
About 5% to 10% of individuals with dementia show evidence of vascular dementia alone.[18,25] However, it is more common as a mixed pathology, with most people living with dementia showing the brain changes of cerebrovascular disease and Alzheimer's disease.[18,25]	Slowed thoughts or impaired ability to make decisions, plan or organize may be the initial symptoms, but memory may also be affected. People with vascular dementia may become less emotional and have difficulty with motor function, especially slow gait and poor balance.
About 60% of people with FTD are ages 45 to 60.[31] In a systematic review, FTD accounted for about 3% of dementia cases in studies that included people 65 and older and about 10% of dementia cases in studies restricted to those younger than 65.[32]	Typical early symptoms include marked changes in personality and behavior and/or difficulty with producing or comprehending language. Unlike Alzheimer's, memory is typically spared in the early stages of disease.
HS is present in about 3% to 13% of people with dementia.[33] It often occurs with the brain changes of other types of dementia. An estimated 0.4% to 2% of dementia cases are due to HS alone.[33]	The most pronounced symptom of HS is memory loss, and individuals are often misdiagnosed as having Alzheimer's disease. HS is a common cause of dementia in individuals age 85 or older.
About 5% of older individuals with dementia show evidence of DLB alone, but most people with DLB also have the brain changes of Alzheimer's disease.[34]	Early symptoms include sleep disturbances, well-formed visual hallucinations and visuospatial impairment. These symptoms may change dramatically throughout the day or from day to day. Problems with motor function (similar to Parkinson's disease) are common. Memory loss may occur at some point in the disease.
While the percentage of dementia cases caused by LATE is unknown, autopsy studies of more than 6,000 people found that 40% had the TDP-43 deposits characteristic of LATE, and that LATE was associated with deficits in memory and thinking in approximately 25% of the individuals.[35]	Symptoms are similar to those of Alzheimer's but begin at an older age (75 or older), are milder and worsen more slowly. Individuals initially have fewer cognitive and functional problems than individuals living with Alzheimer's.
More than 50% of people diagnosed with Alzheimer's dementia who were studied at Alzheimer's Disease Research Centers had mixed dementia.[25] In community-based studies, the percentage is considerably higher.[18] Mixed dementia is most common in people age 85 or older.[29,30]	Symptoms vary depending on the combination of brain changes present.
A systematic review found that 3.6% of dementia cases were due to PD and 24.5% of people with PD developed dementia.[37]	Problems with movement (slowness, rigidity, tremor and changes in gait) are common symptoms of PD. Cognitive symptoms may develop later in the disease, typically years after movement symptoms.

Timing of Brain Changes

Researchers have gained insight into the timing of these brain changes by studying long-term data from people with rare genetic mutations that virtually guarantee they will develop Alzheimer's disease. Researchers have found that levels of beta-amyloid significantly increased up to 22 years (mean, 18.9 years) before symptoms were expected to develop (individuals with these genetic mutations usually develop symptoms at the same or nearly the same age as their parent with Alzheimer's).[13] Abnormally high levels of the neurofilament light chain protein in blood, a biomarker of damaged neurons, were found to start an average of 22 years before the median estimated age of symptom onset.[14] Research on tau in cerebrospinal fluid suggests that levels of abnormally folded tau in the brain increase as early as two decades before the characteristic mature tau tangles of Alzheimer's disease appear.[15] Researchers also found that glucose metabolism in the brain starts decreasing up to 18 years (mean, 14.1 years) before expected symptom onset, and brain atrophy begins up to 13 years (mean, 4.7 years) before expected symptom onset.[13]

Brain Changes as Biomarkers

Biomarkers are biological changes that can be measured to indicate the presence or absence of a disease or the risk of developing symptoms from a disease. For example, the level of glucose in blood is a biomarker of diabetes, and blood cholesterol level is a biomarker of disordered lipid metabolism, which is a risk factor for cardiovascular disease.

Biomarkers of Alzheimer's include abnormal levels of beta-amyloid and tau in blood and cerebrospinal fluid (CSF, the fluid surrounding the brain), the accumulation of beta-amyloid and abnormal tau as seen on positron emission tomography (PET), decreased glucose metabolism using PET and a compound called [^{18}F] fluorodeoxyglucose, brain atrophy as determined by structural magnetic resonance imaging (sMRI), and increased levels of the neurofilament light chain protein in CSF or blood, among others. It is important to note that not all biomarkers are specific to a single disease. For example, an abnormal level of the neurofilament light chain protein is a biomarker of Alzheimer's disease as well as other types of neurodegenerative disease.

In 2025 the first blood test for Alzheimer's disease, the Lumipulse G pTau217/ß-Amyloid 1-42 Plasma Ratio, was cleared by the U.S Food and Drug Administration (FDA). It measures the ratio of a form of tau called phosphorylated tau 217 to a form of beta-amyloid called beta-amyloid 1-42. The test is for the early detection of amyloid plaques associated with Alzheimer's disease in individuals 50 and older exhibiting signs and symptoms of the disease.[16] It is for use in specialty care settings. The Elecsys® pTau181 plasma test was cleared the same year. It measures the level of the phosphorylated tau (pTau) 181 protein in blood and is the first blood-based biomarker test for use in primary care settings. It is designed specifically to rule out the presence of Alzheimer's-related brain changes. It is for individuals 55 or older presenting with signs, symptoms or complaints of cognitive decline.[17]

Alzheimer's Dementia

Many people wonder what the difference is between dementia and Alzheimer's disease. Dementia is a syndrome — a group of symptoms that consistently occur together. The symptoms of dementia include loss of memory, language, problem-solving and other thinking abilities; difficulty concentrating and struggling to understand and express thoughts; and confusion, apathy, poor judgment and impulsive behavior. A person is said to have dementia when symptoms are severe enough to interfere with daily activities. Symptoms must represent a change from previous abilities and cannot be attributable to another medical condition.

There are many types of dementia, each associated with specific changes in the brain (Table 1). When imaging studies, CSF analysis, blood tests or other diagnostic tools show that the brain changes are characteristic of Alzheimer's disease, individuals are said to have dementia due to Alzheimer's disease or Alzheimer's dementia.

Most people with dementia have brain changes associated with more than one type of dementia.[18-24] This is called mixed pathology dementia or simply mixed dementia. Some studies report that the majority of people with the brain changes of Alzheimer's disease also have the brain changes of a second cause of dementia on autopsy.[18, 25] One autopsy study showed that of 447 older people who were believed to have Alzheimer's dementia when they died, only 3% had the brain changes of Alzheimer's disease alone, while 15% had the brain changes of an entirely different type of dementia, and 82% had the brain changes of Alzheimer's disease plus at least one other type of dementia.[18] Studies suggest that mixed dementia is the norm, not just for those diagnosed with Alzheimer's dementia based on symptoms, but also for those diagnosed with other types of dementia.[26, 27]

Mixed dementia is especially common at advanced ages.[19, 28] For example, those age 85 or older are more likely than those younger than age 85 to have evidence of two or more causes of dementia.[29, 30] Having Alzheimer's brain changes plus brain changes of another type of dementia increases one's chances of having dementia symptoms in one's lifetime compared with

TABLE 2

Signs of Alzheimer's Dementia Compared with Typical Age-Related Changes*

Signs of Alzheimer's Dementia	Typical Age-Related Changes
Memory loss that disrupts daily life: One of the most common signs of Alzheimer's dementia, especially in the early stage, is forgetting recently learned information. Others include asking the same questions over and over, and increasingly needing to rely on memory aids (for example, reminder notes or electronic devices) or family members for things that used to be handled on one's own.	Sometimes forgetting names or appointments, but remembering them later.
Challenges in planning or solving problems: Some people experience changes in their ability to develop and follow a plan or work with numbers. They may have trouble following a familiar recipe or keeping track of monthly bills. They may have difficulty concentrating and take much longer to do things than they did before.	Making occasional errors when managing finances or household bills.
Difficulty completing familiar tasks: People with Alzheimer's often find it hard to complete daily tasks. Sometimes, people have trouble driving to a familiar location, organizing a grocery list or remembering the rules of a favorite game.	Occasionally needing help to use microwave settings or record a television show.
Confusion with time or place: People living with Alzheimer's can lose track of dates, seasons and the passage of time. They may have trouble understanding something if it is not happening immediately. Sometimes they forget where they are or how they got there.	Getting confused about the day of the week but figuring it out later.
Trouble understanding visual images and spatial relationships: For some people, having vision problems is a sign of Alzheimer's. They may also have problems judging distance and determining color and contrast, causing issues with driving.	Vision changes related to cataracts.
New problems with words in speaking or writing: People living with Alzheimer's may have trouble following or joining a conversation. They may stop in the middle of a conversation and have no idea how to continue or they may repeat themselves. They may struggle with vocabulary, have trouble naming a familiar object or use the wrong name (e.g., calling a watch a "hand clock").	Sometimes having trouble finding the right word.
Misplacing things and losing the ability to retrace steps: People living with Alzheimer's may put things in unusual places. They may lose things and be unable to go back over their steps to find them. They may accuse others of stealing, especially as the disease progresses.	Misplacing things from time to time and retracing steps to find them.
Decreased or poor judgment: Individuals may experience changes in judgment or decision-making. For example, they may use poor judgment when dealing with money or pay less attention to grooming or keeping themselves clean.	Making a bad decision or mistake once in a while because all the details of a decision were not considered.
Withdrawal from work or social activities: People living with Alzheimer's disease may experience changes in the ability to hold or follow a conversation. As a result, they may withdraw from hobbies, social activities or other engagements. They may have trouble keeping up with a favorite sports team or activity.	Sometimes feeling uninterested in family and social obligations.
Changes in mood, personality and behavior: The mood and personalities of people living with Alzheimer's can change. They can become confused, suspicious, depressed, fearful or anxious. They may be easily upset at home, at work, with friends or when out of their comfort zones.	Developing very specific ways of doing things and becoming irritable when a routine is disrupted.

*For more information about the symptoms of Alzheimer's, visit alz.org.

having Alzheimer's brain changes alone.[18, 19] Mixed dementia may also account for the wide variety of memory and thinking problems experienced by people living with dementia.

Dementia symptoms may sometimes be misleading. Some individuals may have dementia symptoms without the progressive brain changes of Alzheimer's or other types of dementia. Potential causes include depression, stress, untreated sleep apnea, delirium, side effects of medications, Lyme disease, thyroid problems, head injury, blood clots or tumors in the brain, certain vitamin deficiencies and excessive alcohol consumption. These symptoms may be temporary if the cause is treated. In addition, people experiencing typical age-related cognitive changes may become concerned that the changes are signs of Alzheimer's disease. As shown in Table 2 (page 9), the differences between normal cognitive aging and Alzheimer's disease can be subtle. People experiencing symptoms should seek help from a health care professional to determine if the symptoms are reversible with treatment, reflect normal cognitive aging, or are signs of Alzheimer's or other dementias.

Clinical Stages of Alzheimer's Disease

Because of the complexity of Alzheimer's brain changes, as well as the changes in cognitive and physical abilities that follow, the Alzheimer's Association formed a workgroup to revise the diagnostic criteria for Alzheimer's disease with the end goals of facilitating consistency in how Alzheimer's is diagnosed and described and incorporating the latest evidence-based information.

These revised criteria for diagnosing Alzheimer's and identifying where it is on the Alzheimer's disease continuum (called staging) were published in 2024.[1] They replace the previous stages of preclinical Alzheimer's disease, mild cognitive impairment (MCI) due to Alzheimer's disease and dementia due to Alzheimer's disease. The new criteria incorporate advances in biomarkers to provide objective data for making a diagnosis and assigning a clinical stage (0 to 6) to the progression of the disease (Table 3a). The criteria also create a biological staging method for Alzheimer's (Table 3b) and an integrated biological and clinical staging method (Table 3c).

Clinical Stage 0

Individuals do not have symptoms of Alzheimer's disease but have (1) a deterministic gene that virtually guarantees that they will develop Alzheimer's dementia or (2) trisomy 21, in which individuals have three copies of chromosome 21 instead of two (Down syndrome). Biomarker levels are in the normal range, and in individuals with a deterministic gene there is no evidence of clinical change (that is, no evidence of changes in cognition such as thinking, language and memory, and no evidence of changes in function such as the ability to work, drive and perform other everyday activities). In individuals with trisomy 21, intellectual disability that accompanies the condition can make it difficult to identify cognitive change, and decline in functional independence may be more helpful in identifying change or assigning an initial stage.

Clinical Stage 1

Individuals do not have symptoms but do have biomarker evidence of Alzheimer's disease, such as the accumulation of the protein fragment beta-amyloid or an abnormal form of the protein tau in the brain. When these brain changes occur, the brain compensates for them, enabling individuals to continue to function normally. Individuals perform within the expected range on objective tests of cognitive function. There is no evidence of recent cognitive decline or new symptoms, and there are no detectable abnormalities on sensitive neuropsychological measures.[39] Individuals may remain in stage 1 for years, even for the remainder of their lives; having stage 1 Alzheimer's disease does not guarantee that a person will develop Alzheimer's dementia.

Clinical Stage 2

A transitional stage from being biomarker-positive and asymptomatic to having a mild decline in cognitive or neurobehavioral function. Decline represents a change from baseline within the previous one to three years, and the decline has lasted for at least six months. People in stage 2 may have subtle decreases in performance on cognitive testing (but results are still in the normal range), self-reported subjective cognitive decline, or changes in mood, anxiety or motivation not explained by life events. There are subtle detectable abnormalities on sensitive neuropsychological measures, but there is no functional impairment.[39] Individuals in stage 2 remain fully independent on basic activities of daily living (ADLs) such as dressing, eating and bathing.

Clinical Stage 3

Roughly corresponds to MCI. Thinking, memory and other cognitive problems are noticeable to those affected, friends and family members, but do not interfere with individuals' ability to carry out everyday activities. Individuals are biomarker-positive and have mild but detectable functional impairment and often increased detectable abnormalities on sensitive neuropsychological measures.[39] They perform in the impaired/abnormal range on objective cognitive tests. There may be a change in results of cognitive testing or neurobehavioral assessments. Individuals perform basic ADLs independently but cognitive difficulties may interfere with performing complex ADLs such as managing finances and medications, preparing meals, and shopping (also called instrumental ADLs [IADLs]). Individuals are able to complete these tasks but may require more time or be less efficient in doing so.

TABLE **3a**

Clinical Staging for Individuals on the Alzheimer's Disease Continuum

Stage 0 **Asymptomatic, deterministic gene***	No evidence of clinical change. Biomarkers such as levels of beta-amyloid and tau in normal range.
Stage 1 **Asymptomatic, biomarker evidence only**	Performance within expected range on objective cognitive tests. No evidence of recent cognitive decline or new symptoms. Biomarker evidence of Alzheimer's such as elevated levels of beta-amyloid and abnormal tau.
Stage 2 **Transitional decline: mild detectable change, but minimal impact on daily function**	Normal performance within expected range on objective cognitive tests. Decline from previous level of cognitive or neurobehavioral function that represents a change from individual baseline within the past one to three years, and has been persistent for at least six months. May be documented by evidence of subtle decline on longitudinal cognitive testing, which may involve memory or other cognitive domains but performance still within normal range. May be documented through subjective report of cognitive decline. May be documented with recent-onset change in mood, anxiety and/or motivation not explained by life events. Remains fully independent with no or minimal functional impact on activities of daily living (ADLs).
Stage 3 **Cognitive impairment with early functional impact**	Performance in the impaired/abnormal range on objective cognitive tests. Evidence of decline from baseline, documented by the individual's report or by an observer's (e.g., study partner) report or by change on longitudinal cognitive testing or neurobehavioral assessments. Performs daily life activities independently but cognitive difficulty may result in detectable functional impact on complex ADLs (i.e., may take more time or be less efficient but still can complete — either self-reported or corroborated by an observer).
Stage 4 **Dementia with mild functional impairment**	Progressive cognitive and mild functional impairment on instrumental ADLs, with independence in basic ADLs.
Stage 5 **Dementia with moderate functional impairment**	Progressive cognitive and moderate functional impairment on basic ADLs, requiring assistance.
Stage 6 **Dementia with severe functional impairment**	Progressive cognitive and functional impairment, and complete dependence for basic ADLs.

*Individuals with Down syndrome may not be fully independent even in stage 0 because of underlying intellectual disability. In these individuals, decline in functional independence from baseline may be a more appropriate indicator of stage.

Created from data from Jack et al.[1]

TABLE **3b**

Biological Staging by Positron Emission Tomography (PET)

	Amyloid PET	Tau PET Medial Temporal Lobe Uptake	Tau PET Moderate Neocortical Uptake	Tau PET High Neocortical Uptake	AT_2 Notation
A	+	—	—	—	$A+T_2^-$
B	+	+	—	—	$A+T_{2MTL}^+$
C	+	+	+	—	$A+T_{2MOD}^+$
D	+	+	+	+	$A+T_{2HIGH}^+$

Created from data from Jack et al.[1]

TABLE **3c**

Integrated Biological and Clinical Staging

	Stage 0	Clinical Stage 1	Clinical Stage 2	Clinical Stage 3	Clinical Stages 4-6
Initial biological stage (A)	NA	1A	2A	3A	4-6A
Early biological stage (B)	NA	1B	2B	3B	4-6B
Intermediate biological stage (C)	NA	1C	2C	3C	4-6C
Advanced biological stage (D)	NA	1D	2D	3D	4-6D

Note: The typical expected progression trajectory is along the diagonal cells, from 1A to 4-6D. However, considerable individual variability exists in the population. Individuals above the diagonal (i.e., worse clinical stage than expected for biological stage) often have greater than average comorbid pathology. Individuals below the diagonal (i.e., better clinical stage than expected for biological stage) may have exceptional cognitive reserve or resilience. NA = not applicable.

Created from data from Jack et al.[1]

Clinical Stage 4

Similar to stage 3, but increased functional impairment interferes with carrying out everyday activities. Individuals are biomarker-positive and have dementia symptoms with mild functional impairment. Most individuals are able to independently perform basic ADLs but may need help with IADLs. They are able to function independently in many areas but are likely to require assistance with some activities to maximize independence and remain safe. They may still be able to drive, work and participate in their favorite activities. They may need more time to complete common daily tasks and may rely on reminders more than in the past. This stage was formerly known as mild Alzheimer's dementia.

Clinical Stage 5

Individuals are biomarker-positive and have dementia symptoms with moderate functional impairment. They require assistance in performing many ADLs and IADLs. Individuals experience more problems with memory and language, are more likely to become confused, and find it harder to complete multistep basic tasks such as bathing and dressing. They may become incontinent at times, begin to have problems recognizing loved ones, and start showing personality and behavioral changes, including suspiciousness and agitation. This stage was formerly known as moderate Alzheimer's dementia.

Clinical Stage 6

Individuals are biomarker-positive and have dementia symptoms with severe functional impairment. Individuals in stage 6 depend on others to perform ADLs and IADLs. Because of damage to areas of the brain involved in movement, individuals may be unable to walk. As a result, they may spend most of their time in a wheelchair or on a bed. This loss of mobility increases their vulnerability to complications such as blood clots, skin infections and sepsis (a condition that triggers body-wide inflammation that can result in organ failure). Their ability to communicate verbally is diminished, but even in this final stage of Alzheimer's it is common for them to have short, temporary periods of lucidity when they may be able to communicate coherently and regain some functional abilities.[40-42] This stage was formerly known as severe Alzheimer's dementia.

Treatments

Drug Treatments for Alzheimer's Disease

Several FDA-approved treatments for Alzheimer's disease are available (Figure 1). Two change the underlying biology of Alzheimer's and may slow cognitive and functional decline. The remaining treat the symptoms of Alzheimer's dementia.

Drug Treatments That Change the Underlying Biology of Alzheimer's

The drugs lecanemab (Leqembi®) and donanemab (Kisunla®) change the underlying biology of Alzheimer's disease by targeting and removing beta-amyloid from the brain. Lecanemab and donanemab are approved for use in individuals with MCI or mild dementia due to Alzheimer's (clinical stages 3 and 4 on the Alzheimer's disease continuum) and confirmation of elevated levels of beta-amyloid in the brain. In clinical trials, most participants receiving lecanemab or donanemab transitioned from being amyloid-positive to being amyloid-negative after 18 months of treatment (called treatment-related amyloid clearance or TRAC).[43] A framework for identifying an individual's response to anti-amyloid treatment was recently published to help guide clinical management of anti-amyloid treatment.[44] While both drugs are currently administered intravenously at infusion centers, some individuals receiving lecanemab may be able to receive the drug at home using a subcutaneous auto-injection device. Lecanemab and donanemab have not been tested in people in the moderate or severe stages of Alzheimer's dementia (stages 5 and 6) or those without clinical symptoms (stages 0-2). Lecanemab and donanemab are not cures for Alzheimer's disease and not appropriate for all individuals living with Alzheimer's.

While clinical trials showed statistically significant differences in cognitive outcomes between people randomized to receive lecanemab or donanemab and those randomized to receive placebo, the benefits of treatment in the short term may be imperceptible to those receiving it. Because lecanemab and donanemab have been approved relatively recently (in 2023 and 2024, respectively), their effectiveness beyond the length of their 18-month clinical trials has not yet been fully established. However, early results suggest that lecanemab and donanemab continue to have clinical benefit after four and three years' use (including the clinical trial period), respectively.[45] An example of clinical benefit is that, overall, individuals receiving lecanemab stayed in the early stages of Alzheimer's longer than individuals who did not receive lecanemab.[46] Among those receiving donanemab, earlier initiation of the drug reduced the risk of progression to the next stage of Alzheimer's disease by 27%.[47] In addition, a study found that lecanemab may extend independence in IADLs for 10 months and donanemab may extend independence in IADLs for 13 months.[48] Results from an analysis of data from one of the phase 3 studies of lecanemab and 16 clinical studies of other monoclonal antibody treatments for Alzheimer's disease imply that long-term treatment with lecanemab, when started early, may continue to slow progression and help maintain cognitive function over a longer period.[49] In the analysis, the time to progression from MCI to mild dementia was 7.2 years in the untreated group, but 9.7 years in the treatment group, indicating a time savings of 2.5 years. In the low-amyloid group (comprising individuals who started treatment when lower amounts of beta-amyloid had accumulated), the time to progression from MCI to mild dementia was 13.2 years, suggesting a time savings of 6 years compared with the untreated group.

To better understand the drugs' effectiveness, systems have been established to track the health outcomes of people receiving them. Among these systems is the Alzheimer's Network for Treatment and Diagnostics (ALZ-NET, alz-net.org). ALZ-NET is a voluntary provider-enrolled patient network that collects data from the clinical visits and physician-ordered brain imaging procedures of people evaluated for or treated with new FDA-approved Alzheimer's therapies, including treatments designed to slow disease progression, as well as those receiving treatment for cognitive, behavioral or neuropsychiatric symptoms of Alzheimer's.

Anti-amyloid treatments such as lecanemab and donanemab can have side effects. These include serious allergic reactions, amyloid-related imaging abnormalities (ARIA), infusion-related reactions, headaches and falls. ARIA is a common side effect that does not usually cause symptoms but can be serious. An updated meta-analysis of data from 6,315 individuals who received anti-amyloid treatment found that the pooled incidence of ARIA-E (characterized by edema or effusion) was 9.5%, and the pooled incidence of ARIA-H (characterized by microhemorrhages and superficial siderosis) was 17.5%.[50] ARIA is typically a temporary swelling in areas of the brain and usually resolves over time. Some people may also have small spots of bleeding in or on the surface of the brain along with swelling. Most people with ARIA who experience swelling do not have symptoms. Those who do experience symptoms of ARIA may have headache, dizziness, nausea, confusion or vision changes. Management of ARIA may include discontinuation of the medication either temporarily or indefinitely.

To ensure that ARIA is identified should it occur, the appropriate use recommendations (AUR, i.e., guidelines for clinicians to administer new therapies safely and effectively) for lecanemab suggest health care professionals obtain MRI scans of the brain before the 5th, 7th, 14th and 26th infusions, in addition to a baseline scan before starting treatment.[51] In addition to the baseline scan, the AUR for donanemab advise MRIs before the 2nd, 3rd, 4th and 7th infusions, as well as before the 12th dose in higher risk individuals, and any time ARIA is suspected.[52]

Individuals who carry two copies of the apolipoprotein E (APOE)-e4 gene are at increased risk of developing ARIA.[52] The AUR for lecanemab and donanemab advise APOE-e4 testing before starting treatment with anti-amyloid medications. Prior to testing, doctors should discuss with patients the risk of ARIA and the implications of genetic testing results. The Alzheimer's Association Clinical Meaningfulness Workgroup has developed recommendations and suggested language to help health care providers explain treatment eligibility, risks, benefits and costs to patients and caregivers.[53]

Before beginning any medication, individuals should talk with their doctors to develop a treatment plan that is right for them, including weighing the benefits and risks of all approved therapies.

Drugs currently in development for Alzheimer's explore a variety of mechanisms of action to slow the disease. They involve a range of factors, including epigenetic regulators, inflammation, oxidative stress, neuroprotection, synaptic plasticity and many more.[51, 54, 55] As of January 1, 2025, 138 Alzheimer's drugs were being assessed in 182 clinical trials registered with clinicaltrials.gov. Of these, 73% sought to change the underlying biology of Alzheimer's disease.[56] Overall, the 2025 Alzheimer's disease drug pipeline had more trials and drugs than the 2024 pipeline. Especially noteworthy was a near doubling of phase 1 trials (48 vs. 26) and drugs (45 vs. 25) in 2025 compared with 2024.

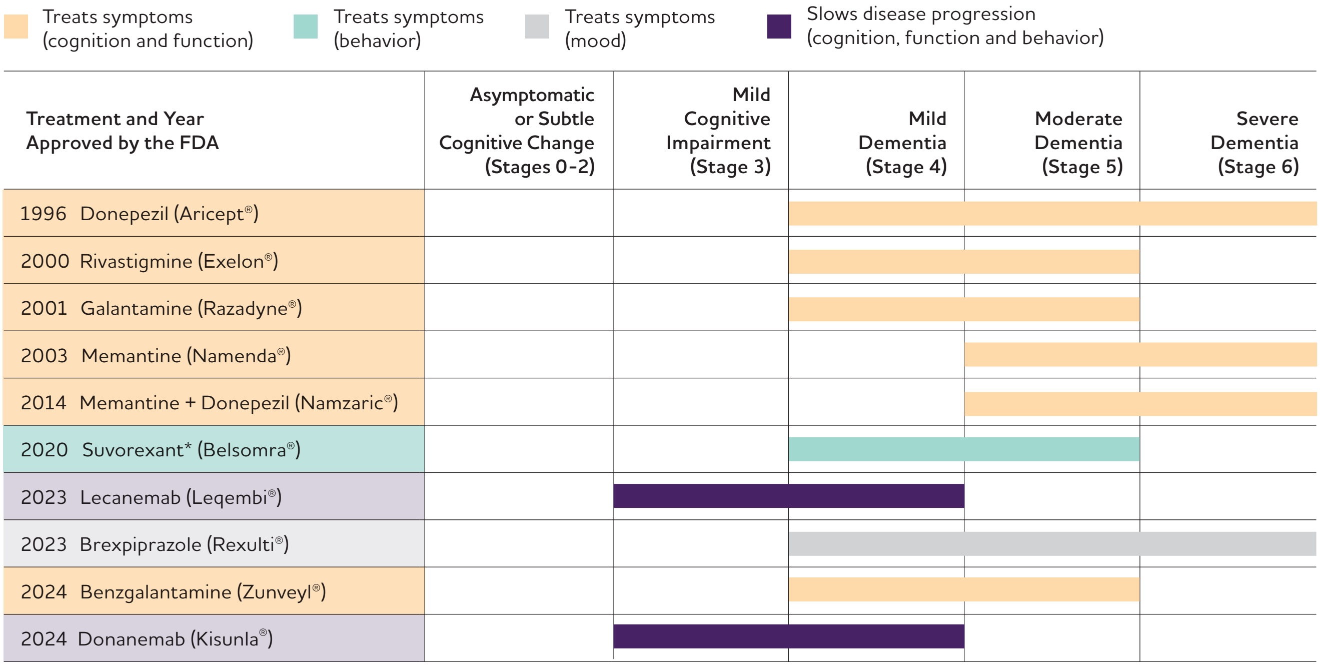
Drug Treatments to Address Cognitive and Behavioral Symptoms

Eight of the FDA-approved drugs for Alzheimer's disease are aimed at treating cognitive and behavioral symptoms. They do not slow, stop or reverse the underlying brain changes that result in Alzheimer's symptoms, nor do they slow or stop the course of the disease.

Six of the drugs — donepezil, rivastigmine, galantamine, benzgalantamine, memantine and memantine combined with donepezil — help compensate for the brain changes of Alzheimer's by altering neurotransmitter levels. Neurotransmitters are chemicals that brain cells use to

FIGURE 1

U.S. Food and Drug Administration (FDA)-Approved Treatments for Alzheimer's Disease



🟧 Treats symptoms (cognition and function)
🟩 Treats symptoms (behavior)
⬜ Treats symptoms (mood)
🟪 Slows disease progression (cognition, function and behavior)

Treatment and Year Approved by the FDA	Asymptomatic or Subtle Cognitive Change (Stages 0-2)	Mild Cognitive Impairment (Stage 3)	Mild Dementia (Stage 4)	Moderate Dementia (Stage 5)	Severe Dementia (Stage 6)
🟧 1996 Donepezil (Aricept®)			🟧	🟧	🟧
🟧 2000 Rivastigmine (Exelon®)			🟧	🟧	
🟧 2001 Galantamine (Razadyne®)			🟧	🟧	
🟧 2003 Memantine (Namenda®)				🟧	🟧
🟧 2014 Memantine + Donepezil (Namzaric®)				🟧	🟧
🟩 2020 Suvorexant* (Belsomra®)			🟩	🟩	
🟪 2023 Lecanemab (Leqembi®)		🟪	🟪		
⬜ 2023 Brexpiprazole (Rexulti®)			⬜	⬜	⬜
🟧 2024 Benzgalantamine (Zunveyl®)			🟧	🟧	
🟪 2024 Donanemab (Kisunla®)		🟪	🟪		

*Approved for insomnia, not Alzheimer's, but safe and effective in people living with Alzheimer's.

communicate with each other. Memantine protects the brain from excessive levels of a neurotransmitter called glutamate, which overstimulates neurons and can damage them, while the remaining drugs increase the amount of the neurotransmitter acetylcholine.

These six drugs may have side effects such as headaches and nausea, although these are not all the possible side effects. As with lecanemab and donanemab, individuals should talk with their doctors to develop a treatment plan that is right for them, including weighing the benefits and risks of all therapies.

Another FDA-approved drug, brexpiprazole, treats agitation that can occur in Alzheimer's. Agitation is common in Alzheimer's disease, with 60% of people with MCI due to Alzheimer's disease and 76% of people with Alzheimer's dementia experiencing agitation.[57] Brexpiprazole is thought to lessen agitation through its effects on dopamine and serotonin receptors in the brain. Brexpiprazole is also FDA-approved as an adjunct treatment for schizophrenia occurring in people with major depressive disorder who do not have Alzheimer's. It's important to note that brexpiprazole falls into a category of drugs called atypical antipsychotic drugs. Atypical antipsychotic drugs have been associated with an increased risk of stroke and death in older people with dementia-related psychosis.[58-60] Non-drug interventions should always be implemented first; only upon failure of non-drug interventions should these medications be considered.

In addition, the drug suvorexant, approved for insomnia in the general public, has been shown in clinical trials to be effective in treating problems with falling asleep and staying asleep that can occur in people with mild to moderate Alzheimer's dementia. Suvorexant inhibits the activity of orexin, a type of neurotransmitter involved in the sleep-wake cycle. Possible side effects include, but are not limited to, impaired alertness and motor coordination (including impaired driving), worsening of depression or suicidal thinking, developing complex sleep behaviors (such as sleepwalking and sleep driving), and experiencing sleep paralysis.

As of January 1, 2025, 25% of Alzheimer's clinical trials registered with clinicaltrials.gov addressed cognitive and neuropsychiatric symptoms of Alzheimer's.[56]

Non-Drug Treatments for Alzheimer's Disease

There are also non-drug treatments for the symptoms of Alzheimer's disease. Non-drug treatments should be the first-line approach for behavioral and psychological symptoms of dementia. Non-drug treatments include physical activity, reminiscence exercises, music- and art-based therapies, pet therapy, light therapy and many others. Non-drug treatments do not change the underlying biology of Alzheimer's or cure the disease. They are often used with the goals of maintaining or improving cognitive and functional health, overall quality of life and engagement, and the ability to perform activities of daily living. Non-drug treatments may also be used to reduce behavioral and psychological symptoms such as depression, apathy, wandering, sleep disturbances, agitation and aggression. A review and analysis of non-drug treatments for agitation and aggression in people with dementia concluded that they seemed to be more effective than pharmacologic interventions.[61] In addition to being more effective than pharmacological interventions in some cases, non-drug interventions generally pose minimal risk or harm to people living with Alzheimer's.

Determining the effectiveness of non-drug treatments can be difficult because of the large number of unique treatments tested; the diversity of treatment aims (from improved overall quality of life to improvement in specific symptoms); the range of dementia stages in which treatments are tested; the multiple types of dementia that may be present among participants given the pervasiveness of mixed dementia; and the lack of a standard method for carrying out any individual treatment. With these multiple factors to consider, it is challenging to group together and compare non-drug treatments.

Nevertheless, researchers have combined results from multiple studies of non-drug treatments to provide insight into their potential effectiveness:

- A systematic review of non-pharmacological interventions to treat behavioral disturbances in older people with dementia found that, overall, music therapy and behavioral management techniques (e.g., progressive muscle relaxation) were effective for reducing behavioral and psychological symptoms of dementia.[62]
- An umbrella review of non-pharmacological interventions for neuropsychiatric symptoms of dementia in residential aged care settings reported that tailored interventions that included music and social elements appeared to be most beneficial for depressive symptoms and mood.[63]
- A review of non-pharmacological interventions for people with dementia found that the strongest evidence for reducing responsive behaviors (behaviors in response to sensations such as pain, hunger, thirst, fatigue, and feeling too hot or too cold) involved music, sensory stimulation, simulated presence (using video or audio recordings from a loved one to reduce distress) and validation therapies.[64] The same review reported that exercise and light therapy improved/maintained ADLs, while cognitive stimulation and reminiscence therapy improved cognition. The strongest evidence for reducing emotional disorders related to dementia involved music therapy, psychological interventions and reminiscence therapy.[65]

Risk Factors for Alzheimer's Dementia

As shown in Figure 2, there are many risk factors for Alzheimer's dementia. Some can be changed or modified to reduce risk and some cannot. Experts believe that Alzheimer's dementia, like other common chronic diseases and conditions, likely develops as a result of multiple factors. Exceptions are cases of Alzheimer's related to trisomy 21 in Down syndrome and rare cases of Alzheimer's dementia related to specific genetic mutations.

Non-Modifiable Risk Factors: Age, Genetics and Family History

The greatest risk factors for Alzheimer's dementia cannot be modified. They are older age,[66, 67] genetics — especially the e4 form of the apolipoprotein E (APOE) gene[68, 69] — and having a family history of Alzheimer's dementia.[70-73]

Age

Age is the greatest of these three risk factors. The vast majority of people who develop Alzheimer's dementia are age 65 or older. This is called late-onset Alzheimer's dementia. However, people younger than 65 can also develop Alzheimer's. This is called younger-onset Alzheimer's and is much less common than late-onset Alzheimer's.

The percentage of people living with Alzheimer's dementia increases dramatically with age. Among those age 65 to 74, 5.2% have Alzheimer's dementia; age 75 to 84, 13.8%; and age 85 or older, 35.8% (see Prevalence section). The aging of the population, by which older adults comprise a larger share of the population, will significantly increase the number of people in the United States with Alzheimer's dementia.[74] However, it is important to note that Alzheimer's dementia is not a normal part of aging, and older age alone is not sufficient to cause Alzheimer's dementia.[75]

FIGURE 2

Factors That May Impact Risk of Cognitive Decline and Dementia

*See page 23 to learn more about social determinants of health.

Genetics

Researchers have found variants of many genes that increase or decrease the risk of Alzheimer's disease. At least 75 genetic variants are associated with an increased risk of Alzheimer's.[76] Of the many genetic variants known to increase risk, APOE-e4 has the strongest impact on risk of late-onset Alzheimer's dementia. APOE provides the blueprint for a protein that transports cholesterol in the bloodstream. Everyone inherits one of three forms (alleles) of the APOE gene — e2, e3 or e4 — from each parent, resulting in six possible APOE pairs: e2/e2, e2/e3, e2/e4, e3/e3, e3/e4 and e4/e4.

While having the e4 form of APOE increases one's risk of developing late-onset Alzheimer's dementia compared with having the e3 or e2 forms, it does not guarantee that an individual will develop Alzheimer's dementia. Having the e2 form may decrease one's risk compared with having the e3 or e4 form. Individuals with the e2 form who develop Alzheimer's dementia generally do so later in life than those without the e2 form. The e3 form is thought to have a neutral effect on Alzheimer's dementia risk.

In general, the risk of developing Alzheimer's dementia increases with inheriting one copy of the e4 form and increases further still with inheriting two copies of the e4 form, compared with inheriting only copies of the e2 or e3 forms.[75-77] For example, based on data from a study in Europe and a study in the United States, of people age 65-69, the risk of developing dementia by their early to mid-80s was 5% to 7% among those with no copies of the e4 form, 15% to 16% among those with one copy, and 31% to 40% among those with two copies.[78] In addition, those with the e4 form are more likely to have beta-amyloid accumulation and Alzheimer's dementia at a younger age than are those with the e2 or e3 forms of the APOE gene.[79]

A meta-analysis including 20 published articles describing the frequency of the e4 form among people in the United States who had been diagnosed with Alzheimer's dementia found that 56% had one copy of the APOE-e4 gene, and 11% had two copies of the APOE-e4 gene.[80] Another study found that among 1,770 diagnosed individuals from 26 Alzheimer's Disease Research Centers across the United States, 65% had at least one copy of the APOE-e4 gene.[81]

TABLE **4**

Percentage of American Indians and Black, Hispanic and White Americans with Specified APOE Pairs*

APOE Pair	American Indians†	Black Americans	Hispanic Americans	White Americans
e3/e3	71.6 - 73.2	43.3	61.3	50.5
e3/e4	22.7 - 23.9	31.2	24.8	31.8
e3/e2	2.6 - 3.0	14.2	8.4	8.5
e2/e4	0.5	4.7	1.7	2.2
e4/e4	1.0 - 1.2	5.7	3.3	6.6
e2/e2	0.0 - 0.1	0.9	0.4	0.4

*Data for APOE pairs in other populations were not available. Percentages do not total 100 due to rounding.

† Study provided a percentage for women and a percentage for men. Percentages represent the range for the two.

Created from data from Kataoka et al[90] and Belloy et al.[92]

Most of the research to date associating APOE-e4 with increased risk of late-onset Alzheimer's dementia has studied White individuals. Studies of this association in Black and Hispanic populations have had inconsistent results. For example, some have found that having the e4 allele did not increase risk among Black people,[82-84] while other studies have found that it significantly increased risk.[85-88] In addition, researchers have found differences in the frequency of APOE pairs among racial and ethnic groups.[89-92] For instance, data show that a higher percentage of Black Americans have at least one copy of the e4 allele (Table 4) than White Americans, Hispanic Americans and American Indian individuals.[82, 83, 89, 90, 92] Among individuals of African ancestry who have one copy of e3 and one of e4, those with a particular variant of e3 called R145C are at increased risk of developing Alzheimer's dementia compared with those who do not have this variant.[93] Researchers have also found that a form of another gene, the gene for the ATP-binding cassette transporter (ABCA7) protein, significantly increases the risk of Alzheimer's dementia in African Americans with ABCA7 compared with African Americans without ABCA7.[86]

To better understand inconsistencies in the effect of APOE-e4 in Hispanic/Latino groups, one research team analyzed the effect of APOE-e4 in 4,183 individuals from six Latino backgrounds: Central American, Cuban, Dominican, Mexican, Puerto Rican and South American.[94] They found that the effect of APOE-e4 on cognitive decline differed among groups, suggesting that factors related to geographic background and genetic ancestry may alter the extent to which APOE-e4 contributes to cognitive decline. An additional study found that among Hispanic Americans, APOE-e4 was associated with fewer cases of mild cognitive impairment than among White Americans, and APOE-e2 was associated with more cases of Alzheimer's disease compared with White Americans.[91] Results of a third study suggest that APOE-e2 is less protective in Black, East Asian and Hispanic Americans than in White Americans.[92] These differences point to the need for more research to better understand the genetic mechanisms involved in Alzheimer's risk among different populations.

Genetics are also at play in younger-onset Alzheimer's dementia. About 10% of those with younger-onset Alzheimer's dementia have known genetic mutations that nearly guarantee that they will develop Alzheimer's dementia.[95] For the remaining 90%, having a copy of APOE-e4 is the primary genetic risk factor, although variants in about 20 other genes have been identified that may increase risk.[95]

While routine genetic testing for APOE-e4 is not recommended at this time, health care professionals request APOE-e4 testing for individuals considering the treatments lecanemab and donanemab, as people with the APOE-e4 gene are at increased risk of side effects from the treatments.

Genetic Mutations/Deterministic Genes

An estimated 1% or less of people living with Alzheimer's dementia develop the disease as a result of mutations to any of three specific genes.[96] (A genetic mutation is an abnormal change in the sequence of chemical pairs that make up genes.) This is called dominantly inherited or autosomal dominant Alzheimer's dementia. These mutations involve the amyloid precursor protein gene and the genes for the presenilin 1 and presenilin 2 proteins. Symptoms tend to develop before age 65 and sometimes as young as age 30. People who inherit an Alzheimer's mutation to these genes are virtually guaranteed to develop the disease if they live a normal life span.[97] However, rare cases have been reported of individuals who have one of these mutations and do not develop dementia symptoms until late life.[98, 99] The experiences of these individuals highlight the possibility of being resilient to Alzheimer's dementia despite genetic mutations, and point to new areas of investigation to better understand resilience.

Trisomy in Down Syndrome

In Down syndrome, an individual is born with three copies of chromosome 21 (called trisomy 21) instead of two. People with Down syndrome have an increased risk of developing Alzheimer's dementia, and this is believed to be related to trisomy 21. Chromosome 21 includes the gene that encodes the production of the amyloid precursor protein (APP), which in people with Alzheimer's is cut into beta-amyloid fragments that accumulate into plaques. Having an extra copy of chromosome 21 may increase the production of beta-amyloid fragments in the brain.

Overall, people with Down syndrome develop Alzheimer's dementia at an earlier age than people without Down syndrome. By age 40, most people with Down syndrome have significant levels of beta-amyloid plaques and tau tangles in their brains.[100] In a study of 132,720 individuals age 18 and older with Down syndrome who were enrolled in Medicaid and/or Medicare between 2011 and 2019, 23% had diagnoses of Alzheimer's dementia.[101] Among those who were 55 or older when data collection began in 2011, prevalence was 42%; in the same group, prevalence was about 50% in 2019. The mean age of dementia onset was 54.5 years.

As with all adults, advancing age increases the likelihood that a person with Down syndrome will exhibit symptoms of Alzheimer's dementia. The life expectancy of people with Down syndrome has more than doubled from age 25 in 1983 to age 60 in 2020, which corresponds to a growing population of adults living with both this condition and dementia.[102] Dementia is the leading cause of death for adults with Down syndrome.[103] Care for people with Down syndrome and dementia is especially challenging due to the intellectual, cognitive and communication impairments associated with Down syndrome that are present in addition to the cognitive impairments due to dementia.

Family History

A family history of Alzheimer's dementia is not necessary for an individual to develop Alzheimer's, nor does having a family history of Alzheimer's dementia guarantee that an individual will develop Alzheimer's in older age. However, individuals who have or had a parent or sibling (first-degree relative) with Alzheimer's dementia are more likely to develop Alzheimer's than those who do not have a first-degree relative with Alzheimer's dementia.[70, 77] Those who have more than one first-degree relative with Alzheimer's dementia are at even higher risk.[73] A large, population-based study found that having a parent with Alzheimer's dementia increases risk independent of known genetic risk factors such as APOE-e4.[104] When diseases run in families, heredity (genetics) and shared non-genetic factors (for example, access to healthy foods and physical activity-related habits) may play a role.

Potentially Modifiable Risk Factors

Although age, genetics and family history cannot be changed, some risk factors may be modified to reduce a person's overall risk of cognitive decline and dementia (Figure 2).

As mentioned earlier, most people living with Alzheimer's dementia have the brain changes of Alzheimer's disease as well as one or more other types of dementia. Because Alzheimer's is the most common type of dementia, modifiable risk factors for dementia are often assumed to support a link between the risk factors and Alzheimer's disease specifically. However, this link may not be accurate.[65] Additional research will help identify whether these risk factors are shared across multiple types of dementia or are type-specific. In this section we discuss risk factors for cognitive decline and dementia generally, recognizing that it is unclear whether these are risk factors for Alzheimer's disease specifically.

There are many potentially modifiable risk factors for cognitive decline and dementia — too many to discuss in a single report. This report focuses on some of the modifiable risk factors with substantial supportive evidence.

The 2024 report of *The Lancet* Commission on dementia prevention, intervention and care identified 14 modifiable risk factors that, if eliminated, might prevent nearly half of dementia cases worldwide.[65] These factors occur across the lifespan and are: lower education, vision loss, high cholesterol, head injury, physical inactivity, smoking, excessive alcohol consumption, hypertension, obesity, diabetes, hearing loss, depression, infrequent social contact and air pollution. In the United States, a study involving more than 375,000 participants estimated that nearly 37% of dementia cases were associated with eight modifiable risk factors, the most common being midlife obesity, followed by physical inactivity and low educational attainment.[105] The other risk factors were depression, smoking, diabetes, hearing loss and midlife hypertension.

Researchers are interested not only in the types of modifiable risk factors but also how those risk factors affect different populations. For example, a 2024 study of nearly 92,000 participants in the Multiethnic Cohort Study with an average age of 59 found that after an average follow-up of nine years, slightly more than 16,500 (approximately 18%) had developed Alzheimer's or another dementia. Looking more closely at the data, researchers calculated that modifiable risk factors accounted for 33% of cases among Latinos, 29% among Native Hawaiians, 28% among African Americans, 22% among White Americans and 14% among Japanese Americans.[106]

There is increasing recognition that risk factors might accrue over the life course to result in dementia. For example, the risk of developing dementia in later life can be influenced by health factors present years (or even decades) earlier. Midlife obesity,[107-109] hypertension[87, 107, 110, 111] and high cholesterol[112] are among the midlife factors associated with an increased risk of dementia in later life. Researchers are looking at potential risk factors present even earlier in the life course, such as during adolescence and young adulthood, to understand how health factors experienced throughout one's life span may affect later life cognitive health.[113-118] This life course approach offers the potential to inform preventive measures across multiple stages of life.

Cardiovascular Health, Exercise and Diet

Brain health is affected by the health of the heart and blood vessels. Although the brain makes up just 2% of body weight, it consumes 20% of the body's oxygen and energy supplies.[119] A healthy heart ensures that enough blood is pumped to the brain, while healthy blood vessels enable the oxygen- and nutrient-rich blood to reach the brain so it can function normally. One of the clearest examples of this relationship is how stroke, which occurs when a blood vessel in the brain is blocked or bursts, markedly increases dementia risk.[120]

Many mid- and late-life factors that increase the risk of cardiovascular disease are also associated with a higher risk of dementia.[121] These factors include untreated or uncontrolled hypertension,[87, 107, 110, 111, 122-124] smoking[125, 126] and diabetes.[127-130] Likewise, many factors that decrease risk of cardiovascular disease are associated with decreased risk of dementia.[131] Physical activity in mid- or late life is an example of a potentially modifiable factor that reduces risk of cardiovascular disease and may also reduce risk of dementia.[132-140] In addition, many but not all studies suggest that consuming a healthy diet during mid- and/or late life may be associated with reduced dementia risk.[141-149] A healthy diet emphasizes fruits, vegetables, whole grains, fish, chicken, nuts, legumes and certain fats such as olive oil while limiting saturated fats, red meat and sugar. Examples of healthy diets include but are not limited to the Mediterranean, DASH (Dietary Approaches to Stop Hypertension) and MIND (Mediterranean-DASH Intervention for Neurodegenerative Delay) diets.[150-153] It is important to keep in mind that individuals' metabolic and neurobiological responses to diet vary, and that a "one size fits all" approach to diet may not be effective in reducing risk of cognitive decline and dementia.

Adding or avoiding any given single food, beverage, ingredient, vitamin, multivitamin or supplement has not been proven to prevent, delay, treat or cure Alzheimer's or any other dementia.[154]

Social and Cognitive Engagement

Remaining socially and cognitively active throughout life may support brain health and possibly reduce the risk of Alzheimer's and other dementias.[136, 155-165] For example, a study of more than 39,000 individuals from 13 longitudinal studies of aging found associations between good social connections (e.g., frequent contact with family and friends, having a confidante or never feeling lonely) and lower risk of dementia.[164] Another study found that the least socially active older adults (lowest 10th percentile) developed dementia an average of five years earlier than the most socially active older adults (90th percentile).[166]

In terms of cognitive activity, a study of more than 7,000 individuals found that those who had cognitively stimulating occupations in their 30s, 40s, 50s and 60s had a lower risk of MCI and dementia when they were 70 or older.[167] Another large study examined data on main lifetime occupation for 7,637 individuals 65 or older in the Chicago Health and Aging Project study and found that higher occupational cognitive requirements corresponded to significantly better late-life cognitive performance at baseline and to slower decline in global cognitive function over time.[168] Further, in a multicohort study of 107,896 participants, the risk of dementia in older age was found to be lower in individuals with cognitively stimulating jobs than in those with non-stimulating jobs.[169]

While socially and cognitively stimulating activities appear to reduce risk, it is also possible that undetected cognitive impairment decreases one's interest in and ability to participate in activities involving social and cognitive skills. In this case, the association may reflect the effect of cognitive impairment on social and cognitive engagement rather than the effect of engagement on dementia risk.[161] More research is needed to better understand the mechanisms that link social and cognitive engagement to dementia risk, along with types of activities that provide benefit and how often they should take place.

Education

Researchers have long reported that people with more years of formal education are at lower risk for Alzheimer's and other dementias than those with fewer years of formal education.[82, 170-175] Much of the research linking formal education to decreased risk of Alzheimer's dementia was conducted without the benefit of technological advances such as PET imaging of the brain that might shed light on whether education affects Alzheimer's biomarkers such as beta-amyloid and tau accumulation that are believed to contribute to dementia symptoms. More recent research incorporating these technological advances suggests that rather than reducing the risk of developing Alzheimer's brain changes, formal education may help sustain cognitive function in mid- and late life and delay the development of symptoms even though brain changes may be present.[176-178]

To that point, some researchers believe that having more years of education builds "cognitive reserve." Cognitive reserve refers to the brain's ability to make flexible and efficient use of cognitive networks (networks of neuron-to-neuron connections) to enable a person to continue to carry out cognitive tasks despite brain changes.[179, 180] The number of years of formal education is not the only determinant of cognitive reserve. Having a mentally stimulating job and engaging in other mentally stimulating activities may also help build cognitive reserve.[168, 181-183] Recent research has found that among individuals at increased risk of dementia, higher occupational complexity is associated with better cognition.[181]

Today, researchers are investigating a wide range of education-related factors in addition to the number of years of formal education to better understand how education may affect cognitive function and dementia risk. One of these factors is education quality, with emerging research suggesting that lower early-life educational quality is associated with increased dementia risk[184, 185] and lower late-life cognitive function.[186, 187]

Sleep

Among the many dementia risk factors being studied is inadequate sleep or poor sleep quality.[188-190] Researchers have found that an important function of sleep is the removal of toxic beta-amyloid and other substances from the brain.[191, 192] Inadequate or poor sleep may compromise the brain's ability to remove beta-amyloid and other toxins, enabling levels of toxins to remain elevated. In addition, poor sleep quality such as that associated with obstructive sleep apnea may increase risk by interfering with blood flow to the brain and normal patterns of brain activity that promote memory and attention.[193, 194] Many researchers believe that the relationship between sleep and Alzheimer's disease is bidirectional, meaning that not only may poor sleep increase one's risk of Alzheimer's, but also that the brain changes of Alzheimer's may increase the risk of poor sleep.[195-197] For example, increases in beta-amyloid and tau may interrupt the sleep-wake cycle,[198] leading to increased sleep fragmentation and wakefulness and decreased slow-wave sleep.[199] Poor sleep may have similar bidirectional relationships with other types of dementia, including vascular dementia.[200] More research is needed to understand the potential relationship between sleep and cognitive decline and dementia.

Sensory Loss

Problems with smell (olfactory dysfunction), hearing, vision and other sensory abilities have been reported to increase one's risk of cognitive decline and dementia.[201, 202] Olfactory dysfunction is linked to MCI as well as neurodegenerative diseases including Alzheimer's disease.[203-207] Problems with smell typically precede cognitive and motor symptoms and may occur as a result of the accumulation of beta-amyloid and hyperphosphorylated tau in olfactory regions of the brain. This may signal the future spread of these pathologies to parts of the brain affected by dementia.[208] In this way, olfactory dysfunction may be an indicator of potential forthcoming cognitive decline or dementia rather than a contributor to cognitive decline or dementia. A community-based study of 380 older adults without dementia who were followed for up to 15 years found that olfactory impairment was associated with faster cognitive decline and lower brain volume in regions that play key roles in memory and language.[209]

Age-related hearing loss has also been associated with faster rates of cognitive decline and dementia.[210-214] Among the reasons being examined is that hearing loss places a burden on cortical processing, which directs increased resources to auditory processing at the expense of other cognitive functions such as memory. Another possible explanation being explored is that hearing loss leads to social isolation, which has been linked to an increased risk of dementia.[215, 216] Supporting the idea that addressing hearing loss has promise for reducing dementia risk are findings from the Aging and Cognitive Health Evaluation in Elders (ACHIEVE) Study.[217] The findings suggest that use of hearing aids may slow cognitive decline among those with hearing loss who are at increased risk for dementia. An additional explanation under investigation is that hearing loss is an early manifestation of the underlying brain changes of various types of dementia. Researchers recognize that these explanations may not be mutually exclusive but may all contribute to the link between hearing loss and increased risk of dementia.

With respect to vision impairment and dementia risk, additional research is needed to better understand how vision impairment throughout life and from many causes may affect risk. Currently, one area of research that has undergone notable investigation is the potential relationship between cataract correction and dementia risk.[218] An analysis of data from participants in the UK Biobank found that those with cataracts who did not undergo cataract surgery were at increased risk for all-cause dementia and Alzheimer's disease compared with those with cataracts who underwent cataract surgery. In addition, an analysis of 3,038 adults 65 or older with cataracts who were enrolled in the Adult Changes in Thought study found that participants whose cataracts were removed had a lower risk of developing dementia than those who did not have cataract surgery after controlling for additional health factors.[219] A meta-analysis of 24 studies comprising 558,276 participants found that cataract surgery was associated with a 25% reduced risk of long-term cognitive decline compared with uncorrected cataracts.[220]

Air Pollution

There is also rapidly emerging evidence on how exposure to toxicants in the environment, especially air pollution, may be related to dementia risk. A number of air pollutants have been studied in relation to cognition, cognitive decline and dementia itself. The most consistent and rigorous results concern fine particulate matter (PM) air pollution. PM consists of tiny solid particles and liquid droplets generated by fuel combustion, fires and processes that produce dust. $PM_{2.5}$, particulate matter that is 2.5 microns in diameter or smaller, is small enough to be inhaled deeply into the lungs. This subset of PM particles has been shown to have the greatest health impact and is the focus in most studies. Based on a sweeping review of the scientific literature, the U.S. Environmental Protection Agency judged long-term exposure to $PM_{2.5}$ as likely to be causal in relation to nervous system effects.[221] Studies specific to dementia and related outcomes have reported that higher long-term exposure to $PM_{2.5}$ is associated with worse cognitive decline,[222, 223] reduced brain volumes,[222] increased dementia severity[224] and increased rates of incident (new onset) dementia.[223, 225, 226] $PM_{2.5}$ takes on a chemical composition that depends on what produces this pollutant, and there is emerging evidence that exposure to $PM_{2.5}$ generated by wildfire or burning wood may confer a notable uptick in dementia risk.[225, 227, 228]

Urgent and Emergency Hospitalizations in Older Adults

A growing body of evidence suggests that urgent and emergency hospitalizations in older adults are associated with increased risk of long-term cognitive impairment and dementia.[229-233] There are a number of ways that critical illness and aspects of the hospital experience may affect the brain.[234] One example is that experiencing hospitalization may make older adults more vulnerable to the existing brain changes of dementia.[235] Furthermore, experiencing delirium — a sudden and transient state of confusion common in hospitalized older adults — has been linked to long-term cognitive decline and dementia.[234, 236] This is not to suggest that hospitalization should be avoided if one is ill; rather, researchers are focusing on specific aspects of hospitalization, such as prolonged sedation, immobilization and lack of family engagement, that may increase risk of cognitive impairment.[234] Modifying these aspects of hospitalization (i.e., making hospitals more dementia friendly) may decrease risk of cognitive decline. In addition, better preventive health measures and improved and expanded health care coordination may help to prevent critical illness and subsequent hospitalization and the negative cognitive outcomes that may follow.

Traumatic Brain Injury (TBI)

TBI is a head injury caused by an external force that results in disruption of normal brain function.[237] TBI is associated with an increased risk of dementia.[238-240]

According to the Centers for Disease Control and Prevention (CDC), in 2020, people age 75 and older had the highest numbers and rates of TBI-related hospitalizations and deaths, accounting for about 32% of TBI-related hospitalizations and 28% of TBI-related deaths.[241] In 2018 and 2019, falls were the leading cause of TBI-related deaths among those 75 and older.[237]

- *Mild TBI* (also known as a concussion) is characterized by loss of consciousness or post-traumatic amnesia lasting 30 minutes or less. About 75% of TBIs are mild.[242]
- *Moderate TBI* is characterized by loss of consciousness or post-traumatic amnesia lasting more than 30 minutes but less than 24 hours.
- *Severe TBI* is characterized by loss of consciousness or post-traumatic amnesia lasting 24 hours or more.

Experiencing moderate or severe TBI increases risk of dementia between 2- and 4-fold compared with risk among individuals without a history of moderate or severe TBI.[243] The risk of dementia increases with the number of TBIs sustained.[238-240] In addition, studies have found that people with a history of TBI who develop dementia do so at a younger age than those without a history of TBI.[244, 245] Repetitive TBI can cause a brain disorder called chronic traumatic encephalopathy (CTE) that results in dementia symptoms.[246, 247] Like Alzheimer's disease, CTE is characterized by tangles of an abnormal form of the protein tau in the brain.[248] Beta-amyloid plaques may also be present, with one study indicating that more than 50% of individuals with CTE have beta-amyloid plaques.[248, 249] The brain changes of CTE can only be identified at autopsy.

Societal Risk Factors

Many but not all potentially modifiable risk factors may be impacted by individuals' decision to take action to lower their risk. Some modifiable risk factors must be addressed at a societal level to reduce risk.

Social Determinants of Health

Social determinants of health (SDOH) affect the risk of developing Alzheimer's and other dementias.[250-252] The World Health Organization (WHO) defines SDOH as the conditions in which people are born, grow, live, work and age, and people's access to power, money and resources.[253]

SDOH may decrease one's access to and ability to afford foods that support brain health; decrease one's ability to afford health care or medical treatments, such as treatments for cardiovascular risk factors that are closely linked to brain health; and limit one's access to safe housing, safe employment and safe outdoor areas in which to exercise. Furthermore, housing and employment conditions can influence one's exposure to substances that are toxic to the nervous system such as air pollution,[222] lead[254] and pesticides.[255]

According to WHO, "People who have limited access to quality housing, education, social protection and job opportunities have a higher risk of illness and death. Research shows that these social determinants can outweigh genetic influences or healthcare access in terms of influencing health."[253]

Socioeconomic Status

Socioeconomic status (SES) is typically defined as access to economic resources, including income, education, employment and occupation, but also includes factors such as financial security and perceived social standing. SES has many effects on one's health that are relevant to dementia risk. Researchers report that lower SES is associated with being less physically active,[256] having a higher risk of diabetes,[257-259] and being more likely to have hypertension[260] and to smoke[261] — all of which are risk factors for dementia (see Cardiovascular Health, Exercise, and Diet). Researchers have reported that SES is associated with changes in brain anatomy, including gray matter volume, that may affect overall cognitive ability.[262] WHO points out that "In countries at all levels of income, health and illness follow a social gradient: the lower the socioeconomic position, the worse the health."[253]

Community Disadvantage

Community disadvantage is an example of an SDOH often studied at the level of geographic regions. Area Deprivation Index (ADI) is a measure of community disadvantage that reflects a geographic area's level of socioeconomic deprivation. It can be used to identify communities at higher risk of experiencing social needs as well as to screen individuals for SDOH.[263, 264]

A study investigating the association of neighborhood disadvantage with the incidence of Alzheimer's disease and related dementias in 10,915 women in the longitudinal Black Women's Health Study found an association between living in a disadvantaged neighborhood (based on ADI score) and dementia risk.[265]

A nationally representative longitudinal study using data from the 2015 cohort of the National Health and Aging Trends Study found that among 7,499 community-living older adults, those living in disadvantaged counties had a significantly higher incidence of probable dementia after five years' follow-up than older adults living in less disadvantaged counties.[266]

In addition, a study of ADI and dementia incidence among more than 18,000 Asian American and nearly 150,000 non-Latino white members of a Northern California integrated health care delivery system found that ADI was associated with dementia incidence in non-Latino White individuals, but not in Asian American individuals.[267]

This growing area of research demonstrates both the importance of community disadvantage to one's health as well as the complexity of the effects of community disadvantage among various populations.

This report keeps the population identifiers used in source documents when describing findings from specific studies.

FIGURE 3

U.S. POINTER Brain Health Recipe*

● **Physical Exercise**
30–35 minutes of moderate-to-intense aerobic activity four times a week, plus strength and flexibility exercises twice a week.

○ **Health Monitoring**
Regular check-ins on blood pressure, weight and lab results.

● **Nutrition**
Adherence to the MIND diet, which emphasizes dark leafy greens, berries, nuts, whole grains, olive oil and fish, and limits sugar and unhealthy fats.

● **Cognitive Exercise**
Computer-based brain training program three times a week for 30 minutes, plus regular engagement in other intellectually challenging and social activities.

* U.S. POINTER = U.S. Study to Protect Brain Health Through Lifestyle Intervention to Reduce Risk. U.S. POINTER participants followed either a self-guided or structured lifestyle program. The two interventions both focused on the same lifestyle domains, but differed in structure, accountability and support provided. MIND = Mediterranean-DASH Intervention for Neurodegenerative Delay.

Created from data from Baker et al.[268]

U.S. POINTER Study

To better understand potentially modifiable risk factors, the Alzheimer's Association initiated the U.S. Study to Protect Brain Health Through Lifestyle Intervention to Reduce Risk (U.S. POINTER) and reported results in 2025.[268] U.S. POINTER is the first large-scale, randomized controlled clinical trial to demonstrate that an accessible and sustainable healthy lifestyle intervention can protect cognitive function in diverse populations in communities across the United States. The two-year, multi-site study examined whether interventions simultaneously addressing a combination of modifiable risk factors are effective in protecting cognitive function among individuals at elevated risk for cognitive decline and dementia. The more than 2,100 study participants, who were representative of the ethnic and racial diversity of the U.S., were assigned to a structured or self-guided intervention. They also were assigned to peer teams of 10-15 participants for support.

Both interventions focused on physical exercise, nutrition, cognitive exercise, social engagement and heart health monitoring (Figure 3). They differed in intensity, structure, accountability and support provided.

Those in the structured intervention attended 38 facilitated peer team meetings during the course of the study and had a prescribed activity program with measurable goals for aerobic, resistance and stretching exercise; adherence to the MIND diet; cognitive exercise; and social activity and every six months reviewed abnormal laboratory test results for cholesterol, hemoglobin A_{1C} (a diabetes biomarker) and blood pressure with a clinician, who also helped with goal-setting. Those in the self-guided intervention were encouraged to make lifestyle changes that best suited their personal needs and schedules. They received publicly available education materials and attended six peer team meetings during the two years of the study, at which they received gift cards to support behavior change. Study staff offered encouragement, without goal-directed coaching, during peer team meetings. Annual health monitoring was conducted during clinic visits.

Results showed that both intervention groups had improved cognitive function at the end of the study, with the structured intervention group having a significantly greater improvement in cognition.[268]

Looking to the Future

Importance of Biomarkers

The identification and validation of biomarkers for Alzheimer's disease has changed the landscape of Alzheimer's research. For example, biomarkers have enabled the discovery that Alzheimer's disease begins 20 years or more before the onset of symptoms. This discovery suggests that there is a substantial window of time in which we may be able to intervene in the progression of the disease. Biomarkers were critical in the research leading to FDA approval of lecanemab and donanemab, both of which slow disease progression in individuals with mild symptoms. They were also critical in the FDA's clearance of the first two blood tests for Alzheimer's disease. They promise to play an important role in future treatments and tools that aid in detection and diagnosis.

In addition, by enabling earlier detection of the brain changes of Alzheimer's disease, biomarkers give those affected the opportunity to seek treatment, address modifiable risk factors that may slow cognitive decline and consider participating in clinical trials.

Much remains to be understood about biomarkers and how they can best be used for detection and diagnosis. For example, some studies have found that comorbidities can affect biomarker results and that biomarker levels associated with elevated risk of dementia may differ by race and ethnicity.[269-271] Fine-tuning diagnostic cut-off points for populations with different dementia risks and incorporating an understanding of how coexisting conditions may affect biomarkers are among the factors of paramount importance in putting biomarker tests into everyday practice.

Health Care Provider Resources

Also of paramount importance to putting biomarkers into everyday practice is providing health care professionals with resources to guide them in using biomarker information to aid in detection and diagnosis. To this end, in 2025 the Alzheimer's Association launched ALZPro (pro.alz.org), which offers clinical guidelines, education and training, research publications and practical tools for researchers, clinicians and dementia care providers. ALZPro aims to deliver timely, relevant resources to advance evidence-informed, person-centered care. It includes content hubs for training, education, and professional development; the care pathway, which provides access to clinical tools and planning resources to support dementia risk reduction, diagnosis, treatment and care; professional networks and registries; research, publications and grants; and conferences and events, which connect health care professionals with dementia researchers, care experts and other leaders in the dementia field.

Increased Diversity in Research Participation

Gaining a more comprehensive understanding of Alzheimer's — from its causes to how to prevent, manage and treat it — requires inclusion of increased numbers of participants from diverse sociodemographic groups, including racial and ethnic groups, in research.

Without adequate data from these groups, the current and future burden of Alzheimer's disease and Alzheimer's dementia in the United States cannot be accurately measured.[272] Moreover, current data indicate that, compared with non-Hispanic White older adults, Black and Hispanic older adults are at increased risk for Alzheimer's dementia (see Prevalence section), and underrepresentation may exacerbate disparities by largely ignoring populations who bear the greatest risk. Other groups, including older adults who live with Down syndrome, Americans living in rural settings, and those who are American Indian, Alaska Native or Asian American or identify with multiple races, are also underrepresented in Alzheimer's research. Lack of inclusion limits our ability to understand whether and how dementia risk factors and interventions work in populations that carry different baseline susceptibility to Alzheimer's disease.[273] In addition, understanding why some populations may have particularly low levels of dementia risk could inform intervention strategies that may benefit all populations.

PREVALENCE

AN ESTIMATED 7.4 MILLION AMERICANS ARE LIVING WITH ALZHEIMER'S DEMENTIA.

Millions of Americans are living with Alzheimer's or other dementias. As the size of the U.S. population age 65 and older continues to grow, so too will the number and proportion of Americans with Alzheimer's or other dementias.

This section reports on the number and proportion of people with clinical Alzheimer's dementia to describe the magnitude of the burden of clinical Alzheimer's dementia on communities, health care systems and social safety nets. The prevalence of clinical Alzheimer's dementia refers to the number and proportion of people in a population who have clinical Alzheimer's dementia at a given point in time. Incidence refers to the number or rate of new cases per year, often expressed as the number of people per 100,000 who newly develop the condition in a year. This section reports estimates from several studies of the number of people and proportion of the population with Alzheimer's or other dementias. Estimates vary depending on how each study was conducted.

The number and proportion of Americans with Alzheimer's or other dementias is expected to continue to grow in coming years because the risk of dementia increases with advancing age. The population of Americans age 65 and older is projected to grow from 65 million in 2026 to 82 million by 2050.[274] A number of recent studies have reported that the incidence rate of Alzheimer's and other dementias appears to have declined in recent decades (see "Trends in the Prevalence and Incidence of Clinical Alzheimer's Dementia Over Time" page 37). This decline in incidence has been attributed to improvements over the 20th century in modifiable risk factors for dementia, such as increased prevention and treatment of hypertension and greater educational attainment.[275] It is unknown how COVID-19, including infection with SARS-CoV-2 (the virus that causes COVID-19), mortality from COVID-19 and changes in health care access resulting from the COVID-19 pandemic, will influence the number and proportion of people in the U.S. with clinical Alzheimer's dementia in years to come. Even so, the absolute number of people with Alzheimer's and other dementias is expected to continue growing because of the large increase in the number of adults age 65 and older.[276]

A Note on the Term "Clinical Alzheimer's Dementia" in This Section

The term "clinical Alzheimer's dementia" throughout most of the Prevalence section refers to dementia that is believed to be due to Alzheimer's disease based on clinical symptoms only but not confirmed by tests or biomarkers indicating the brain changes of Alzheimer's disease. This is because most of the population-based studies of Alzheimer's dementia prevalence to date have been based on clinical outcomes, as biomarkers are relatively newly available for population-based research. The state of the science for the term "Alzheimer's dementia" is now dementia that has been confirmed to be due to the brain changes of Alzheimer's disease (see "Alzheimer's Dementia" in the Overview). Population-based prevalence studies that have the data to provide an estimate of the prevalence of biomarker-confirmed Alzheimer's dementia have only started to be published in the previous year. We now attempt to preliminarily provide an estimate of the prevalence of biomarker-confirmed Alzheimer's dementia, as well as the prevalence of Alzheimer's disease along the entire disease continuum using these new studies (see "Prevalence Estimates," page 30).

Prevalence of Clinical Alzheimer's Dementia and Other Dementias in the United States

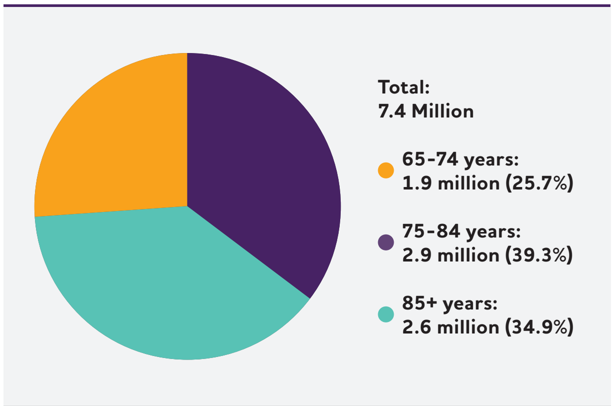
An estimated 7.4 million Americans age 65 and older are living with clinical Alzheimer's dementia in 2026.[A2,276] Seventy-four percent are age 75 or older (Figure 4).[276]

Of the total U.S. population:

- About 1 in 9 people (11%) age 65 and older has clinical Alzheimer's dementia.[A2, 276]
- The percentage of people with clinical Alzheimer's dementia increases with age: for example, 5.2% of people age 65 to 74 and 35.8% of people age 85 and older have clinical Alzheimer's dementia (Figure 5).[A2, 276]
- People younger than 65 can also develop clinical Alzheimer's dementia. Although prevalence studies of younger-onset dementia in the U.S. are limited, researchers believe about 110 of every 100,000 people age 30 to 64 years, or about 200,000 Americans in total, have younger-onset dementia.[277]

FIGURE **4**

Number and Ages of People 65 or Older with Clinical Alzheimer's Dementia, 2026*

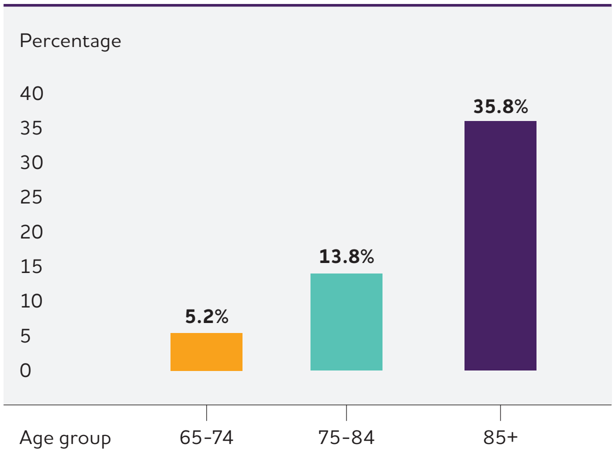


*Percentages do not total 100 due to rounding. The denominator for each percentage is the total number of people with clinical Alzheimer's dementia in the U.S. in 2026: 7.4 million.

Created from data from Rajan et al.[A2, 276]

FIGURE **5**

Percentage of People with Clinical Alzheimer's Dementia by Age Group, 2026



*Percentages do not total 100 due to rounding. The denominator for each percentage is the U.S. Census population projection for the specific age group of interest.

Created from data from Rajan et al.[A2, 276]

The estimated number of people age 65 and older with clinical Alzheimer's dementia comes from an updated study using the Chicago Health and Aging Project (CHAP), a population-based study of chronic health conditions of older people, and the latest data from the 2024 population projections from the U.S. Census Bureau.[276]

Whereas CHAP generated estimates specific to clinical Alzheimer's dementia, national estimates of the prevalence of all dementias combined are available from other population-based studies, including the Health and Retirement Study (HRS), a nationally representative sample of older adults. Based on estimates from the HRS Harmonized Cognitive Assessment Protocol (HCAP), 10% of people age 65 and older in the U.S. had dementia in 2016.[A3, 175]

Underdiagnosis of Clinical Alzheimer's Dementia and Other Dementias in Health Care Settings

Prevalence studies such as CHAP and HRS are designed so that everyone in the study undergoes evaluation for dementia. But outside of research settings, a substantial portion of those who would meet the clinical diagnostic criteria for Alzheimer's and other dementias are not diagnosed with dementia by a clinician.[289-298] Furthermore, only about half of Medicare beneficiaries who have a diagnosis of Alzheimer's or another dementia in their Medicare billing records report being told of the diagnosis.[299-303] (See "Detection, Screening, and Diagnosis" in the Workforce section, page 63, for a discussion of barriers to timely and accurate diagnosis from the perspective of primary care physicians.) Because dementia is often underdiagnosed — and if it is diagnosed by a clinician, some people appear to be unaware of their diagnosis — a large portion of Americans with dementia may not know they have it.[304] Some studies indicate that underdiagnosis is higher in Black and Hispanic older adults.[297, 298, 305-309] A number of potential harms may result from a missed or delayed dementia diagnosis. These include delayed access to treatment and supportive services, less time for care planning, higher costs of care, and negative impact on the individual's physical and mental health or even the mental health of their family members and potential caregivers. More research is needed to better understand the potential harms of delayed or lack of diagnosis.[310] Underdiagnosis is most pronounced at the earliest stages of dementia when symptoms are mild.[305] Even fewer people living with MCI receive a diagnosis despite this being the stage where treatment and planning may be most effective.[311] One recent study estimates that only 8% of older Americans living with MCI receive a diagnosis.[312]

The previous paragraph discusses underdiagnosis of Alzheimer's and other dementias in people who have clinical symptoms that would meet the diagnostic criteria for dementia or MCI. However, as discussed in the Overview and the "Prevalence Estimates" box, the field is moving toward defining Alzheimer's disease based on the presence of biomarkers — regardless of the severity of symptoms or even the presence of any cognitive symptoms.[1] Thus, diagnostic criteria for "early Alzheimer's disease" — i.e., before the development of symptoms — are in the beginning stages of being drafted by the FDA and other regulatory bodies.[39] In the meantime, researchers have taken the lead and proposed revised criteria for diagnosing and staging Alzheimer's along the entire disease continuum, including its early, asymptomatic stages.[1] According to these new criteria, anyone in the entire continuum of Alzheimer's disease (stages 1-6 in Table 3) would be considered to have Alzheimer's disease, and stages 1-3 would be considered "early Alzheimer's disease". This raises questions about who should be screened for Alzheimer's disease, and what the harms and benefits of receiving a diagnosis of early Alzheimer's disease may be in the absence of cognitive impairment.[313-315] Furthermore, even if the health care system at large were to adopt these diagnostic criteria, workforce shortages would likely result in very long waits for the tens of millions of adult Americans who might be interested in diagnostic testing for early Alzheimer's (see Workforce section, page 63).

Prevalence of Subjective Cognitive Decline

Subjective cognitive decline (SCD) refers to an individual's perception that their memory or other thinking abilities are worsening. SCD is one of the earliest warning signs of dementia and may be a way to identify people who are at high risk of developing dementia or MCI.[316-323] However, not all those who experience SCD go on to develop MCI or dementia. SCD is often an indicator of other, treatable conditions, such as sleep apnea, depression or anxiety. Some researchers have defined SCD as an individual's perception of worsening of their memory thinking abilities in the absence of standardized cognitive test results indicating objective cognitive impairment; however, such standardized testing is not always available in surveys assessing SCD.[324]

The Behavioral Risk Factor Surveillance System survey, a large cross-sectional, telephone-based survey of community-dwelling people across the U.S. that includes questions on SCD, found that 16.6% of Americans age 45 and older (17.1% of Americans age 65 and older) reported SCD, but 54% of those who reported it had not consulted a health care professional.[286] For others, SCD prompts medical attention. Understanding the reason an individual thinks that they are experiencing cognitive decline can help distinguish factors that may in fact be related to higher dementia risk from experiences less likely to be related, such as other underlying health conditions.[324] Seeking care for SCD may be beneficial to one's physical and mental health.

Estimates of the Prevalence of Clinical Alzheimer's Dementia by State and County

Understanding regional differences in clinical Alzheimer's dementia prevalence can help guide the allocation of resources to public health programs for Alzheimer's in the U.S. Table 5 displays the prevalence (both number and percentage) of clinical Alzheimer's dementia for each state in 2020. A recent analysis, based on the same data sources that generated the national prevalence estimate in this report, estimated the prevalence of clinical Alzheimer's dementia by state and, for the first time, by county.[325] As shown in both Table 5 and Figure 6, states and counties in the eastern and southeastern U.S. have the highest prevalence of clinical Alzheimer's dementia; eight of the 10 counties (with at least 10,000 older adults) with the highest prevalence are in the East and Southeast. In these regions, older people and Black and Hispanic residents — groups that are at higher risk of clinical Alzheimer's dementia (see "Racial and Ethnic Differences in the Prevalence of Alzheimer's and Other Dementias") — comprise larger percentages of the population. Although these estimates did not incorporate information related to health-related behaviors or health conditions, it is notable that the Southeast region also has the highest prevalence of conditions such as hypertension, stroke and diabetes that raise the risk of dementia (see "Modifiable Risk Factors" in the Overview).[326]

Incidence of Clinical Alzheimer's Dementia

Incidence is a measure of risk for developing a disease. According to estimates using data from the CHAP study and the U.S. Census Bureau, approximately 910,000 people age 65 or older developed clinical Alzheimer's dementia in the U.S. in 2011, a number that would be expected to be even higher in 2026 if updated CHAP estimates were available.[327] The rate at which new cases of Alzheimer's develop increases dramatically with age: according to estimates from CHAP, in 2011 the average annual incidence in people age 65 to 74 was 0.4% (meaning four of every 1,000 people age 65 to 74 developed clinical Alzheimer's dementia in 2011); in people age 75 to 84, the annual incidence was 3.2% (32 of every 1,000 people); and in people age 85 and older, the incidence was 7.6% (76 of every 1,000 people).[327] A 2015 study using data from the Adult Changes in Thought Study, a cohort of members of a health care delivery system in the Seattle area, reported incidence rates similar to those from the CHAP study.[3] Because of the increasing number of people age 65 and older in the U.S., particularly those age 85 and older, the annual number of new cases of Alzheimer's and other dementias is projected to double by 2050.[328]

Prevalence Estimates

The prevalence numbers for "clinical Alzheimer's dementia" included in the rest of this section are based on estimates of how many people in the U.S. are living with the clinical symptoms of Alzheimer's.

The estimate of 7.4 million older adults who have clinical Alzheimer's dementia comes from a single community-based, longitudinal study in which participants were systematically evaluated and then re-evaluated on a regular basis; those who exhibited the clinical symptoms of Alzheimer's dementia were classified as having clinical Alzheimer's dementia.[A2, 276] A major advantage of this approach is that it attempts to capture all individuals living with the condition and does not rely on a dementia diagnosis by the health care system, a process that has resulted in a substantial undercount (i.e., "underdiagnosis") of the clinical Alzheimer's dementia population. The disadvantage is that the longitudinal study is located in a single, small geographic area and may not be nationally representative (although the estimation process attempted to account for the demographics of the entire U.S. population). In the future, *Facts and Figures* could report estimates of clinical Alzheimer's dementia prevalence from multiple longitudinal studies or using different symptom-based diagnostic criteria; these differences in criteria could result in different prevalence estimates from what we report here.

Estimating the Prevalence of Biological Alzheimer's Disease Across the Alzheimer's Disease Continuum Based on Biomarker Evidence

Almost all existing Alzheimer's dementia prevalence studies are based on the identification of clinical symptoms to classify an individual as having clinical Alzheimer's dementia; they do not rely on a biological diagnosis of Alzheimer's disease (i.e., a diagnosis based on evidence of Alzheimer's biomarkers). As data sources, methods and scientific knowledge begin to incorporate biomarkers, estimates of prevalence based on biological diagnosis may be available. This could lead to very different prevalence estimates for a number of reasons, which are discussed here. In this section, we present rough estimates of the number of people in each stage of the Alzheimer's disease continuum from no cognitive impairment to severe dementia (see Table 3a), based on a very recently available population-based study that included Alzheimer's disease biomarkers.[278] This study involves the Norwegian population and does not use a clinical staging system identical to the one presented in the Overview. As more population-based studies that incorporate Alzheimer's disease biomarkers become available, we will refine these estimates.

Estimated Prevalence of Dementia Due to Alzheimer's Disease Based on Biomarkers and Dementia Symptoms (stages 4-6)[1]

The estimated prevalence of dementia due to Alzheimer's disease based on biomarker evidence of Alzheimer's disease, as well as overt clinical dementia symptoms, is likely to be lower than the 7.4 million figure reported here. This is because autopsy- and biomarker-based studies[18, 75, 279-281] indicate that some individuals counted as having Alzheimer's dementia based on symptoms do not have biological Alzheimer's disease; that is, their dementia is caused by something other than Alzheimer's disease. Both autopsy studies and clinical trials have found that 15% to 30% of individuals who meet the criteria for clinical Alzheimer's dementia based on symptoms did not have biomarkers of Alzheimer's disease, that is, they did not have a biological diagnosis of Alzheimer's disease. A recent population-based study reported that 60% of older people with dementia had Alzheimer's disease based on biomarkers.[278] This would translate to roughly 4.4 million Americans age 65 and older being classified as having dementia due to Alzheimer's disease in 2026. This corresponds to stages 4-6 in the new criteria for clinical staging along the entire Alzheimer's disease continuum.

Estimated Prevalence of MCI due to Alzheimer's Disease Based on Biomarkers and Mild Cognitive Symptoms (stage 3)[1]

For decades, it has been recognized that all individuals with dementia have passed through a precursor stage frequently referred to as mild cognitive impairment (MCI). With the recent advent of biomarkers that detect the brain changes believed to characterize Alzheimer's disease, it may now be possible to determine which individuals diagnosed with MCI have MCI due to Alzheimer's disease. The number and proportion of older adults who have MCI due to Alzheimer's disease are currently difficult to estimate because they require studies with both population-based prevalence measures of MCI and tests of Alzheimer's biomarkers. This line of research is in its infancy. Furthermore, studies vary in both the threshold of cognitive impairment required for an MCI diagnosis and the level of biomarker burden that defines the presence of Alzheimer's disease. However, we can roughly estimate this prevalence indirectly using multiple data sources. A systematic review of more than 30 studies of all-cause MCI reported that about 17% of people age 65 and older had MCI.[282] The HRS HCAP study more recently estimated the prevalence of MCI in people age 65 and older to be 22%.[175] Therefore, approximately 20% of older adults are likely to have MCI. Meanwhile, the recent population-based study in Norway reported that 32.6% of older people age 70 and older with MCI had Alzheimer's disease based on biomarkers.[278] Taken together, this means roughly 7% — or 4.2 million older Americans — may have MCI due to Alzheimer's disease. This corresponds to stage 3 in the new criteria for clinical staging along the entire Alzheimer's disease continuum.

Estimated Prevalence of Biological Alzheimer's Disease Across the Entire Cognitive Spectrum (stages 1-6)

Finally, as measures of the brain changes of Alzheimer's disease become more widely available in research, we will be able to estimate how many people have biological Alzheimer's disease regardless of the presence or absence of dementia or any form of cognitive impairment. The total number of people living with biological Alzheimer's disease is larger than the number with MCI or dementia due to Alzheimer's disease given that there is an incipient and silent (i.e., "preclinical") stage of Alzheimer's disease before the emergence of cognitive symptoms of either MCI or dementia.[283] While this is still the subject of ongoing research, estimates are emerging of the prevalence of preclinical Alzheimer's disease in the population.[284, 285] More research is needed to validate preclinical Alzheimer's and determine how to measure it with biomarkers that conclusively represent Alzheimer's disease, as opposed to other dementia-causing diseases. We also need to further understand if this preclinical stage is a valid representation of people who may go on to develop dementia due to Alzheimer's disease. For example, we know that many individuals with biological Alzheimer's disease may not develop cognitive symptoms in their lifetime, or not develop symptoms for many years in the future. The proportion of the asymptomatic population with biological Alzheimer's disease that will or will not develop cognitive symptoms has not been established.

For now, we provide a reasonable initial estimate of the number of people who have biomarkers for Alzheimer's disease in the preclinical stages of the Alzheimer's disease continuum using the most valid sources available. Approximately 16.6% of Americans age 45 and older report subjective cognitive decline[286] (SCD; see "Prevalence of Subjective Cognitive Decline" in this section), and a meta-analysis reported that 15% to 35% of people reporting SCD had biomarkers for Alzheimer's disease. This corresponds to about 1 to 3 million Americans age 65 and older with SCD and Alzheimer's disease, or 2 million as the middle estimate, corresponding to stage 2 in the new clinical staging criteria (see Table 3a).

In regard to older adults without any cognitive impairment (objective or subjective), recent studies have reported that 22% to 24% of older adults without cognitive symptoms have Alzheimer's disease biomarkers.[287, 288] The population-based study in Norway reported that 23.5% of people age 70 and older without cognitive impairment had Alzheimer's disease based on biomarkers.[278] Multiplying this by the estimated number of Americans who do not have dementia, MCI, or SCD yields an estimate of 8-9 million older Americans with asymptomatic Alzheimer's disease, corresponding to stage 1 of the new clinical criteria. Taken together, our estimates of people in stages 1 through 6 of the Alzheimer's disease continuum sums to approximately 19 million Americans age 65 and older, or 30% of all older Americans.

This will need to be verified through more population-based studies that incorporate biomarkers across the entire cognitive spectrum. This rough estimate is based on one population-based study conducted outside of the U.S. that included blood biomarker data,[278] as well as other studies and data sources that use a number of biomarker modalities (e.g. PET scans, cerebrospinal fluid analysis, and blood biomarker tests), some of which measured amyloid only and others of which measured amyloid and/or tau. Studies used here come from clinic-based samples rather than community-based samples, which could lead to inflated estimates of the proportions with biological Alzheimer's disease. This all introduces substantial uncertainty into these estimates for the U.S. population. Furthermore, most of these studies only included data from people age 65 or, in the case of the Norway study, 70 and older; the estimates of Americans with biological Alzheimer's disease will be higher if we could include individuals age 55 and older. In addition to variability in the prevalence of Alzheimer's disease by age, these estimates could be affected by other demographic factors including sex and race/ethnicity, which have yet to be taken into account when estimating prevalence for all Americans. Finally, it should be noted that fully understanding the impact of biological Alzheimer's disease on dementia prevalence will require biomarkers for other dementia-causing conditions: even if asymptomatic people with biological Alzheimer's disease do go on to develop dementia, the primary cause may not be Alzheimer's disease but another condition or a combination of Alzheimer's disease and other pathologies.

TABLE 5

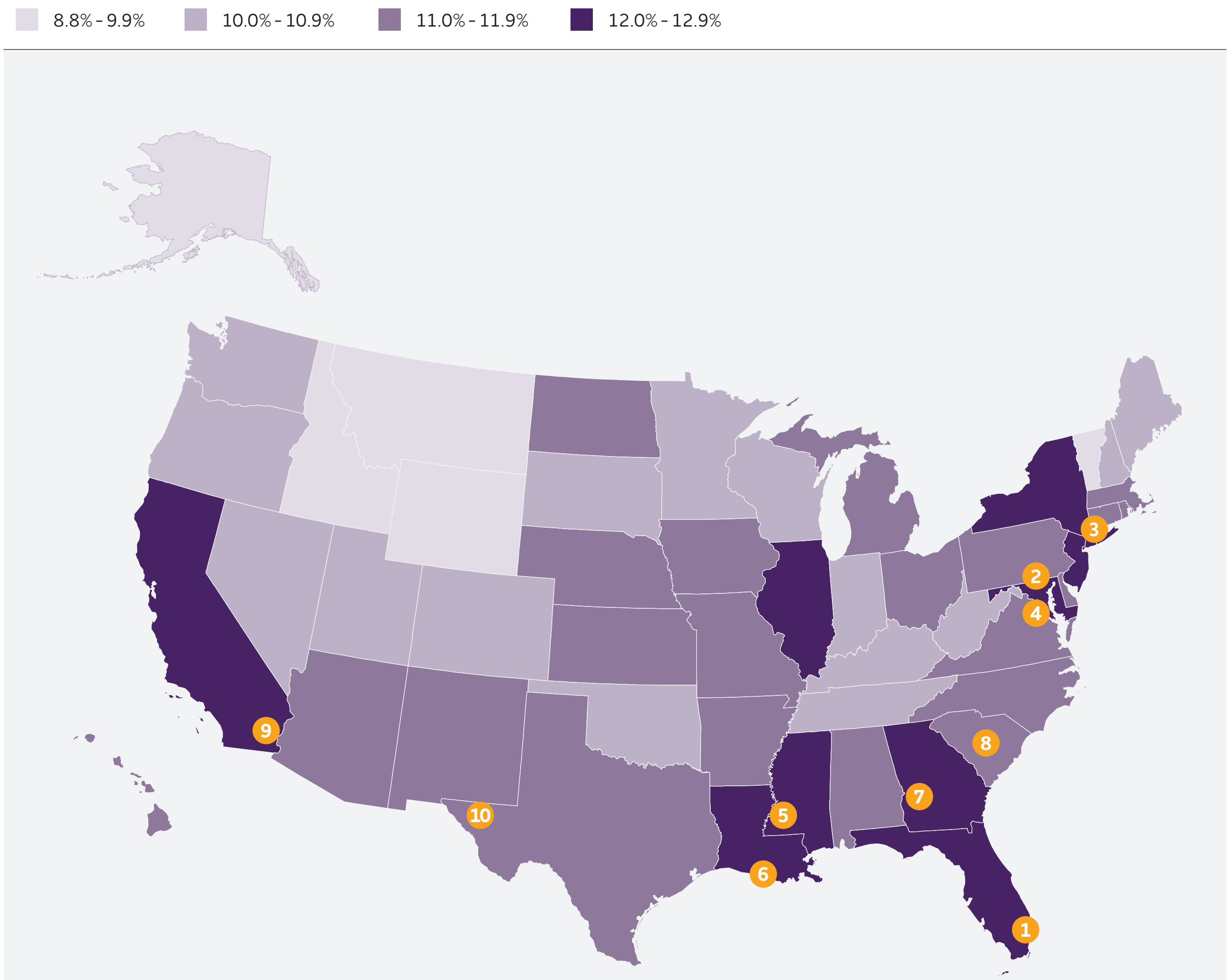
Estimated Prevalence (Number and Percentage) of Clinical Alzheimer's Dementia in the 50 U.S. States and District of Columbia Among Adults Age 65 Years and Older in 2020

State	Number (in thousands)	Percentage
Alabama	103.6	11.8
Alaska	8.4	8.8
Arizona	151.5	11.0
Arkansas	60.4	11.3
California	719.7	12.0
Colorado	90.8	10.4
Connecticut	76.8	11.9
Delaware	22.3	11.3
District of Columbia	15.1	16.8
Florida	579.9	12.5
Georgia	188.3	12.0
Hawaii	31.2	11.3
Idaho	29.9	9.8
Illinois	250.6	12.0
Indiana	121.3	10.9
Iowa	62.1	11.0
Kansas	54.5	11.2
Kentucky	80.5	10.4
Louisiana	94.7	12.4
Maine	29.6	10.1
Maryland	127.2	12.9
Massachusetts	135.2	11.3
Michigan	202.8	11.2
Minnesota	101.9	10.7
Mississippi	62.5	12.5
Missouri	122.3	11.2
Montana	21.0	9.8
Nebraska	35.1	11.0
Nevada	54.9	10.6
New Hampshire	26.5	10.1
New Jersey	185.3	12.3
New Mexico	46.0	11.8
New York	426.5	12.7
North Carolina	210.5	11.6
North Dakota	13.7	11.1
Ohio	236.2	11.3
Oklahoma	70.5	10.8
Oregon	79.1	10.0
Pennsylvania	282.1	11.5
Rhode Island	22.0	11.4
South Carolina	112.5	11.5
South Dakota	16.5	10.5
Tennessee	129.2	10.9
Texas	459.3	11.9
Utah	38.3	10.0
Vermont	12.8	9.9
Virginia	164.0	11.7
Washington	126.7	10.2
West Virginia	38.1	10.2
Wisconsin	110.9	10.6
Wyoming	10.3	9.9

Created from data from Dhana et al.[325] Prevalence estimates were derived from age, sex and race distributions of state and county populations.

FIGURE **6**

Prevalence of Clinical Alzheimer's Dementia in the 50 U.S. States, and the 10 Counties with the Highest Prevalence, 2020*



1 **Miami-Dade County, FL** (16.6%)

2 **Baltimore City, MD** (16.6%)

3 **Bronx County, NY** (16.6%)

4 **Prince George's County, MD** (16.1%)

5 **Hinds County, MS** (15.5%)

6 **Orleans Parish, LA** (15.4%)

7 **Dougherty County, GA** (15.3%)

8 **Orangeburg County, SC** (15.2%)

9 **Imperial County, CA** (15.0%)

10 **El Paso County, TX** (15.0%)

* Only counties with 10,000 or more residents age 65 or older were included in the ranking. For detailed prevalence data for all U.S. counties, visit alz-journals.onlinelibrary.wiley.com/doi/10.1002/alz.13081 and click on the last file in the Supporting Information section. Baltimore City is a county-level governmental unit. Study did not include Washington, D.C.

Created from data from Dhana et al.[325]

Lifetime Risk of Clinical Alzheimer's Dementia

Lifetime risk is the probability that someone of a given age who does not have a particular condition will develop the condition during that person's remaining life span. Data through 2009 from the Framingham Heart Study were used to estimate lifetime risk of clinical Alzheimer's dementia by age and sex.[A4, 329] As shown in Figure 7, the study estimated that the lifetime risk for clinical Alzheimer's dementia at age 45 was approximately 1 in 5 (20%) for women and 1 in 10 (10%) for men. The risks for both sexes were slightly higher at age 65.[329]

Differences Between Women and Men in the Prevalence and Risk of Clinical Alzheimer's and Other Dementias

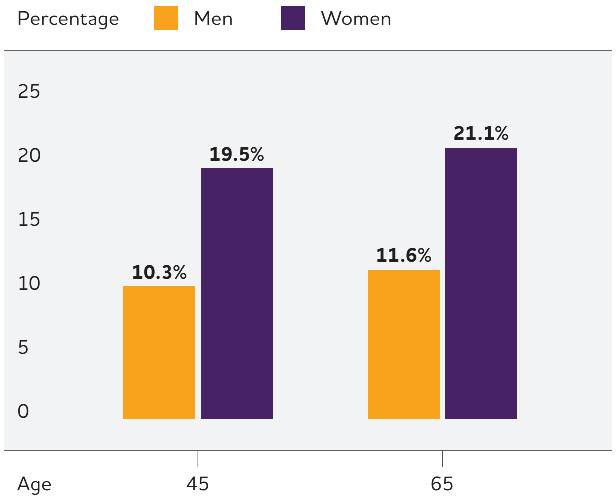
Almost two-thirds of Americans with Alzheimer's are women.[276] Of the 7.4 million people age 65 and older with clinical Alzheimer's dementia in the United States, 4.5 million are women and 2.9 million are men.[276] This represents 13% of women and 10% of men age 65 and older in the United States.[274]

Older age is the greatest risk factor for Alzheimer's and other dementias, and women live longer than men on average; this survival difference contributes to higher prevalence of Alzheimer's and other dementias in women than in men.[329-332] However, it is not clear that the risk of developing Alzheimer's or other dementias differs between men and women of the same age. Most studies of incidence in the United States have found no meaningful difference between men and women in the proportion who develop Alzheimer's or other dementias at any given age.[3, 82, 331, 333, 334] Similarly, some European studies have reported a higher incidence among women at older ages,[335, 336] while others have reported higher incidence among men.[337] One multi-country study found that incidence of all-cause dementia was greater in women than men, with this difference more pronounced in low- and middle-income countries than in high-income countries, and more pronounced in Africa and South America than in Asia, Europe and North America. Therefore, differences in the risk of dementia between men and women may depend in part on age, birth cohort, survival differences related to sex/gender and/or geographic region.[338-340]

Other studies have provided evidence that any observed difference in dementia risk between men and women may be an artifact of who is more or less likely to die of other causes before developing dementia. A study using Framingham Heart Study data suggested that men in the study appeared to have a lower risk for dementia due to "survival bias," in which the men who survived to age 65 or beyond and were included in the study were the ones with a healthier cardiovascular risk profile (men have a higher rate of death from cardiovascular disease in middle age than women) and thus a lower risk for dementia.[330] Studies have supported the notion that survival bias contributes to reports of sex and gender differences in clinical Alzheimer's dementia risk.[328, 341, 342] More research is needed to support this interpretation.

FIGURE **7**

Estimated Lifetime Risk for Clinical Alzheimer's Dementia, by Sex, at Ages 45 and 65



Created from data from Chene et al.[329]

Although differences in the rates at which men and women develop Alzheimer's or other dementias do not appear to be large or consistent, the reasons men and women develop dementia may vary. These differences may be based in biology, such as chromosomal or hormonal differences related to reproductive history[343] (i.e., sex differences), or in how social and cultural factors are distributed among or are experienced by men and women (i.e., gender differences), or a combination of these.[338, 344-346] The likelihood of having or experiencing a known risk factor — such as low levels of education, cardiovascular disease, or negative health behaviors — varies by gender. The effects of these risk factors on dementia can vary by gender, as well. For example, lower educational attainment in women than in men born in the first half of the 20th century may contribute to elevated risk in women, as limited formal education is a risk factor for dementia.[347] This possibility requires more research, but evidence supports that greater educational attainment over time in the United States — the gains in which have been more substantial for women than men — has led to decreased risk for dementia.[348] In addition to differences in educational attainment relating to dementia risk differences in men and women, the same level of education may affect men's and women's dementia risk differently. Studies have found that the association of lower educational attainment with dementia and cognitive outcomes may be stronger in women than men.[349-351]

Other societal gender differences may also be at play, such as differences in occupational attainment between men and women, with a recent study showing that women who participated in the paid workforce earlier in life had better cognitive outcomes after age 60 than women who were not part of the paid workforce.[352, 353] More recently, gender differences during the lockdown phase in the early part of the COVID-19 pandemic included increased child care responsibilities and job loss in sectors where women were more likely to be employed.[354-356] It is unclear how these differential impacts on women may affect their brain health in the future. Researchers have begun exploring how mental health challenges, lost job opportunities and decreased employment earnings experienced during the pandemic may affect women's ability to maintain brain health.[355] This is part of broader efforts to understand how social and political circumstances across women's lives affect their dementia risk.[357]

It is unclear whether genetic risk operates differently in women and men in the development of Alzheimer's disease or susceptibility to the brain changes of Alzheimer's disease.[358] A number of studies have indicated that the APOE-e4 genotype, the best known common genetic risk factor for clinical Alzheimer's dementia, may have a stronger association with clinical Alzheimer's dementia[359, 360] and neurodegeneration[361] in women than in men. However, a meta-analysis found no difference between men and women in the association between APOE-e4 and clinical Alzheimer's dementia overall, although age played an interesting interactive role. That is, APOE-e4 was related to higher Alzheimer's risk in women than men between ages 55 and 70, when APOE is thought to exert its largest effects.[362] It is unclear whether the influence of APOE-e4 may depend on the sex hormone estrogen.[346, 363, 364]

Racial and Ethnic Differences in the Prevalence and Risk of Clinical Alzheimer's Dementia and Other Dementias

The risk of Alzheimer's and other dementias appears to vary by race and ethnicity in the U.S. While risk is poorly characterized in smaller racial and ethnic groups in the U.S., multiple studies have reported differences in risk among Hispanic, non-Hispanic Black and non-Hispanic White individuals. In the U.S., Hispanic and non-Hispanic Black older adults are more likely than non-Hispanic White older adults to have Alzheimer's or other dementias.[365-371] Data from the CHAP study indicates 19% of Black and 14% of Hispanic adults age 65 and older have clinical Alzheimer's dementia compared with 10% of White older adults.[276] In line with these observations, most other prevalence studies indicate that Black older adults are about twice as likely to have Alzheimer's or other dementias as White older adults.[175, 327, 372, 373] Some other studies indicate Hispanic older adults are about one and one-half times as likely to have Alzheimer's or other dementias as White older adults,[373-375] though others have shown similar prevalences among Hispanic and non-Hispanic White older adults.[175] The population of Hispanic people comprises very diverse groups with different cultural histories and health profiles, and prevalence may differ between Hispanic ethnic groups (for example, Mexican Americans compared with Caribbean Americans).[376, 377]

The higher prevalence of clinical Alzheimer's dementia in non-Hispanic Black and Hispanic populations compared with the non-Hispanic White population appears to be due to a higher risk of developing dementia in these groups compared with the non-Hispanic White population of the same age.[378, 379] Genetic factors do not account for the large differences in prevalence and incidence among groups.[378, 380] While there is some research into how the influence of genetic risk factors on Alzheimer's and other dementias may differ by race — for example, the influence of the APOE-e4 allele on Alzheimer's risk may be stronger for White Americans than Black Americans[84-88, 381] — these differences in genetic influence do not explain the large elevated risk among Black individuals.

Instead, research suggests that differences in life experiences, socioeconomic indicators and health conditions, including cardiovascular disease and diabetes, most likely explain the difference in risk for Alzheimer's and other dementias among groups.[114, 382-387] Social inequality and the resulting differences in social and physical environments may directly influence dementia risk among historically marginalized and socially disadvantaged racial and ethnic groups.[382-384] These influences can occur across the life course. For example, some studies indicate that early life experiences can have detrimental effects on the cognitive health of Black Americans in later life.[114, 385, 386, 388-390]

Furthermore, longstanding inequities contribute to racial and ethnic differences in a wide range of health outcomes including increased risk for chronic conditions that are themselves associated with higher dementia risk, such as cardiovascular disease[391-394] and diabetes.[395, 396] These

This report keeps the population identifiers used in source documents when describing findings from specific studies.

health conditions, which disproportionately affect non-Hispanic Black and Hispanic populations, are believed to explain much of the elevated risk of dementia among non-Hispanic Black and Hispanic populations.[84, 382, 397, 398] Many studies suggest that differences in dementia risk do not persist in rigorous analyses that account for health and socioeconomic factors.[38, 171, 378]

Many of the factors that influence the development of dementia could also influence whether and when a diagnosis of dementia occurs. There is evidence that missed or delayed diagnoses of Alzheimer's and other dementias are more common among Black and Hispanic older adults than among White older adultss.[291, 293, 296] Based on data from Medicare beneficiaries age 65 and older, it has been estimated that Alzheimer's or another dementia has been diagnosed in 10.3% of White older adults, 12.2% of Hispanic older adults and 13.8% of Black older adults.[399] Although the percentages among Black and Hispanic older adults indicate that the dementia burden is greater in these groups than in White older adults, these percentages should be even higher according to prevalence studies that detect all people who have dementia irrespective of their use of health care systems.

Population-based cohort studies of the prevalence and incidence of Alzheimer's and other dementias in racial and ethnic groups other than Hispanic, non-Hispanic Black, and non-Hispanic White populations are relatively sparse.[379] Among the few studies, one examined electronic medical records of members of a large health plan in California. Its findings indicated that dementia incidence — determined by the first instance of a dementia diagnosis in members' medical records — was highest among African American older adults (the term used in the study for those who self-reported as Black or African American); intermediate for Latino older adults (the term used in the study for those who self-reported as Latino or Hispanic), American Indian and Native Alaskan older adults, Pacific Islander older adults and White older adults; and lowest among Asian American older adults.[400] A follow-up study with the same cohort showed differences across Asian American subgroups, but all subgroups studied had lower dementia incidence than the White population.[401] A systematic review of the literature found that Japanese Americans were the only Asian American subgroup with reliable prevalence data, and that they had the lowest prevalence of dementia compared with all other ethnic groups.[376] The combination of people from distinct countries and regions of Asia may mask important socioeconomic, political and cultural influences on dementia.[402, 403] Similarly, findings about dementia from American Indian older adults from certain regions of the U.S. may not generalize to those from other regions.[404] We have limited understanding of Alzheimer's disease as experienced by people of Middle Eastern and North African descent.[405] More studies, especially those involving community-based cohorts, are necessary to draw conclusions about the prevalence of Alzheimer's and other dementias in different groups and subgroups.

Non-Hispanic White populations also experience differences in Alzheimer's prevalence, including differences based on rural versus urban residence.[406, 407] More research is needed to understand rural versus urban differences in the prevalence of Alzheimer's and other dementias.

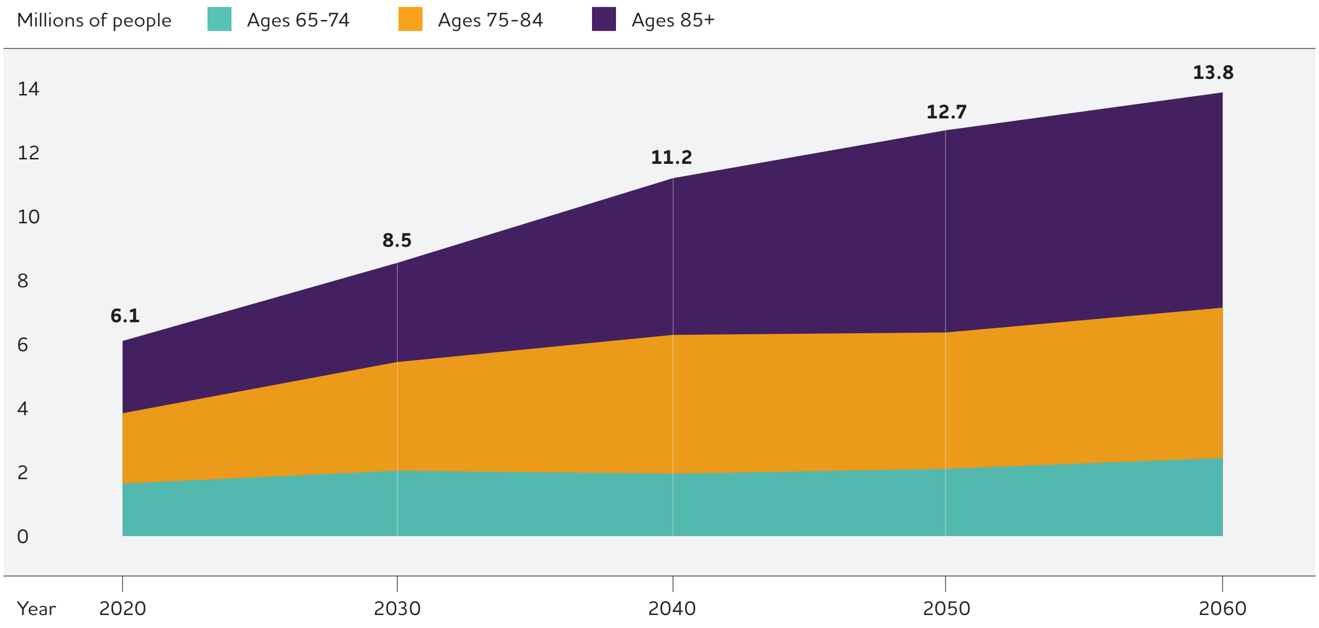
Risk for Alzheimer's and Other Dementias in Sexual and Gender Minority Groups

Other groups that may experience different risks of Alzheimer's and other dementias include sexual and gender minority (SGM) groups. SGM is a common term among scientific researchers that refers to individuals who identify as lesbian, gay, bisexual, queer (sexual minorities) and/or transgender or gender nonbinary and people with a gender identity, gender expression or reproductive development that varies from traditional, societal, cultural or physiological norms (gender minorities), commonly referred to as a whole as the LGBTQIA+ community.

SGM older adults may face an increased dementia risk through exposure to discrimination, disadvantage and/or exclusion from social organizations and enterprises. Those enterprises include Alzheimer's research, and, until recently, little has been known about the dementia risks of people who identify as SGM. Although few studies have been designed to investigate whether SGM older adults are at greater risk of dementia than non-SGM older adults, a growing body of preliminary evidence suggests that this may be the case. In a study of adults living in any of 25 U.S. states, SGM older adults reported experiencing more memory and thinking problems than non-SGM older adults.[408] Two population-based studies found higher rates of cognitive impairment among SGM older adults than among non-SGM older adults,[409, 410] although a third study reported that the risks for dementia and mild cognitive impairment were similar for people in same-sex relationships and people in another-sex relationships.[411] Two studies found indications of potentially elevated dementia risk among transgender adults. Studies of Medicare beneficiaries estimated that 18%-21% of transgender adults age 65 and older had dementia, compared with 12%-13% of adults age 65 and older who are not transgender.[412, 413] Another study reported that transgender adults were more likely to have a diagnosis of Alzheimer's and other dementias in their electronic medical records than older adults who are not transgender.[414] A recent review of the evidence found that most studies examining subjective

FIGURE **8**

Projected Number of People Age 65 and Older (Total and by Age) in the U.S. Population with Clinical Alzheimer's Dementia, 2020 to 2060



Created from data from Rajan et al.[A5,276]

cognitive decline as an outcome showed higher prevalence among SGM older adults, while those examining objective measures of cognitive performance showed more mixed results.[415] More research is necessary to establish whether SGM older adults face elevated dementia risk.

Researchers have begun to examine what experiences are common among SGM individuals that might place them at increased risk for Alzheimer's and other dementias later in life.[345] The stressors SGM adults often face could take a toll on their physical and mental health.[416] One study showed that SGM older adults who were experiencing depression were more likely to report subjective cognitive decline than SGM older adults without depression.[417] SGM adults experience disparities in other health-related factors that elevate the risk of Alzheimer's and other dementias, including higher rates of alcohol and tobacco use, obesity and other cardiovascular risk factors compared with non-SGM older adults.[418] SGM older adults also have lower rates of health care access and preventive health screenings, in part due to experiencing barriers such as discrimination and heterosexist attitudes in health care settings.[419] Finally, research has tied HIV/AIDS and its burden of illness, mortality and social stigma to the SGM population, particularly gay and bisexual men and transgender people. HIV/AIDS is now a chronic condition that can be managed successfully with medication, and many people with HIV/AIDS survive into older ages. In addition to any effects of this history on social stressors and health care access, HIV/AIDS itself can cause dementia.[420, 421]

Other areas of research examine the risk of subjective cognitive decline among transgender adults from different populations, the importance of delivering more effective and compassionate dementia care to a variety of populations, and the importance of considering the entirety of an individual's and a population's experience when addressing dementia risk.[422-425]

Trends in the Prevalence and Incidence of Clinical Alzheimer's Dementia Over Time

Several studies indicate that the prevalence (i.e., proportion) [296, 399-401, 426-429] and incidence[337, 427-436] of Alzheimer's and other dementias in the U.S. and other high income countries may have declined from the 1970s to 2018,[337, 348, 427-435, 437-441] though results are mixed.[66, 327, 442, 443] One systematic review found that the incidence of all-cause dementia decreased worldwide from 1977-2017 while incidence of clinical Alzheimer's dementia, specifically, has held steady. More research on this distinction is needed, especially in low- and middle-income countries.[444] Declines in dementia risk have been attributed to increasing levels of education and improved control of cardiovascular risk factors.[348, 430, 433, 437, 445, 446] Such findings are promising and suggest that identifying and reducing risk factors for dementia may be effective — whether interventions occur person by person (such as obtaining treatment for one's blood pressure) or are integrated into the fabric of communities (such as changes in education policies). Although these findings indicate that a person's risk of dementia at any given age may be decreasing slightly, the total number of people with Alzheimer's or other dementias in the U.S. and other high-income countries is expected to continue to increase dramatically because of the increase in the number of people at the oldest ages.

It is unclear whether these encouraging declines in incidence have persisted past 2018 and will continue into the future. For example, worldwide increases in diabetes and obesity, which are risk factors for dementia, among people younger than 65 may lead to an uptick in dementia risk in coming years.[428, 447-450] It is also not clear that the encouraging trends pertain to all racial and ethnic groups.[327, 371, 445, 446, 451, 452] Thus, while recent findings are promising, the social and economic burden of Alzheimer's and other dementias will continue to grow. Moreover, 68% of the projected increase in the global prevalence and burden of dementia by 2050 will take place in low- and middle-income countries, where current evidence does not support a downward trend in the risk of Alzheimer's and other dementias.[453]

Finally, it is not known how COVID-19 will influence the prevalence and incidence of clinical Alzheimer's dementia. For example, the neurologic effects of COVID-19[454] and the pandemic's disruptions to general and brain-related health care may increase the incidence of Alzheimer's and other dementias. Some researchers have surmised that factors such as social isolation from lockdowns, no-visitor policies in long-term care facilities, and increased intensive hospitalizations may raise dementia risk at the population level. However, research in coming years will be necessary to confirm this and examine whether the impact is time-limited or long term. On the other hand, the number of people living with clinical Alzheimer's dementia could be lessened by increased mortality due to COVID-19 in vulnerable older adults during the height of the pandemic.[455]

Looking to the Future

Continued Population Aging

By 2060, the segment of the U.S. population age 65 and older will have grown substantially, and the projected 89 million older Americans will make up 24% of the total population (up from 19% in 2025).[274] Additionally, the size of the older adult population is expected to continue to increase relative to the population age 64 and younger — a shift known as population aging — due to a projected decline in fertility, as well as to increased survival at older ages. Fertility, the average number of children per woman, has decreased since 1960 in the United States.[456] With fewer babies born each year, older adults will make up a larger proportion of the population. Because increasing age is the predominant risk factor for clinical Alzheimer's dementia, as the number and proportion of older Americans grows rapidly, so too will the numbers of new and existing cases of clinical Alzheimer's dementia, as shown in Figure 8.[A5, 276] By 2060, the number of people age 65 and older with clinical Alzheimer's dementia is projected to reach 13.8 million, barring the development of breakthroughs to prevent or cure Alzheimer's disease.[A5, 276]

Growth of the Age 85 and Older Population

The number of Americans aged 85 and older is expected to grow dramatically. This age group comprises 11% of the population age 65 and older in 2026 and is expected to comprise 21% of the population age 65 and older in 2060.[457] This will result in an additional 10 million people age 85 and older — individuals at the highest risk for developing clinical Alzheimer's dementia.[457] By 2060, 6.7 million people age 85 and older are expected to have clinical Alzheimer's dementia, accounting for about half (48%) of all people age 65 and older with clinical Alzheimer's dementia.[276]

Increased Diversity of Older Adults

The group of older adults who will be at risk for Alzheimer's in the coming years will be socially, culturally and economically different from previous groups of older U.S. adults. For example, between 2022 and 2040, projections for older adults show increases in the African American population of 57%, in the American Indian and Alaska Native population of 39%, in the Asian American population of 76% and in the Hispanic population of 118% compared with an increase of 19% in the White population.[458] As reported above, most of these racial/ethnic groups are at higher risk for dementia than the White population.

In addition, in the coming years women age 65 and older will be among the first generations of women to have widely worked outside the home, and they will have more years of formal education than previous generations of women.[459] In parallel these generations of women came of age during a decrease in the birth rate, resulting in smaller family size.[460] Whether and how these social and economic experiences influence women's risk of and resilience to Alzheimer's and other dementias will become clearer in the decades ahead.

Since the 1970s, the gaps in income and net wealth, the value of an owned home, retirement accounts, and pensions minus debt in the U.S. have been widening between lower-income, middle-income and upper-income households.[461, 462] This means that those age 65 and older experienced their adulthood during this trend, which may have influenced health and health behaviors prior to age 65. In older adulthood, income and net wealth inequality may have implications for health care, health behaviors and social determinants of health that influence Alzheimer's risk, particularly in low-income households.

It is unclear what effect the different life experiences of future older adult populations will have on dementia incidence and prevalence, both at the population level and within racial/ethnic, socioeconomic, and sex and gender groups. A birth cohort perspective, considers how a certain group of people has passed through different life stages in particular years. Because of the diverse cultural, economic, and health experiences across the 20th century and subpopulations in the U.S. this perspective will be increasingly important for identifying groups of people at highest risk for dementia in the coming decades.[436, 463, 464]

MORTALITY AND MORBIDITY

AMONG PEOPLE AGE 70, 61% OF THOSE WITH ALZHEIMER'S DEMENTIA ARE EXPECTED TO DIE BEFORE AGE 80 COMPARED WITH 30% OF PEOPLE WITHOUT ALZHEIMER'S DEMENTIA.

Alzheimer's disease was officially listed as the sixth-leading cause of death in the United States in 2024.[465] Alzheimer's disease was the fifth-leading cause of death among individuals age 65 and older in 2024.[465]

Alzheimer's disease may cause even more deaths than official sources recognize. It is also a leading cause of disability and poor health (morbidity) in older adults.[466] Before a person with Alzheimer's dies, they are likely to live through years of morbidity as the disease progresses.

Deaths from Alzheimer's Disease

The data presented in this section are through 2024, the latest year for which finalized death data from the CDC are available, which states that 116,022 people died from Alzheimer's disease in 2024.[465] The number and rate of deaths from Alzheimer's disease in the United States has trended upward since 2000 (49,558 deaths). However, Alzheimer's deaths surged in 2020 due to the COVID-19 pandemic: the number of deaths from Alzheimer's disease recorded on death certificates increased 10% from 2019 to a peak of 134,242 deaths in 2020. During the height of the pandemic, excess mortality (the difference between the expected and observed numbers of deaths in a time period) from any cause was very high, especially among older adults.[467] Many of these excess deaths were in older adults with Alzheimer's disease and other dementias, conditions that increased vulnerability to and the risk of dying from COVID-19. In 2024, the number and rate of deaths from Alzheimer's disease decreased to pre-pandemic numbers.

In this section, "deaths from Alzheimer's disease" refers to what is officially reported on death certificates. Note that while death certificates use the term "Alzheimer's disease," the determination is made based on clinical symptoms in almost every case, and thus more closely aligns with "Alzheimer's dementia" as we have defined it in the Prevalence section of this report; to remain consistent with the U.S. Centers for Disease Control and Prevention (CDC) terminology for causes of death, we use the term "Alzheimer's disease" for this section when referring to officially reported statistics gleaned from death certificates.

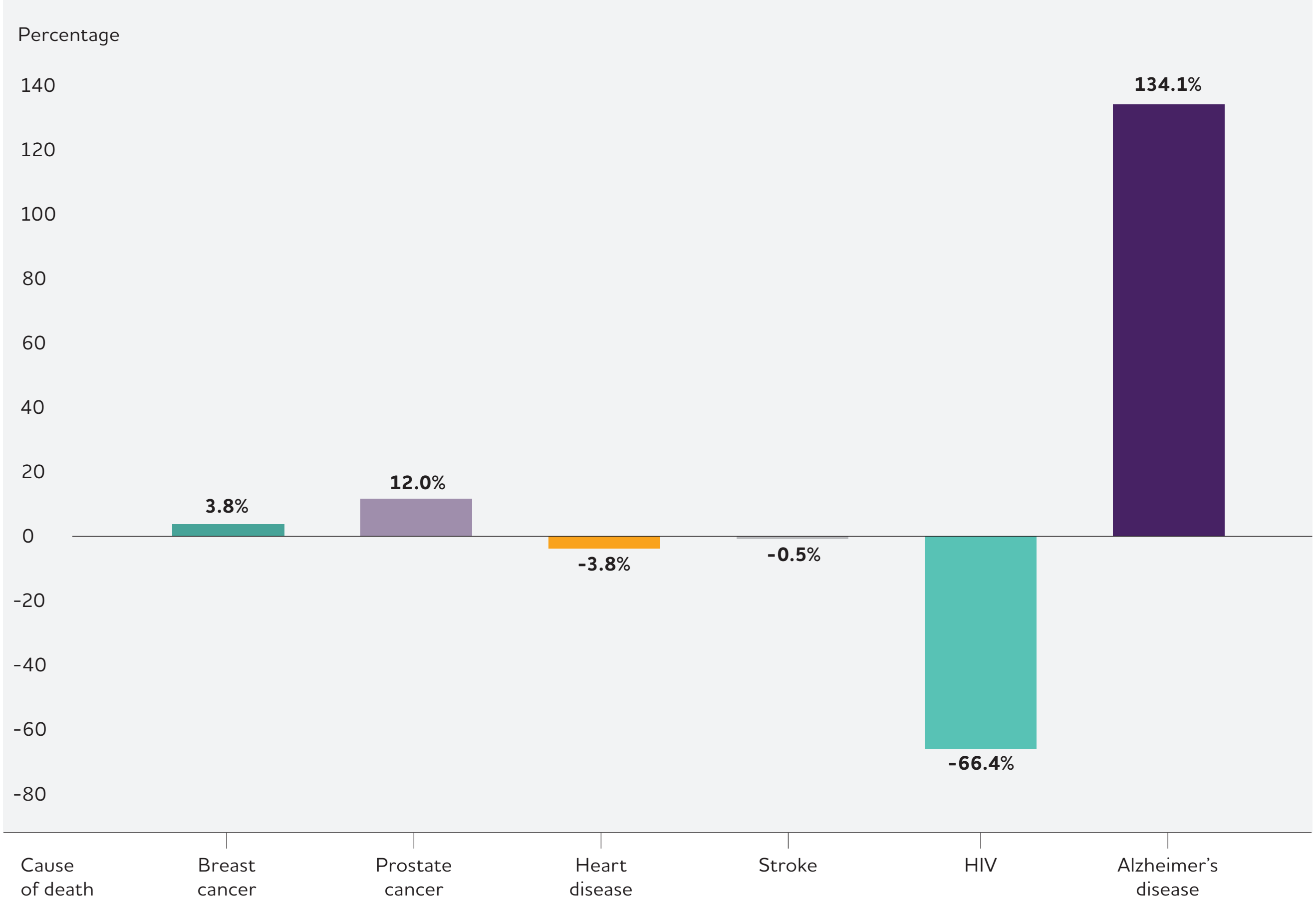
The number of deaths from dementia of any type is much higher than the number of reported Alzheimer's deaths. In 2024, some form of dementia was the officially recorded underlying cause of death for 303,984 individuals (this includes the number who died from Alzheimer's disease.[465] This is more than twice the number of reported Alzheimer's deaths, specifically.

It is difficult to determine how many deaths are caused by Alzheimer's disease each year because of the way causes of death are recorded. The CDC considers a person to have died from Alzheimer's if the death certificate lists Alzheimer's as the underlying cause of death, defined as "the disease or injury which initiated the train of events leading directly to death."[468] Severe dementia frequently causes complications such as immobility, swallowing disorders and malnutrition that significantly increase the risk of acute conditions that can cause death. One such condition is pneumonia (infection of the lungs), which is the most commonly identified immediate cause of death among older adults with Alzheimer's or other dementias.[469-471] One pre-COVID-19 autopsy study found that respiratory system diseases were the immediate cause of death in more than half of people with Alzheimer's dementia, followed by circulatory system disease in about a quarter.[469] Death certificates of individuals with Alzheimer's often list acute conditions such as pneumonia as the primary cause of death rather than Alzheimer's.[469, 470] As a result, people with Alzheimer's dementia who die due to these acute conditions may not be counted among the number of people who die from Alzheimer's disease, even though Alzheimer's disease may well have caused the acute condition listed on the death certificate. This difficulty in using death certificates to determine the number of deaths from Alzheimer's and other dementias has been referred to as a "blurred distinction between death *with* dementia and death *from* dementia."[472]

Another way to determine the number of deaths from Alzheimer's dementia is through calculations that compare the estimated risk of death in those who have Alzheimer's dementia with the estimated risk of death in those who do not have Alzheimer's dementia. A study using data from the Rush Memory and Aging Project and the Religious Orders Study estimated that 500,000 deaths among people age 75 and older in the United States in 2010 could be attributed to Alzheimer's dementia (estimates for people age 65 to 74 were not available), meaning that those deaths would not be expected to occur in that year if the individuals did not have Alzheimer's dementia.[473] A more recent study using data from the nationally representative Health and Retirement Study estimated that about 14% of deaths among Americans age 70 and older from 2000 to 2009 were attributable to dementia; however, only 5% of death certificates listed dementia as the underlying cause of death for this age group, suggesting underreporting on death certificates.[474] According to 2019 Medicare claims data, about one-third of all Medicare beneficiaries who died in that year had been diagnosed with Alzheimer's or another dementia.[475] Based on data from the Chicago Health and Aging Project, in 2020 an estimated 700,000 people age 65 and older in the United States had Alzheimer's dementia at death.[476] Although some undoubtedly died from causes other than Alzheimer's, it is likely that many died from Alzheimer's disease itself or from conditions for which Alzheimer's was a contributing

FIGURE **9**

Percentage Changes in Select Causes of Death (All Ages) Between 2000 and 2024



Created from data from the National Center for Health Statistics.[465, 479]

cause, such as pneumonia. In terms of the proportion of people who die with dementia of any cause, an analysis of data from the Health and Retirement Study found that of participants who died at age 70 and older, 41% had dementia six months before death, and 20% had dementia five years before death.[477]

Adding further complexity, the vast majority of death certificates listing Alzheimer's disease as an underlying cause of death are not verified by autopsy, and research has shown that 15% to 30% of those diagnosed with Alzheimer's dementia during life do not have the brain changes of Alzheimer's disease but instead have the brain changes of another cause of dementia (see Table 1).[18, 75, 279-281] Therefore, an underlying cause of death listed as Alzheimer's disease may not be accurate. Irrespective of the cause of death, among people age 70, 61% of those with Alzheimer's dementia are expected to die before age 80 compared with 30% of people without Alzheimer's dementia.[478]

Public Health Impact of Deaths from Alzheimer's Disease

Although the number of deaths from other major causes *decreased* significantly or remained approximately the same in the past two decades, official records indicate that deaths from Alzheimer's disease *increased* significantly. Between 2000 and 2024, the number of deaths from Alzheimer's disease as recorded on death certificates more than doubled, increasing 134.1%, while the number of deaths from the number-one cause of death (heart disease) decreased 3.8% (Figure 9).[465, 479] The increase in the number of death certificates listing Alzheimer's as the underlying cause of death probably

This report keeps the population identifiers used in source documents when describing findings from specific studies.

TABLE 6

Number of Deaths and Annual Mortality Rate (per 100,000 People) From Alzheimer's Disease by State, 2024

State	Number of Deaths	Mortality Rate
Alabama	2,381	46.2
Alaska	134	18.1
Arizona	2,678	35.3
Arkansas	1,435	46.5
California	16,286	41.3
Colorado	1,851	31.1
Connecticut	1,041	28.3
Delaware	320	30.4
District of Columbia	76	10.8
Florida	6,115	26.2
Georgia	4,200	37.6
Hawaii	509	35.2
Idaho	853	42.6
Illinois	3,607	28.4
Indiana	2,262	32.7
Iowa	1,328	41.0
Kansas	840	28.3
Kentucky	1,551	33.8
Louisiana	2,044	44.5
Maine	562	40.0
Maryland	1,244	19.9
Massachusetts	1,834	25.7
Michigan	4,404	43.4
Minnesota	2,459	42.4
Mississippi	1,664	56.5
Missouri	2,690	43.1
Montana	367	32.3
Nebraska	687	34.3
Nevada	903	27.6
New Hampshire	514	36.5
New Jersey	2,291	24.1
New Mexico	642	30.1
New York	3,208	16.1
North Carolina	4,031	36.5
North Dakota	375	47.1
Ohio	4,966	41.8
Oklahoma	1,601	39.1
Oregon	1,837	43.0
Pennsylvania	3,832	29.3
Rhode Island	457	41.1
South Carolina	2,347	42.8
South Dakota	505	54.6
Tennessee	2,925	40.5
Texas	9,887	31.6
Utah	1,028	29.3
Vermont	322	49.7
Virginia	2,580	29.3
Washington	3,311	41.6
West Virginia	585	33.1
Wisconsin	2,255	37.8
Wyoming	198	33.7
Total	**116,022**	**34.1**

Created from data from the National Center for Health Statistics.[A6, 465] reflects two trends: first, Alzheimer's has become a more common cause of death as the population ages, and second, over time, physicians, coroners and others who assign causes of death may be increasingly likely to report Alzheimer's on death certificates.[480]

State-by-State Deaths from Alzheimer's

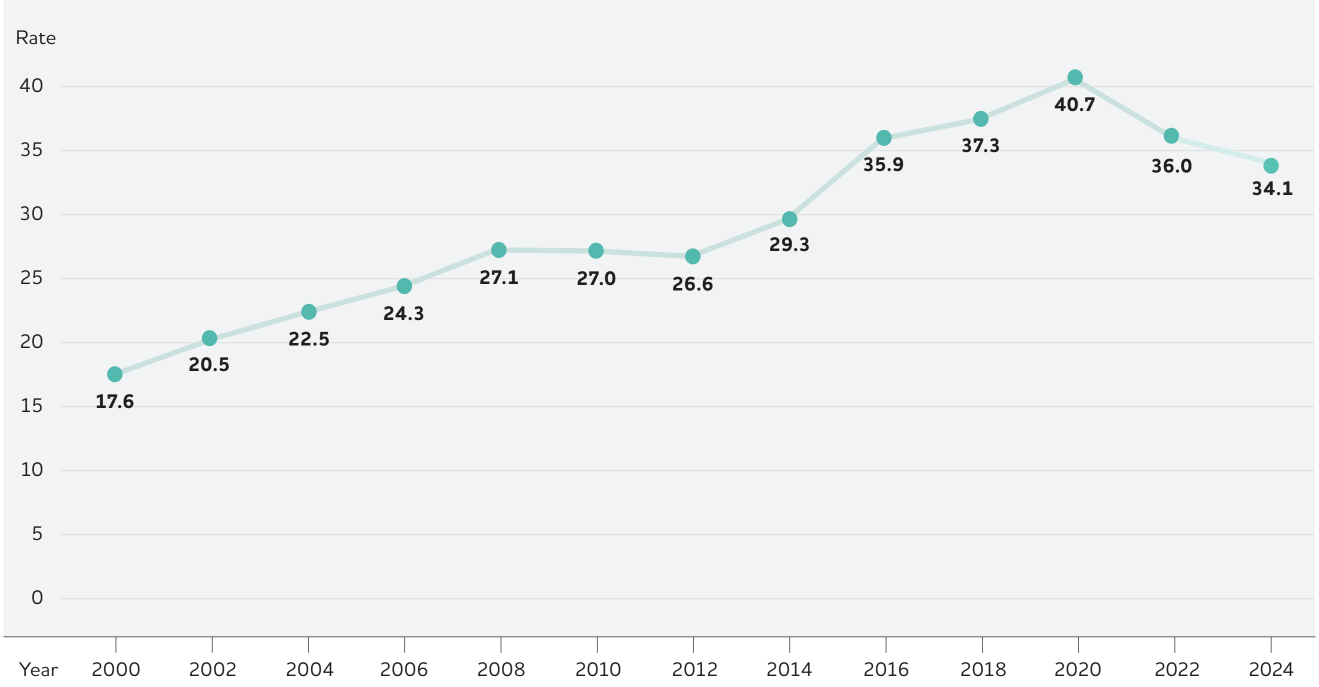
Table 6 provides information on the number of deaths due to Alzheimer's by state in 2024, the most recent year for which state-by-state data are available. This information was obtained from death certificates and reflects the condition identified by the physician or other medical personnel who filled out the death certificate. The table also provides annual mortality rates by state, computed with the death certificate data, to compare the risk of death from Alzheimer's disease across states with varying population sizes. For the United States as a whole, in 2024, the mortality rate for Alzheimer's disease was 34.1 deaths per 100,000 people.[A6, 465]

Alzheimer's Death Rates

As shown in Figure 10, the annual rate of deaths from Alzheimer's — that is, the number of Alzheimer's deaths per 100,000 people in the population — has risen substantially since 2000.[465] Table 7 shows that the annual rate of death from Alzheimer's increases dramatically with age, especially after age 65.[A6, 465] The increase in the Alzheimer's death rate over time has disproportionately affected people age 85 and older.[479] Between 2000 and 2023, the death rate from Alzheimer's increased 37% for people age 65 to 74, 38% for people age 75 to 84 and 65% for people age 85 and older.[465] A report by the CDC determined that even after adjusting for changes over time in the specific ages of people within these age groups, the annual Alzheimer's death rate in the U.S. increased substantially between 1999 and 2014.[480] Therefore, the advancing average age of the older adult population in the U.S. is not the only explanation for the increase in Alzheimer's death rates. Other possible reasons include fewer deaths from other common causes of death in older adults such as heart disease and stroke; increased clinical recognition and formal diagnosis of Alzheimer's dementia; and increased reporting of Alzheimer's as a cause of death by physicians and others who complete death certificates.[480] However, as can be seen in Figure 10, the rate of deaths from Alzheimer's surged in the year 2020 due to the COVID-19 pandemic, but has since decreased. In fact the rate in 2024 is closer to the rate in 2015. Data from years after 2024 will help determine if this decrease in rate of deaths is part of a trend that has continued or reflects that the COVID-19 pandemic was especially deathly to the most vulnerable among those with Alzheimer's.

FIGURE 10

U.S. Annual Alzheimer's Death Rate (per 100,000 People) by Year



Created from data from the National Center for Health Statistics.[465]

TABLE **7**

U.S. Annual Alzheimer's Death Rates (per 100,000 People) by Age and Year

Age	2000	2002	2004	2006	2008	2010	2012	2014	2016	2018	2020	2022	2024
45-54	0.2	0.1	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.3	0.2	0.3	0.3
55-64	2.0	1.9	1.8	2.1	2.2	2.1	2.2	2.1	2.7	2.9	3.3	3.5	3.3
65-74	18.7	19.6	19.5	19.9	21.1	19.8	17.9	19.6	23.6	24.7	28.6	26.7	26.3
75-84	139.6	157.7	168.5	175.0	192.5	184.5	175.4	185.6	214.1	213.9	229.3	206.2	193.6
85+	667.7	790.9	875.3	923.4	1,002.2	987.1	936.1	1,006.8	1,216.9	1,225.3	1,287.3	1,131.5	1,101.8

Created from data from the National Center for Health Statistics.[465]

Duration of Illness from Diagnosis to Death and Time Spent in Nursing Homes

Studies indicate that people age 65 and older survive an average of four to eight years after a diagnosis of Alzheimer's dementia, yet some live as long as 20 years with Alzheimer's dementia.[3-11] This reflects the slow, insidious and uncertain progression of Alzheimer's. A person who lives from age 70 to age 80 with Alzheimer's dementia will spend an average of 40% of this time in the severe stage.[478] Much of this time will be spent in a nursing home (see the Use and Costs of Health Care, Long-Term Care and Hospice section). At age 80, approximately 75% of people with Alzheimer's dementia live in a nursing home compared with only 4% of the general population age 80.[478] In all, an estimated two-thirds of those who die from dementia do so in nursing homes, compared with 20% of older adults with cancer and 28% of older adults dying from all other conditions.[481]

The Burden of Alzheimer's Disease

The long duration of illness before death contributes significantly to the public health impact of Alzheimer's disease because much of that time is spent in a state of severe disability and dependence. Scientists have developed measures that compare the burden of different diseases on a population in a way that takes into account not only the number of people with the condition, but also the number of years of life lost due to that disease and the number of healthy years of life lost by virtue of being in a state of disability. One measure of disease burden is called disability-adjusted life years (DALYs), which is a combination of the number of years of life lost (YLLs) due to premature mortality and the number of years lived with disability (YLDs), totaled across all those with the disease or injury. These measures indicate that Alzheimer's is a very burdensome disease, not only to the individuals with the disease, but also to their families, unpaid caregivers and communities at large. In recent years, the burden of Alzheimer's has increased more dramatically in the United States than the burden of other diseases. According to the most recent Global Burden of Disease classification system in 2021, in the United States, Alzheimer's disease and other dementias were the 17th leading disease or injury cause of DALYs overall [482] and the leading disease or injury cause for the age group ≥ 80 years.[483] Alzheimer's disease and other dementias contributed 30% more to DALYs in women compared to men.[483]

It is difficult to measure disability at the population level for a number of reasons. The Alzheimer's burden estimates use different sources for each state in a given year, and data sources for states may differ over the years.[484] Estimates do not account for the context in which disability is experienced, including social support, attitudes, and economic and social resources, which may vary widely both across and within geographic location.[485-487] Estimates may not fully account for variation in disability levels between individuals and along the stages of Alzheimer's dementia. These variations in data sources and measurement of disability may limit the value of these metrics and the comparability of estimates across states and years.

Looking to the Future

Taken together, these statistics indicate that not only is Alzheimer's disease responsible for the deaths of more and more Americans, but also that Alzheimer's and other dementias are contributing to more and more cases of poor health and disability in the U.S. With the population aging, the percentage of deaths from Alzheimer's and other dementias will likely continue to increase. The health and well-being of people with Alzheimer's and other dementias should continue to be prioritized. Thus, it will remain important to develop a comprehensive understanding of how Alzheimer's and other dementias contribute to poor health, disability and mortality. That understanding requires innovative research methods that are more inclusive and that fully capture the lived experience of disability of people living with dementia and of their families and caregivers.

CAREGIVING

NEARLY 13 MILLION AMERICANS PROVIDE UNPAID CARE FOR A FAMILY MEMBER OR FRIEND WITH DEMENTIA, A CONTRIBUTION TO THE NATION VALUED AT MORE THAN $446 BILLION.

Caregiving refers to attending to another person's health needs and well-being. When supporting a person living with Alzheimer's dementia, various types of care are often provided, including help with one or more activities of daily living (ADLs), such as bathing and dressing, as well as multiple instrumental activities of daily living (IADLs), such as paying bills, shopping and using transportation.[488-490] Caregivers also provide emotional support to people with Alzheimer's dementia, help them manage health conditions, and communicate and coordinate care with other family members and health care providers (see Table 8).

In addition to providing descriptive information about caregivers of people with Alzheimer's or other dementias, this section characterizes caregivers of people with dementia in comparison with either caregivers of people with other medical conditions or, if that comparison is not available, with people who are not caregivers (referred to here as non-caregivers).

Unpaid Caregivers

Eighty-three percent of the hours of help provided to older adults with or without dementia in the United States comes from family members, friends or other caregivers, who are often unpaid.[491] Nearly half of all caregivers (48%) who provide help to older adults do so for someone with Alzheimer's or another dementia. A little over a quarter of all households and immediate families in the U.S. include someone living with dementia; of extended families with at least one older adult, close to 40% include an individual living with dementia.[492] More than 12 million Americans provide care for people with Alzheimer's or other dementias.[A7] Table 9 provides details about caregivers.

Among the reasons shared by caregivers for providing assistance to a person with Alzheimer's or another dementia are the desire to keep a family member or friend at home (65%), close proximity to the person with dementia (48%), and the caregiver's perceived obligation to the person with dementia (38%).[A10] In addition, caregivers often indicate love and a sense of duty when describing what motivates them to assume care responsibilities for a relative or friend living with dementia.[493]

TABLE **8**

Dementia Caregiving Tasks

- Helping with instrumental activities of daily living (IADLs), such as household chores, shopping, preparing meals, providing transportation, arranging for doctor's appointments, managing finances and legal affairs, and answering the telephone.
- Helping the person take medications correctly, either via reminders or direct administration of medications.
- Helping the person adhere to treatment recommendations for dementia or other medical conditions.
- Assisting with personal activities of daily living (ADLs), such as bathing, dressing, grooming and feeding and helping the person walk, transfer from bed to chair, use the toilet and manage incontinence.
- Managing behavioral symptoms of the disease such as wandering, depressive mood, agitation, anxiety, repetitive activity and nighttime disturbances.
- Finding and using support services such as support groups and adult day service programs.
- Making arrangements for paid in-home, nursing home or assisted living care.
- Hiring and supervising others who provide care.
- Assuming additional responsibilities that are not necessarily specific tasks, such as:
  - Providing overall management of getting through the day.
  - Addressing family issues related to caring for a relative with Alzheimer's dementia, including communication with other family members about care plans, decision-making and arrangements for respite for the main caregiver.
  - Managing other health conditions (i.e., "comorbidities"), such as arthritis, diabetes or cancer.
  - Providing emotional support and a sense of security.

One-third of people living with dementia have received help from family members at least two years prior to a positive dementia screen from a health care provider.[494] Individuals in the community living with dementia are more likely than older adults without dementia to rely on multiple unpaid caregivers (often family members); 30% of older adults living with dementia rely on three or more unpaid caregivers, whereas 23% of older adults without dementia do so.[495] Only a small percentage (8%) of older adults living with dementia do not receive help from family members or other unpaid care providers. Of these individuals, nearly half live alone, perhaps making it less likely that they have sources of support available to them.[495] Among Medicare home-health care beneficiaries

TABLE 9

Who Are Dementia Caregivers?

Sex/gender	• Approximately two-thirds of dementia caregivers are women.[A10, 502, 503]
Race/ethnicity	• Two-thirds of caregivers are White,[A10, 503, 504] 10% are Black, 8% are Hispanic, and 5% are Asian American.[A10] The remaining 10% represent a variety of other populations.
Living status	• Most caregivers (66%) live with the person with dementia in the community.[495] • Over 60% of caregivers are married, living with a partner or in a long-term relationship.[A10, 503] • Approximately one-quarter of dementia caregivers are "sandwich generation" caregivers — meaning that they care not only for an aging parent but also for at least one child.[A10, 504, 505]
Caring for parents	• Over half of caregivers are providing assistance to a parent or in-law with dementia.[504] • Among primary caregivers (individuals who indicate having the most responsibility for helping their relatives) of people with dementia, over half take care of their parents.[506-508]
Income	• Forty-one percent of caregivers have a household income of $50,000 or less.[A10]
Education	• Approximately 40% of dementia caregivers have a college degree or more of education.[A10, 503, 504]
Age	• About 30% of caregivers are age 65 or older.[A10] • Twenty-three percent of caregivers ages 18 to 49 help someone with dementia, which is an increase of 7% between 2015 and 2021.[509]
Caring for spouse	• Approximately 10% of caregivers provide help to a spouse with Alzheimer's disease or another dementia.[504]

living with dementia, the lack of an available caregiver is associated with depression and a higher likelihood of being a Medicaid beneficiary.[496]

Living alone with dementia may be a particular challenge for certain subgroups, such as sexual and gender minority (SGM) individuals, who may experience greater isolation due to social stigma, a diminished social network of available family or friend caregivers, and other adverse emotional, psychological, and health outcomes.[497-501]

Caregiving and Women

The responsibilities of caring for someone living with dementia are often assumed by women. Approximately two-thirds of dementia caregivers are women.[A10, 502, 503, 508] In the U.S., more caregivers who help someone with a memory problem are female than are male (36 percent vs. 32 percent, respectively).[510] Findings from the 2018 National Health and Wellness survey indicated that more dementia caregivers in the United States are women (61.5%) than in Japan (51.9%) or five European countries/regions (56.3%: France, Germany, the United Kingdom, Italy and Spain).[511] Over one-third of dementia caregivers in the United States are daughters caring for a parent.[491, 495] It is more common for wives to provide informal care for a husband than vice versa.[512] On average, female caregivers spend more time caregiving than male caregivers.[495] The 2021-2022 Behavioral Risk Factor Surveillance System surveys found that of all dementia caregivers who spend more than 40 hours per week providing care, 70% were women.[505] Two and a half times as many women as men reported living with the person with dementia full time.[513] Of those providing care to someone living with dementia for more than five years, 64% were women.[505] Similarly, caregivers who are women may experience slightly higher levels of burden, impaired mood, depression and impaired health than do caregivers who are men, with evidence suggesting that these differences arise because female caregivers tend to spend more time caregiving, assume more caregiving tasks, and care for someone with more cognitive, functional and/or behavioral problems.[514-516]

Race, Ethnicity and Dementia Caregiving

Close to half of Black and Hispanic individuals living with dementia reside with adult children (47.1%), compared with less than a quarter of White individuals living with dementia (24.6%).[517] Although Black individuals have more kin (children, grandchildren and other family members) available as potential caregivers than do their White counterparts, Black individuals are also more likely to have more kin with dementia than do White individuals.[518] Indeed, when compared with White caregivers, Black caregivers are more likely to provide more than 40 hours of care per week (54.3% versus 38.6%) and are more likely to care for someone with dementia (31.7% versus 11.9%). Black caregivers of people living with dementia are also more likely to provide help with ADLs than White caregivers of people living with or without dementia.[519, 520] Hispanic individuals living with dementia receive, on average, 35.8 hours of informal care each week, compared with 30.1 hours for Black individuals living with dementia and 20.1 hours for White individuals living with dementia.

Black male dementia caregivers are 3.3 times more likely to experience financial burdens than are White male or female dementia caregivers.[521] White dementia caregivers report less severity of cognitive and functional decline in care recipients when compared with caregivers in all other race/ethnic groups, indicating potentially more extensive dementia care demands for non-White caregivers.[522] Hispanic, Black and Asian American dementia caregivers indicate greater care demands, less outside help/formal service use and more depressive symptoms compared with White caregivers.[523-526] Unlike White individuals, Black and Hispanic individuals who assume dementia care responsibilities are in poorer health than non-caregivers.[527] In addition, the stress of caregiving may exacerbate adverse health conditions.[528] Among Hispanic and non-White dementia caregivers, support service use (e.g., respite, support groups) was higher in metropolitan (35%) than in non-metropolitan (15%) communities.[529, 530]

Black caregivers are more likely than White caregivers to report positive aspects of caregiving.[519] A meta-analysis found that Black dementia caregivers indicate slightly higher psychological well-being than White dementia caregivers. Hispanic dementia caregivers, however, report slightly lower physical well-being than White dementia caregivers.[531] Support from family and friends is associated with better self-rated health among Black dementia caregivers but not among White or Hispanic caregivers.[524] A more positive perceived relationship between the caregiver and person with dementia is associated with better self-rated health among Black and White caregivers.[524, 532]

There is a pronounced need for culturally informed theories, research frameworks and services for people living with dementia and their caregivers.[533-540] Cultural values (e.g., *familismo*: the Latino cultural value of placing family needs and loyalty to one's family above one's own needs) may influence disparities in perceptions and use of support among caregivers across diverse racial and ethnic contexts.[541, 542] Health care providers and systems may operate with the expectation that Latino dementia caregivers obtain the support they need from their families. These expectations can fuel the underuse of needed services by these caregivers due to culturally incongruent expectations on the part of health care systems and providers that assume that families are the predominant/only support network for Latino individuals living with dementia.[543] Black dementia caregivers' needs include more information about dementia treatment, diagnosis and care strategies; more support when navigating the health care system; improved access to affordable transportation and health care services; more information about navigating family conflict; increased availability of respite support; better communication about dementia within the Black community; and increased availability of financial/legal planning.[525, 544-546] Also, there is increasing recognition that historically marginalized groups — whether defined by gender, sexual orientation, race, ethnicity or other traits — are not monolithic when it comes to their identities and experiences.

Recent reviews and national summits have emphasized the need to revise recruitment strategies of people living with dementia and their caregivers in research studies to capture the range of dementia care experiences among diverse populations.[523, 547] This will help ensure that all caregivers receive the benefits of potential prevention, treatment and care innovations.[523, 524, 548] In addition, establishing stronger relationships with existing organizations and resources in Black, Indigenous and other communities offers the potential for research-based partnerships to enhance representation in dementia care research and result in more culturally appropriate and effective services.[534, 543, 549-560]

Caregiving Tasks

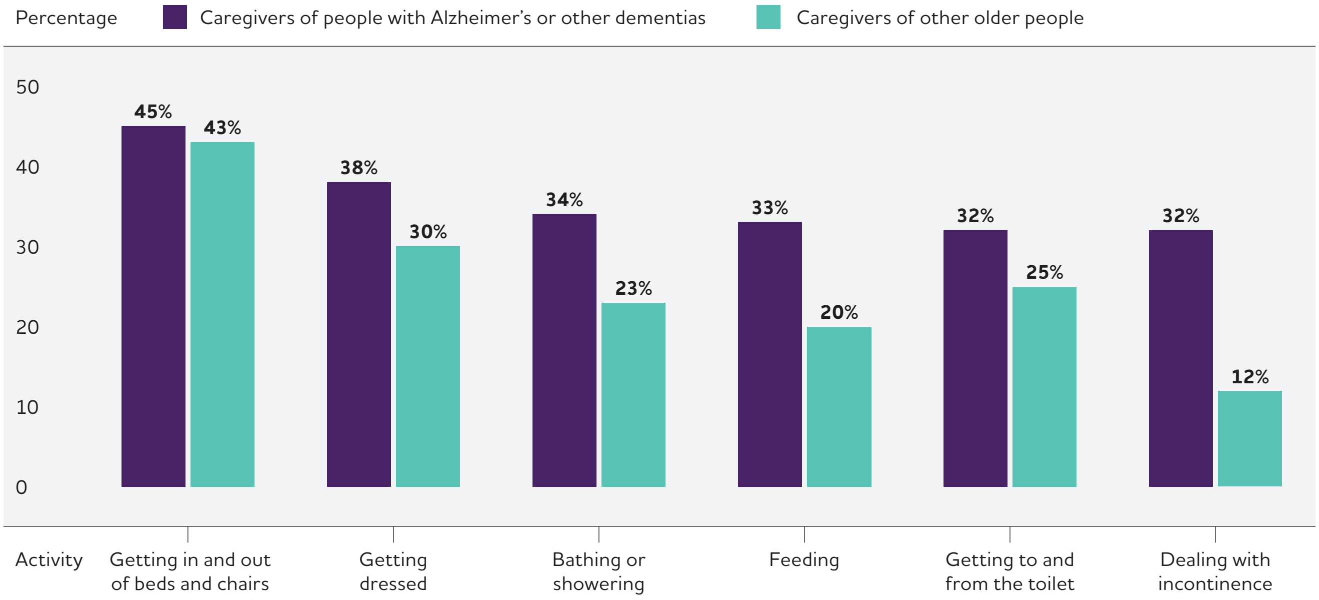
The care provided to people with Alzheimer's or other dementias is wide-ranging and in some instances all-encompassing. Table 8 summarizes some of the most common types of dementia care provided.

Although the care provided by family members of people living with Alzheimer's or other dementias can be similar to that provided by caregivers of people with other conditions, dementia caregivers tend to provide more extensive assistance.[561] Family caregivers of people living with dementia are more likely to monitor the health of the care recipient than are caregivers of people without dementia (79% versus 66%).[562] Data from the National Health and Aging Trends Study indicated that caregivers of people living with dementia are more likely than caregivers of people without dementia to provide help with self-care and mobility (85% versus 71%) and health or medical care (63% versus 52%).[502, 563] Unmet care needs, where an adverse consequence is reported as a result of not having someone available to help, are more common in people living with dementia (43 percent) than those without dementia (24 percent).[564] People living with dementia rely on an average of 2.5 caregivers to manage their medications.[565]

This report keeps the population identifiers used in source documents when describing findings from specific studies.

FIGURE **11**

Proportion of Caregivers of People with Alzheimer's or Other Dementias Versus Caregivers of Other Older People Who Provide Help with Specific Activities of Daily Living, United States, 2015



Created from data from the National Alliance for Caregiving in Partnership with the Alzheimer's Association.[504]

Figure 11 illustrates how caregivers of people living with dementia are more likely than caregivers of other older people to assist with ADLs.[504]

People living with dementia tend to have larger networks of family and friends involved in their care compared with people without dementia. More family members and friends in dementia care networks tend to provide help with household activities, mobility and functional needs, and transportation than family members and friends in non-dementia care networks.[566] Older adults living with dementia are also more likely to rely on a combination of paid help and assistance from family and friend caregivers than older adults without dementia.[567]

When a person living with Alzheimer's or another dementia moves to an assisted living residence or a nursing home, caregiving typically does not stop. The help provided by family caregivers usually changes from the comprehensive care summarized in Table 8 to providing emotional support, interacting with residential care staff and advocating for appropriate care. However, some family caregivers continue to help with bathing, dressing and other ADLs.[568, 569]

Duration and Hours of Caregiving

One national poll found that 86% of dementia caregivers provided assistance for at least the past year.[A10] According to another study, well over half (57%) of family caregivers of people living with Alzheimer's or other dementias in the community had provided care for four or more years.[495]

Apart from its long duration, caregiving involves time-intensive demands. Caregivers of people living with dementia report providing 27 hours more care per month on average (92 hours versus 65 hours) than caregivers of people without dementia.[502] An analysis of national caregiving trends from 1999 to 2015 found that among dementia caregivers the average hours of care per week *increased* from 45 in 1999 to 48 in 2015; among non-dementia caregivers, weekly hours of care *decreased* from 34 to 24.[570] The amount of time required for caregiving increases as dementia progresses; one study showed that people with dementia required 151 hours of caregiving per month at the outset of dementia and this increased to 283 hours per month eight years later. This is an increase from approximately 5 hours a day to 9 hours a day (it is important to note that some family members/caregivers provide assistance to someone due to cognitive issues

TABLE **10**

Number of Caregivers of People with Alzheimer's or Other Dementias, Hours of Unpaid Care and Economic Value of Unpaid Care by State, 2025*

State	Number of Caregivers (in thousands)	Hours of Unpaid Care (in millions)	Value of Unpaid Care (in millions of dollars)
Alabama	222	396	$6,391
Alaska	25	40	929
Arizona	242	379	9,700
Arkansas	175	268	4,957
California	1,403	1,904	53,229
Colorado	211	336	9,613
Connecticut	197	241	6,255
Delaware	37	67	1,649
District of Columbia	15	15	405
Florida	877	1,378	30,319
Georgia	391	789	14,303
Hawaii	62	111	3,275
Idaho	74	118	2,432
Illinois	465	668	16,690
Indiana	221	329	6,622
Iowa	80	118	2,730
Kansas	141	172	3,377
Kentucky	190	323	6,654
Louisiana	221	366	5,353
Maine	66	103	2,993
Maryland	260	294	7,347
Massachusetts	220	254	6,723
Michigan	422	682	16,280
Minnesota	168	231	6,280
Mississippi	109	168	2,701
Missouri	227	357	8,558
Montana	18	26	$652
Nebraska	42	63	1,617
Nevada	137	226	5,651
New Hampshire	57	66	1,518
New Jersey	283	512	13,561
New Mexico	68	119	2,387
New York	776	1299	33,771
North Carolina	338	446	8,300
North Dakota	19	26	609
Ohio	490	705	15,506
Oklahoma	135	226	4,776
Oregon	188	291	8,001
Pennsylvania	472	835	17,213
Rhode Island	37	53	1,525
South Carolina	229	377	7,029
South Dakota	29	33	910
Tennessee	393	686	13,121
Texas	1,287	1913	35,637
Utah	118	150	3,383
Vermont	20	29	836
Virginia	333	561	12,835
Washington	257	393	11,632
West Virginia	65	116	2,181
Wisconsin	206	322	7,292
Wyoming	19	30	601
U.S. Total	**12,734**	**19,608**	**446,312**

*State totals do not add to the U.S. totals due to rounding.

Created from data from the 2016, 2020, 2021, 2022, 2023, and 2024 Behavioral Risk Factor Surveillance System survey, U.S. Census Bureau, National Alliance for Caregiving, AARP, U.S. Department of Labor and Genworth.[A7,A8,A9] before a formal diagnosis of Alzheimer's disease or a related dementia).[571, 572] Each instance of a decrease in ADL or IADL function in someone living with dementia results in nearly five more hours of monthly caregiving compared with a similar functional decrease for someone without dementia.[573] Over a two-year period, one national study found that impairment in one additional self-care activity (e.g., bathing, dressing, eating and using the toilet) for those with dementia resulted in 28 additional hours of family care per month; for those without dementia, an additional self-care need was associated with an increase of 15 hours of family care per month.[574] Among caregivers seeking emergency care, dementia caregivers provided more hours of care per day on average (14 hours per day) when compared with caregivers of those with undiagnosed cognitive impairment (10 hours per day) and caregivers of those with no cognitive impairment (2 hours per day).[575]

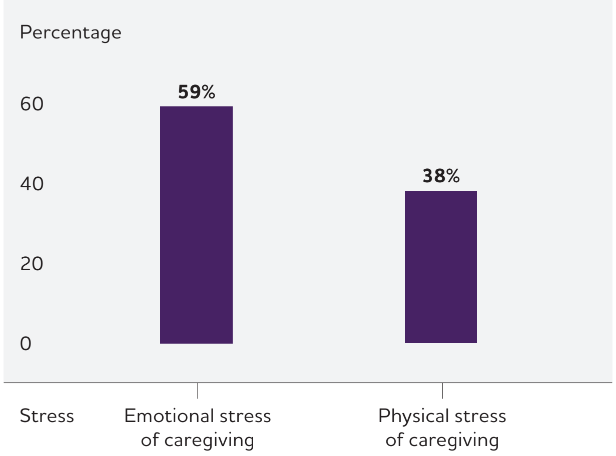
Hours of Unpaid Care and Economic Value of Caregiving

In 2025, the 12.7 million family and other unpaid caregivers of people living with Alzheimer's or other dementias provided an estimated 19.6 billion hours of unpaid help.[A8] This number represents an average of nearly 30 hours of care per caregiver per week, or 1,543 hours of care per caregiver per year. With this care valued at the average of the state minimum wage and the median hourly cost of a home health aide (a conservative estimate),[A9] the estimated economic value of care provided by family and other unpaid caregivers of people with dementia across the United States was $446.3 billion in 2025.[A9] This is approximately 66% of the net value of Walmart's total revenue in fiscal year 2025 ($681 billion)[576] and more than 17 times the total revenue of McDonald's in 2024 ($25.9 billion).[577] The total lifetime cost of care for someone with dementia was estimated at $405,262 in 2024 dollars.[578] Seventy percent of this lifetime cost of care is borne by family caregivers in the forms of unpaid caregiving and out-of-pocket expenses for items ranging from medications to food for the person with dementia. The remaining costs encompass payments by Medicare and Medicaid (see the Use and Costs of Health Care, Long-Term Care and Hospice section).[578, 579] Current estimates of the lifetime costs of care may underestimate the financial impact of a relative's dementia on family caregivers' health and caregivers' workplace productivity, as other potential costs such as home modifications, respite service use and health/work productivity challenges are not always considered in cost estimates.[580]

Table 10 shows the total hours of unpaid care as well as the value of care provided by family and other unpaid caregivers for the United States and each state. Unpaid caregivers of people living with Alzheimer's or other dementias provided care valued at more than $5 billion in each of 28 states. Unpaid caregivers provided care valued at more than $30 billion in each of the four most populous states — California, Texas, Florida and New York.

FIGURE **12**

Percentage of Dementia Caregivers Who Report High to Very High Stress Due to Caregiving



Created from data from the Alzheimer's Association.[A10]

A longitudinal study of the monetary value of family caregiving for people living with dementia found that the overall value of daily family care increased 18% with each additional year of providing care, and that the value of this care further increased as the care recipient's cognitive abilities declined.[581] More research is needed to estimate the future value of family care for people living with Alzheimer's disease and other dementias as the U.S. population continues to age, particularly since many existing economic studies only consider primary caregivers when there are often multiple relatives and others helping an older person living with dementia.[495, 582]

Health and Economic Impacts of Alzheimer's Caregiving

Caring for a person living with Alzheimer's or another dementia poses special challenges. For example, people in the moderate to severe stages of Alzheimer's dementia experience losses in judgment, orientation, and the ability to understand and communicate effectively. Family caregivers must often help people with dementia manage these issues. The personality and behavior of a person with dementia are affected as well, and these changes are often among the most challenging for family caregivers.[583, 584] Individuals with dementia also require increasing levels of supervision and personal care as the disease progresses. As the person living with dementia's symptoms worsen, caregivers can experience increased emotional stress and depression; neglect of their own health due to caregiving priorities;[585, 586] new or exacerbated health problems; and depleted income and finances due in part to disruptions in employment and paying for health care or other services for both themselves and the person living with dementia.[587-592]

Caregiver Emotional and Social Well-Being

The intimacy, shared experiences and memories that are often part of the relationship between a caregiver and person living with dementia may be threatened due to memory loss, functional impairment and psychiatric/behavioral disturbances that can accompany the progression of dementia. In the National Poll on Healthy Aging, however, 45% of caregivers of people living with dementia indicated that providing help to someone with cognitive impairment was very rewarding.[508] In the National Study of Caregiving, greater satisfaction from dementia caregiving was associated with more emotional support from family members and friends.[593] Greater self-mastery in dementia caregivers (or, the degree to which a caregiver believes they can manage the strain of caregiving) is linked with reports of less burden.[594] Although caregivers report positive feelings about caregiving, such as family togetherness and the satisfaction of helping others,[A10, 595-603] they also frequently report higher levels of burden and stress; depression or other adverse mental health outcomes; strain; and problems with navigating care transitions when compared with other caregivers or non-caregivers.

Burden and Stress

- Compared with caregivers of people without dementia, caregivers of those living with dementia indicate more substantial emotional, financial and physical difficulties.[502, 561]
- Fifty-nine percent of family caregivers of people living with Alzheimer's or other dementias rated the emotional stress of caregiving as high or very high (Figure 12).[A10]
- Spousal dementia caregivers are more likely than non-spousal dementia caregivers to experience increased burden over time. This increased burden also occurs when the person with dementia develops behavioral changes and decreased functional ability.[604]
- Many people living with dementia have co-occurring chronic conditions, such as hypertension or arthritis, which may complicate caregiving. For example, a national study found that caregivers of people living with dementia who had a diagnosis of diabetes or osteoporosis were 2.6 and 2.3 times more likely, respectively, to report emotional difficulties with care compared with caregivers of people living with dementia who did not have these co-occurring conditions.[605]

Depression and Mental Health (see Table 11)

- A meta-analysis reported that caregivers of people living with dementia were significantly more likely to experience depression and anxiety than non-caregivers.[514] Dementia caregivers also indicate more depressive symptoms than non-dementia caregivers.[606] Restrictions in social activity (visiting friends and family; attending religious services) are more strongly related to depressive symptoms among dementia caregivers than non-dementia caregivers.[607]
- The prevalence of depression is higher among dementia caregivers (30% to 40% as reported in multiple studies) than other caregivers, such as those who provide help to individuals with schizophrenia (20%) or stroke (19%).[608-610]
- Caring for a spouse living with dementia is associated with 30% more depressive symptoms compared with spousal caregivers of partners without dementia.[611]
- In a meta-analysis, relationship type was the strongest predictor of caregiver depression; caregivers of spouses living with dementia had two-and-a-half times higher odds of having depression than caregivers of people with dementia who were not spouses.[608]
- The prevalence of anxiety among dementia caregivers is 40% or more, which is higher than among caregivers of people with stroke (31%).[608, 610]
- Dementia caregivers in the United States are more likely to have experienced depression (32.5%) or anxiety (26%) when compared with dementia caregivers from Japan (16.8% and 12.9%, respectively) or those from across Germany, Italy, Spain, France and the United Kingdom (29.3% for depression and 22.4% for anxiety).[511]
- Caregivers of individuals living with Alzheimer's report more subjective cognitive problems (for example, problems with memory) and experience greater declines in cognition over time than non-caregivers matched on age and other characteristics.[612, 613] Cognitive decline is associated with rising depressive symptoms among dementia caregivers; caregiving burden accounts for nearly two-thirds of the association between cognitive decline and increasing depressive symptoms.[614]
- Caring for people living with dementia who have four or more behavioral and psychological symptoms (for example, aggression, self-harm and wandering) represents a "tipping point," as these caregivers are more likely to report clinically meaningful depression and burden.[615]

- A systematic review found the prevalence of suicidal ideation (thinking about or making plans for suicide) in dementia caregivers with a mean age of 64 was 32% compared with 2.7% in U.S. adults age 56 and older (an exact age comparator is not available).[616, 617]
- Providing physical and medical care is associated with worse mental health among dementia caregivers than among non-dementia caregivers.[561]

Other Key Findings About the Challenges of Dementia Caregiving

- Caregivers of people living with Alzheimer's or other dementias are twice as likely as caregivers of individuals without dementia (22% compared with 11%) to report that completing medical or nursing-related tasks (for example, injections, tube feedings and catheter or colostomy care) was difficult.[562]
- Dementia caregivers often experience challenges managing medications for individuals with dementia, such as non-adherence.[618-620]
- Compared with non-dementia caregivers, dementia caregivers indicate a greater decrease in their social networks (e.g., other relatives, friends and acquaintances).[621]
- According to a national Alzheimer's Association poll of caregivers, respondents often believed they had no choice in taking on the role of caregiver.[A10]
- The poll also found that more than half (53%) of women with children under age 18 felt that caregiving for someone living with dementia was more challenging than caring for children.[A10]
- Non-heterosexual dementia caregivers are significantly younger and more likely to be employed than heterosexual dementia caregivers and indicate greater difficulty when paying for necessities, while also reporting higher family quality of life than their heterosexual peers.[622]
- Many caregivers of people living with Alzheimer's or other dementias are at risk of social isolation.[623] Forty-one percent of dementia caregivers in the 2014 Alzheimer's Association poll reported that no one else provided unpaid assistance.[A10] Dementia caregivers are more likely to report loneliness and greater social isolation than caregivers of people without dementia.[624, 625]
- Among caregivers of people with dementia who have experienced severe psychiatric symptoms (e.g., aggression or anxiety), those who live in low- or medium-income neighborhoods indicate higher distress than those living in high-income neighborhoods.[626]
- In a survey of caregivers from a large health care system, fewer than 4 in 10 respondents (39.2%) agreed that their primary care providers help them with managing symptoms of a care recipient living with dementia.[627]
- A growing literature has considered positive aspects of dementia caregiving (feelings of "finding meaning, satisfaction gains, uplift, rewards, esteem, gratification and coping" associated with care provision.)[595, 601] A systematic review has found that positive aspects of caregiving are inversely associated with dementia caregivers' depressive symptoms, other negative mental health symptoms (e.g., anxiety) and burden. Positive aspects of caregiving are positively associated with dementia caregivers' quality of life, psychological well-being and perceptions of competence/self-efficacy.[595]

Stress of Care Transitions

- Caregivers who helped someone with a formal diagnosis of dementia indicated more emotional difficulty and family disagreement than caregivers of individuals with probable dementia but without a formal diagnosis.[628] However, caregivers of individuals with a formal dementia diagnosis were also more engaged in communication during doctors' visits and more likely to receive caregiver training than those who assisted someone without a diagnosis of dementia, suggesting the importance of linking support to dementia diagnostic procedures.[628] Care partners of those with mild cognitive impairment did not indicate more significant burden following scans showing elevated amyloid levels in care recipients. Care partners did anticipate increasing responsibility related to caregiving tasks and duties, however.[629]
- Admitting a relative to a residential care facility has mixed effects on the emotional and psychological well-being of dementia family caregivers. Some studies suggest that distress remains unchanged or even increases for some caregivers (such as spouses), but other studies have found that distress decreases.[569, 630, 631]
- The demands of caregiving may intensify as people living with dementia approach the end of life.[632] In the year before the death of the person living with dementia, 59% of caregivers felt they were "on duty" 24 hours a day, and many felt that caregiving during this time was extremely stressful.[633] The same study found that 72% of family caregivers experienced relief when the person with Alzheimer's or another dementia died.[633]
- In the last 12 months of life, people living with dementia relied on more hours of family care (64.5 hours per week) than people with cancer did (39.3 hours per week).[634]

TABLE **11**

Percentage of Dementia Caregivers Reporting Health Conditions by State, 2016 to 2024

State	Percentage Reporting at Least One Chronic Condition	Percentage Reporting Depression	Percentage Reporting Frequent Poor Physical Health
Alabama	57.5	30.9	15.0
Alaska	53.7	27.7	15.2
Arizona	59.5	26.5	17.4
Arkansas	69.8	30.0	18.3
California	61.0	18.6	13.1
Colorado	69.2	32.9	21.2
Connecticut	57.2	22.8	11.2
Delaware	69.7	25.1	18.4
District of Columbia*	65.1	†	†
Florida	66.4	28.6	13.6
Georgia	64.9	33.2	15.1
Hawaii	61.7	16.6	11.9
Idaho	64.9	31.1	22.7
Illinois	62.1	26.3	14.2
Indiana	57.3	34.1	18.2
Iowa	62.2	28.2	14.0
Kansas	63.5	30.5	14.4
Kentucky	65.5	35.4	19.7
Louisiana	65.7	28.0	16.5
Maine	71.5	30.5	16.0
Maryland	63.1	28.1	16.8
Massachusetts	54.2	20.2	†
Michigan	75.9	31.0	11.8
Minnesota	53.1	29.8	8.4
Mississippi	58.5	33.9	18.0
Missouri	59.5	28.1	20.2
Montana*	56.9	22.8	†
Nebraska	57.6	25.4	13.2
Nevada	57.3	†	†
New Hampshire	65.9	29.5	14.4
New Jersey	62.3	27.9	12.8
New Mexico	64.8	31.3	12.6
New York	61.2	20.5	15.5
North Carolina	59.7	27.8	17.8
North Dakota	60.1	30.4	8.6
Ohio	65.5	36.4	11.8
Oklahoma	69.4	31.9	15.4
Oregon	67.4	31.4	18.3
Pennsylvania	76.6	32.5	16.0
Rhode Island	54.2	41.0	11.5
South Carolina	60.6	31.0	15.2
South Dakota	71.0	23.7	12.0
Tennessee	68.0	30.6	18.6
Texas	64.2	39.6	12.0
Utah	59.6	25.9	14.8
Vermont	61.5	35.4	10.7
Virginia	70.5	28.0	11.1
Washington	61.1	39.0	18.0
West Virginia	63.5	32.2	12.0
Wisconsin	58.7	30.6	15.7
Wyoming	71.2	30.2	17.6

*Data are for caregivers of individuals whose main reason for needing care is Alzheimer's or other dementia. For other states, the individuals' main reason for needing care could be another condition, but the individuals also were living with Alzheimer's or other dementia.

†Data not included because the sample size was less than 50 or the relative standard error was greater than 30%.

Created from data from the Behavioral Risk Factor Surveillance System Survey.[505]

TABLE **12**

Percentage of Dementia Caregivers Who Report Having a Chronic Health Condition Compared with Caregivers of People without Dementia or Non-Caregivers*

Condition	Dementia Caregivers	Non-Dementia Caregivers	Non-Caregivers
Stroke	4.1	3.8	3.3
Coronary heart disease	8.6	7.2	6.4
Cardiovascular disease†	11.1	9.8	8.6
Diabetes	13.3	12.7	11.7
Cancer	18.4	14.3	11.8
Obesity	37.0	38.6	38.2

*Table includes caregivers age 18 and older.

†Combination of coronary heart disease and stroke.

Created from data from the Behavioral Risk Factor Surveillance System survey.[505]

Please note these comparisons are unadjusted.

Caregiver Physical Health and Health Conditions

For some caregivers, the demands of caregiving may cause declines in their own health. Evidence suggests that the stress of providing dementia care increases caregivers' susceptibility to disease and health complications.[635] As shown in Figure 12, 38% of Alzheimer's and other dementia caregivers indicate that the physical stress of caregiving is high to very high.[A10] Dementia caregivers are 1.5 times more likely than non-dementia caregivers to indicate substantial physical difficulty providing assistance to their care recipients.[636] The distress associated with caring for a relative with Alzheimer's or another dementia has also been shown to negatively influence the quality of family caregivers' sleep.[637-639] Compared with those of the same age who were not caregivers, caregivers of people living with dementia are estimated to lose between 2.4 hours and 3.5 hours of sleep per week and have 23% lower odds of reporting "excellent/very good" sleep quality.[639, 640]

Tables 11 and 12 present data on caregiver physical and mental health. Table 11 presents state-by-state data on the health status of dementia caregivers, and Table 12 compares the percentages of dementia caregivers, non-dementia caregivers and non-caregivers who report having a specific chronic health condition.

General Health

Seventy-four percent of caregivers of people living with Alzheimer's or other dementias reported that they were "somewhat concerned" to "very concerned" about maintaining their own health since becoming a caregiver.[A10] A 2017 poll found that 27% of dementia caregivers delayed or did not do things they should to maintain their own health.[508] Data from the Health and Retirement Study showed that dementia caregivers who provided care to spouses were much more likely (41% higher odds) than other spousal caregivers of similar age to become increasingly frail during the time between becoming a caregiver and their spouse's death.[641]

Physiological Changes

The chronic stress of caregiving may be associated with an increased incidence of hypertension and a number of physiological changes that could increase the risk of developing chronic conditions, including high levels of stress hormones, impaired immune function, slow wound healing and coronary heart disease.[642-647] A meta-analysis of studies examining the associations between family caregiving with inflammation and immune function suggests that dementia caregivers have slight reductions in immune function and modestly elevated inflammation.[648] However, a study of physiological changes before and after the start of caregiving found no change in six biomarkers of inflammation among dementia caregivers.[649]

Health Care Utilization

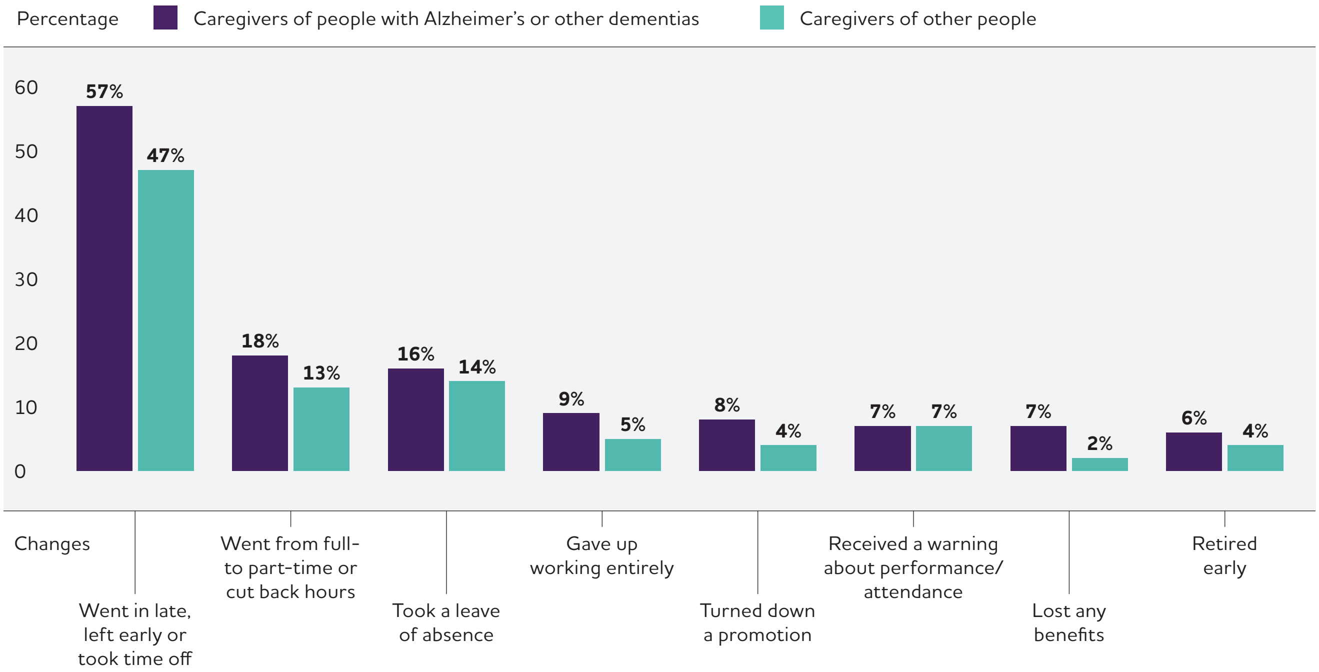
Dementia caregivers have twice the odds of experiencing a hospitalization as non-caregivers.[650] Nearly 1 in 5 dementia caregivers are hospitalized during the course of their years caregiving for spouses with dementia, and almost 70% of these hospitalizations are unexpected. One in three spousal dementia caregivers are "not at all prepared" for their own hospitalization.[651] Dementia caregivers experience almost five emergency department visits every 100 months, compared with three-and-a-half visits every 100 months among age-matched controls.[652] When people living with dementia also have depression, behavioral disturbances or low functional status, their caregivers face a higher risk of emergency department visits and hospitalization compared with caregivers of people living with dementia but without these challenges.[653, 654] Increased depressive symptoms among caregivers are linked to more frequent caregiver doctor visits, increased outpatient tests and procedures, and greater use of over-the-counter and prescription medications.[654]

Mortality

Studies of how the health of people with dementia affects their caregivers' risk of dying have had mixed findings.[655, 656] For example, spouses of hospitalized care recipients living with dementia were more likely to die in the following year than caregivers whose spouses were hospitalized but did not have dementia (after accounting for differences in caregiver age).[657] In addition, caregivers who perceived higher strain due to care responsibilities were at higher risk for death than caregivers who

FIGURE **13**

Work-Related Changes Among Caregivers of People with Alzheimer's or Other Dementias Who Had Been Employed at Any Time Since They Began Caregiving



Created from data from the National Alliance for Caregiving in Partnership with the Alzheimer's Association.[504]

perceived little or no strain.[658] In contrast, a longitudinal analysis of the Health and Retirement Study found that dementia caregivers were less likely to die than non-caregivers of similar age over a 12-year period. These results are consistent with a protective effect of dementia care, at least as it pertains to mortality.[655] The findings are also consistent with the possibility that individuals who assume dementia care roles do so in part because their initial health allows them to. Eighteen percent of spousal caregivers die before their partners living with dementia.[659]

Caregiver Employment and Finances

Six in 10 caregivers of people living with Alzheimer's or another dementia were employed or had been employed while providing care in the prior year.[504] These individuals worked an average of 35 hours per week while caregiving.[504] Among people who were employed in the past year while providing care to someone living with Alzheimer's or another dementia, 57% reported sometimes needing to go in late or leave early compared with 47% of non-dementia caregivers. Eighteen percent of dementia caregivers reduced their work hours due to care responsibilities, compared with 13% of non-dementia caregivers. These caregiving-related impacts on work may result in reduced income for caregivers and substantial economic costs to employers and society through decreased labor force participation and productivity losses. In particular, adult daughters with less than a high school degree were most likely to reduce work hours when compared with other dementia caregivers. Other work-related changes among dementia and non-dementia caregivers who had been employed in the past year are summarized in Figure 13.[504]

In the 2018 National Health and Wellness Survey, nearly 13% of dementia caregivers in the United States indicated absence from work in the past seven days due to a health problem compared with 6% of dementia caregivers in Japan and 10% of dementia caregivers across France, Germany, Italy, Spain and the United Kingdom.[511] One study found that at the onset of a parent's dementia, adult children's employment did not change. However, variations were apparent due to an adult child's education and gender; sons with the lowest level of formal education were least likely to end employment during a parent's onset of dementia, whereas daughters with this same level of formal education were most likely to reduce work hours.[660]

In 2021, it was estimated that dementia caregivers bore nearly twice the average out-of-pocket costs of non-dementia caregivers ($12,388 versus $6,667).[579, 661] Examples include costs of medical care, personal care and household expenses for the person with dementia, and personal expenses and respite services for the caregiver. Caregivers of a spouse living with dementia indicate higher home health care expenditures but lower outpatient expenditures than those who do not have a spouse living with dementia, which suggests a possible "substitution" effect and greater referrals to home health care by providers for people living with dementia.[662, 663] National survey data among "care contributors" (a friend or relative who paid for dementia expenses and/or provided care for someone living with dementia at least once a month in the prior year) revealed that 48% cut back on other spending and 43% cut back on savings due to the out-of-pocket costs of providing help to someone living with dementia.[664] Due to care responsibilities, close to 4 in 10 care contributors indicated that the "food they bought just didn't last, and they didn't have money to get more," and 3 in 10 ate less because of care-related costs.[664] Over half of dementia caregivers experience financial "toxicity" (i.e., "the negative effects of medical expenses on financial security and health-related quality of life").[665] In addition, caregivers living with a family member with dementia pay for 64% of total uncompensated care costs (e.g., total health care spending and out-of-pocket costs) incurred during their relatives' last seven years of life.[666]

One in five caregivers of people living with Alzheimer's or other dementias (22%) report problems dealing with a bank or credit union when helping to manage the finances of people living with dementia, compared with 9% of caregivers of people without dementia.[504]

Effects of Stress and Other Caregiving Factors on People with Dementia

Research has documented the effects of caregiver stress on people living with dementia and their use of health care services. For example, distress on the part of family caregivers is associated with increased odds of residential care entry for the person living with dementia.[667] Individuals living with dementia are more likely to be hospitalized if their caregiver has less than one year of caregiving experience when compared with caregivers who have provided assistance for more than one year.[668] People living with dementia whose care networks featured more complex care arrangements (e.g., involvement of non-immediate family members and caregivers who assist with a broad range of tasks) are significantly more likely to experience an emergency department visit.[669] Similarly, among older adults living with dementia receiving home health care, those who do not have an available caregiver are more likely to receive skilled nursing and social work services.[670] In addition, care recipients living with dementia who rely on more caregivers or whose caregivers indicate greater distress are more likely to experience hospitalization.[668, 671, 672] Literature reviews of dementia caregiving and care recipient emergency department (ED) use found that gaps in primary care access/planning, communication challenges, lack of caregiver involvement in clinical decisions, and post-discharge care represent significant barriers in ED care.[673] A meta-analysis suggested that care coordination/case management and psychoeducational and multi-component programs delivered to dementia caregivers may improve important care recipient outcomes, including improvements in behavior, mood and quality of life and delayed placement in a residential care home. However, the improvements observed were small.[674]

Interventions Designed to Assist Caregivers

For more than 40 years, strategies to support family caregivers of people living with dementia have been developed and evaluated. The types and focus of these strategies (often called "interventions") are summarized in Table 13.[588, 675]

In general, the goal of interventions is to improve the health and well-being of dementia caregivers by relieving the negative aspects of caregiving. Some also aim to delay nursing home admission of the person living with dementia by providing caregivers with skills and resources (emotional, social, psychological and/or technological) to continue helping their relatives or friends at home, among other outcomes. Specific approaches used in various interventions include providing education to caregivers, helping caregivers manage dementia-related symptoms, improving social support for caregivers and providing caregivers with respite from caregiving duties.

The following characteristics distinguish interventions that are effective: family caregivers are actively involved in the intervention, in contrast to passively receiving information; the intervention is tailored and flexible to meet the changing needs of family caregivers during the course of a relative's dementia; and the intervention meets the needs not only of caregivers but of people living with dementia as well.[676] A meta-analysis examining the components of dementia caregiver interventions that are most beneficial found that interventions that initially enhance caregiving competency, gradually address the care needs of the person with dementia, and offer emotional support for loss and grief when needed appeared most effective.[677] A prior report examined

TABLE **13**

Type and Focus of Caregiver Interventions

Type	Focus
Case management	Provides assessment, information, planning, referral, care coordination and/or advocacy for family caregivers.
Psychoeducational approaches	Include structured programs that provide information about the disease, resources and services, and about how to expand skills to effectively respond to symptoms of the disease (for example, cognitive impairment, behavioral symptoms and care-related needs). Include lectures, discussions and written materials and are led by professionals with specialized training.
Counseling	Aims to resolve preexisting personal problems that complicate caregiving to reduce conflicts between caregivers and care recipients and/or improve family functioning.
Psychotherapeutic approaches	Involve the establishment of a therapeutic relationship between the caregiver and a professional therapist (for example, cognitive behavioral therapy for caregivers to focus on identifying and modifying beliefs related to emotional distress, developing new behaviors to deal with caregiving demands, and fostering activities that can promote caregiver well-being).
Respite	Provides planned, temporary relief for the caregiver through the provision of substitute care; examples include adult day services and in-home or institutional respite care for a certain number of weekly hours.
Support groups	Are less structured than psychoeducational or psychotherapeutic interventions. Support groups provide caregivers the opportunity to share personal feelings and concerns to overcome feelings of isolation.
Multicomponent approaches	Are characterized by intensive support strategies that combine multiple forms of intervention, such as education, support and respite, into a single, long-term service (often provided for 12 months or more).

Created from data from Sörensen, et al.[588] and Gaugler et al.[675]

randomized, controlled studies of caregiver interventions and identified 44 interventions that benefited individuals living with dementia as well as caregivers, and more such interventions are emerging each year.[678-682] Although several national reports have suggested that the available scientific evidence does not provide clear suggestions as to which intervention types benefit dementia caregivers consistently,[683] other meta-analyses report that specific intervention types (such as psychoeducation; see Table 13) may result in a small reduction in burden for caregivers, with other meta-analyses indicating broader effects of various interventions across multiple dementia caregiver outcomes.[674, 684-688] A meta-review of over 60 meta-analyses and systematic reviews of dementia caregiver interventions indicate that although various interventions may have positive effects on depression and other measures of caregiver well-being, challenges related to how interventions are reported and classified has made it difficult to ascertain what works and why for dementia caregivers.[689] Additional research gaps include a lack of interventions that take place in hospitals, medical centers, or across multiple sites of care, and the effects of these interventions on caregiver and care recipient coping strategies.[690]

Interventions for dementia caregivers that have demonstrated efficacy in scientific evaluations have been gradually implemented in the community, but are still not widespread or available to all family caregivers.[691, 692] When interventions are implemented, they are generally successful at improving how caregiver services are delivered and have the potential to reach a large number of families while also helping caregivers cope with their responsibilities (this includes the Alzheimer's Association 24/7 Helpline).[690, 693-696] In one example, researchers utilized an "agile implementation" process to more rapidly select, locate, evaluate and replicate a collaborative care model for dementia care. This care model has successfully operated for nearly two decades in an Indianapolis health care system.[697] Other efforts have attempted to broaden the reach and accessibility of interventions for dementia caregivers through the use of technologies (for instance, video-phone delivery and online training),[698-706] while others have disseminated evidence-based dementia care interventions into community-based programs and health care systems.[693, 707-709] Dissemination efforts, such as *Best Programs for Caregiving*, have attempted to provide tools and resources to providers and others to facilitate the implementation of successful interventions into community-based organizations, health care systems and other "real-world" settings.[710-712]

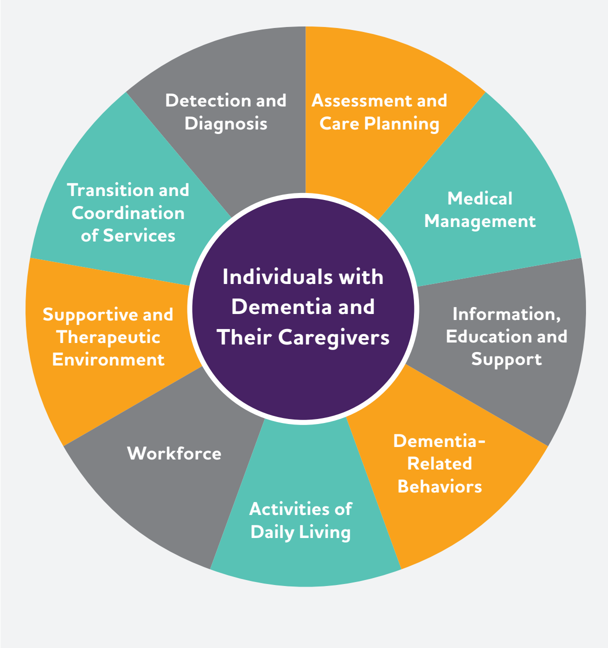
Because caregivers and the settings in which they provide care are diverse, more studies are required to define which interventions are most effective for specific situations and how these interventions are successful. Improved tools and measures to personalize services for caregivers to maximize their benefits represent an emerging area of research.[713-717] More studies are also needed to adapt proven interventions or develop new intervention approaches for families from different racial, ethnic and socioeconomic backgrounds and in different geographic settings.[498, 523, 718-729] Additional research on interventions focused on disease stages is also required, as is research on specific intervention needs for LGBTQIA+ caregivers for whom a lack of inclusive practices on the part of health care professionals, stigma and a reluctance to seek support may result in greater unmet needs compared with non-LGBTQIA+ dementia caregivers.[500, 730, 731]

In 2019 and again in 2025, the National Institute on Aging (NIA) awarded funding to create the NIA Imbedded Pragmatic AD/ADRD Clinical Trials (IMPACT) Collaboratory. The Collaboratory includes experts from research universities/centers across the U.S. to support pilot trials and larger studies that test non-drug, care-based interventions for people living with dementia. The goal of IMPACT is to expedite the timeline of research implementation in real-world settings to improve care for people living with dementia and their caregivers. In addition, in 2020 the CDC established three Public Health Centers of Excellence on dementia to disseminate best practices and tools to local, tribal and state public health organizations throughout the United States; one of those Centers focuses on dementia caregiving.[732-735]

The Alzheimer's Association has also undertaken several efforts to improve dementia care interventions and services. Its dementia care practice recommendations place individuals with dementia and their caregivers at the center of how care should be delivered.[736] Essential to this model is the need to reconsider how care for people with dementia is measured and designed by moving away from an approach that focuses on loss of abilities to one that emphasizes the individual's unique needs, personal experiences and strengths. This person-centered care philosophy not only values and respects the individual with dementia but also promotes well-being and health.[737, 738] Frameworks such as the Alzheimer's Association dementia care practice recommendations are designed to shift how researchers and care providers think about dementia and may point the way to a greater understanding of the resilience, adaptability and possibilities of maintenance or even improvement of skills and abilities when living with dementia.[739, 740] A core element of these frameworks is ensuring that every experience and interaction is seen as an opportunity to have authentic and meaningful engagement, which in turn helps create a better quality of life for the person living with dementia and their caregivers.

FIGURE **14**

Person-Centered Care Delivery



Created from data from the Alzheimer's Association.[736]

Trends in Dementia Caregiving

The use of support services for dementia caregivers has changed over time.[570] Respite use decreased among White dementia caregivers from 2015 to 2021 (32 percent to 23 percent); in contrast, respite use among Black dementia caregivers increased over the same time period (from 16 percent to 21 percent). In general, respite use remains low among dementia caregivers, suggesting the need for identifying and removing access barriers. Similarly, a study of the Older Americans Act's National Family Caregiver Support Program found that over half (52%) of Area Agencies on Aging did not offer evidence-based family caregiver interventions.[741]

The need for new policies, services and research is justified by the increasing opportunity costs of reduced workplace productivity related to dementia caregiving. Converging sociodemographic and health trends in the U.S. (e.g., the aging of the U.S. population, a lower birth rate, and adult children's geographic mobility/dispersion over the prior several decades) emphasize the need for new policies, services and research to address the growing public health concern of dementia caregiving.[742-745] Future research must also involve caregivers in developing research questions and in co-creating services and programs. Finally, more research is needed on the intersection of local, regional, and state policies and their influence on dementia caregiver service availability, costs, and effectiveness.[746]

A National Strategy to Support Family Caregivers

The Recognize, Assist, Include, Support, and Engage (RAISE) Family Caregivers Act, which was signed into law in January 2018, authorized the U.S. Secretary of Health and Human Services to develop the first national strategy to support family caregivers. To advance the development of this strategy, a 30-member Family Caregiving Advisory Council was established to provide key recommendations, guidance and best practices that support family caregivers. In September 2022 the Advisory Council delivered its National Strategy to Support Family Caregivers to Congress. It features nearly 350 actions that 15 federal agencies will adopt and 150 actions that states, communities and others can take. The four core principles that drive these many supportive actions include: 1) placing the family and person at the center of all interactions; 2) addressing trauma and its impact on families; 3) advancing equity, accessibility and inclusion for family caregivers in underserved communities; and 4) elevating direct care workers as family caregiving partners.[747] A 2024 progress report stated that almost all of the 350 federal actions recommended in the 2022 National Strategy were implemented or in process to support family caregivers. This includes $20 million in funding to support the strategy's implementation and federal guidance to states so that new or updated state plans on aging align with the National Strategy's recommendations.[748]

On July 1, 2024, the Centers for Medicare & Medicaid Services (CMS) launched the Guiding an Improved Dementia Experience (GUIDE) Model. More than 300 organizations are participating as GUIDE Model sites across the U.S. The GUIDE Model features the provision of comprehensive dementia care coordination and management, caregiver education and support, and respite services. Individuals living with dementia and their caregivers will also have access to a 24/7 support line. The GUIDE Model is unique in that it incentivizes health care providers to incorporate both the person with dementia *and* the caregiver (or caregivers) into the collaborative, multidisciplinary service approach. Critically, CMS has included policies to ensure that underserved communities have equal access to GUIDE Model services to address disparities in access to and quality of dementia care (see the Workforce section for more information about the GUIDE Model).[749]

There is some evidence that state support for home and community-based services that help caregivers is associated with improved outcomes for people living with dementia. For example, one study measured each state's support for family caregivers using a state-specific ranking criterion on home and community-based services generated by the AARP's *Scorecard*. This study reported that states with more highly rated support for family caregivers had lower rates of hospitalization for people living with dementia.[750]

WORKFORCE

NEARLY 800,000 ADDITIONAL DIRECT CARE WORKERS WILL BE NEEDED BETWEEN 2024 AND 2034 — MORE NEW WORKERS THAN IN ANY OTHER SINGLE OCCUPATION IN THE UNITED STATES.

As the prevalence of Alzheimer's and other dementias increases, so does the need for paid professionals from different fields who are trained to care for people living with dementia and to support their families. Training is needed for care that considers all stages of the disease and all settings, including health care settings (e.g., clinics, hospitals), residential settings (e.g., nursing homes, assisted living communities) and individuals' homes and communities.[751, 752]

There is no single, well-defined dementia care workforce, but rather a range of individuals in myriad roles and occupations who contribute to the care and support of people living with dementia and their families.[753] This diverse workforce includes, but is not limited to, primary care providers (PCPs) and hospitalists; specialists such as geriatricians, neurologists, geropsychologists, and psychiatrists; other licensed professionals, such as registered nurses, therapists and social workers; direct care workers, including personal care aides, home health aides and nursing assistants; and members of the broader community-based workforce, including community health workers as well as non-medical professionals such as first responders, bank tellers, attorneys, librarians, hairdressers, bus drivers, faith leaders and others who interact with the public.

Key roles in this multidisciplinary workforce include detecting, screening for and diagnosing dementia; coordinating and delivering ongoing medical care for dementia as well as for other co-occurring illnesses; providing direct care; and helping individuals and their families stay integrated and engaged in their communities.

Unfortunately, different segments of the dementia care workforce often work in isolation from each other, leading to delayed diagnosis, fragmented care and missed opportunities for intervention and ongoing support.[754] In contrast, a more collaborative, integrated workforce can facilitate earlier detection and diagnosis of cognitive impairment, more comprehensive and coordinated care planning, improved management of coexisting conditions, enhanced support for family caregivers, better use of community resources and, overall, increased sensitivity to the needs of people living with dementia and the needs of their families.

Key Roles of the Dementia-Capable Workforce

Detection, Screening and Diagnosis

Timely dementia detection and diagnosis are critically important. Early detection enables individuals to plan for future care needs; participate in clinical trials; and access FDA-approved disease-modifying therapies alongside treatments for symptom management. It also empowers individuals to make informed decisions about medical, financial and legal matters while connecting them with appropriate services and supports, such as support groups for people living with dementia.

To advance clinical practice in this area, the Alzheimer's Association released in 2025 the first in a series of clinical practice guidelines for the diagnosis, treatment and care of Alzheimer's and all other dementia. This guideline focuses on how blood-based biomarker tests can be used to assess levels of Alzheimer's disease pathology in people living with cognitive impairment, which assists in diagnosis.[755]

The detection, screening, and diagnosis of Alzheimer's disease and other dementias involve a range of health care professionals, including both PCPs and specialists such as geriatricians, neurologists and psychiatrists.

PCPs play a primary role

PCPs include physicians (M.D. [doctor of medicine] or D.O. [doctor of osteopathic medicine]) as well as advanced practice clinicians (including nurse practitioners, clinical nurse specialists and physician assistants). PCPs provide or coordinate access to a range of health care services as allowed under each state's laws.[756]

PCPs often have long-standing relationships with patients and are well-situated to identify factors in their patients that may have increased or decreased their risks for Alzheimer's disease and other dementias, to prescribe lifestyle changes that may prevent or slow cognitive decline, to detect early signs of cognitive impairment and to provide ongoing care and condition management.[757-759] The signs of cognitive impairment that PCPs may detect include overt functional and communication changes as well as more subtle signs, such as irregularities in medication or appointment adherence, loss of control of chronic disease, weight loss, or increased emergency department visits or hospitalizations.

Once clinically significant cognitive concerns have been identified in the primary care setting, it is generally accepted that a patient should be evaluated for cognitive impairment using a standardized and validated assessment.[282, 760, 761] PCPs, however, report numerous individual- and system-level barriers to screening for cognitive impairment and diagnosing dementia.[304, 762] A major barrier is that cognitive assessments take time and training to administer, interpret, document and follow up on, which can make them hard to implement in primary care practice settings.[757, 763] Many PCPs lack specialized training in dementia assessment, may not know how to interpret the results of newly approved blood-based biomarker tests, and feel unprepared to accurately identify the condition — knowledge gaps that can have serious consequences for patients and families.[757, 764] For more information on barriers to cognitive assessment in primary care — where most dementia diagnosis and management occurs — and potential solutions, see the Special Report from *2019 Alzheimer's Disease Facts and Figures*.[304]

Among PCPs surveyed by the Alzheimer's Association, 39% reported that they were "never" or "only sometimes" comfortable making a diagnosis of Alzheimer's or other dementias, 27% reported being "never" or "only sometimes" comfortable answering patients' questions about Alzheimer's or other dementias, and 50% said that the medical profession is either "not very prepared" or "not at all prepared" to care for the growing number of people living with Alzheimer's or other dementias.[765] These findings highlight the need for enhanced training and support for PCPs, who are often the first point of contact for individuals with cognitive concerns, but also underscore the importance of access to specialists for a dementia diagnosis and ongoing care management. Among PCPs, 32% reported making dementia specialist referrals at least once a month, but 55% also reported a shortage of specialists in their areas.[765]

Geriatricians and other specialists are in short supply

Geriatricians are family physicians or board-certified internists who are specially trained to evaluate and manage the unique health care needs and treatment preferences of older adults, including those living with dementia. It is estimated that 30% of people age 65 and older are living with complex multiple health conditions — including those living with frailty or other geriatric conditions, disability, or dementia, as well as those requiring palliative and end-of-life care — and would benefit from geriatrician care, while the other 70% of older adults can often be effectively cared for by PCPs.[766-770] The need for geriatricians appears to be far outpacing demand, however, with greater shortfalls expected in the years ahead. The U.S. Department of Veteran Affairs estimates that each geriatrician can care for an average of 700 older adults with complex medical needs compared with each PCP who can care for an average of 1,200 older adults.[766, 768] Based on these assumptions, among the 55.8 million adults age 65 and older in the United States in 2021,[771] approximately 16.7 million people (30% of all those age 65 and older) needed geriatrician care and at least 23,953 geriatricians were needed to care for them.[766, 768] However, there were only 7,454 certified geriatricians in 2021, a sizable and potentially consequential shortage relative to need.[772] Another indicator of the shortage of geriatricians is that geriatric medicine fellowship positions are consistently underfilled: according to the National Resident Matching Program, of the 382 geriatric medicine fellowship positions available in 2025, more than half (56%) went unfilled.[773]

Table 14 shows the projected number of geriatricians needed in each state to care for individuals age 65 and older who are projected to have Alzheimer's dementia in 2050.[766, 768, 774] If the aging of the United States population continues at the current pace, an estimated 32,521 geriatricians will be needed to effectively care for the approximately 22.7 million individuals age 65 and older who are projected to have multiple complex health conditions, including living with Alzheimer's dementia, in 2050 — more than quadruple the number of geriatricians who were practicing in 2021. An estimated 14,480 geriatricians will be needed to care for the approximately 10.1 million individuals age 65 and older who are projected to have Alzheimer's dementia in 2050.[276, 772]

Although the projected increase in demand for geriatricians by 2050 is expected to far exceed supply across the United States, the shortage of geriatricians will affect states differently.[766, 772, 775] In the District of Columbia and Hawaii, the needs of those projected to have Alzheimer's dementia in 2050 will be sufficiently met if the numbers of geriatricians in these areas do not fall from their 2021 levels. In contrast, 14 states — Alabama, Arizona, Delaware, Florida, Georgia, Kentucky, Louisiana, Mississippi, Montana, Nevada, South Carolina, Tennessee, Utah and Wyoming — will need at least three times the number of practicing geriatricians in 2050 as there were in 2021 to care for those projected to have Alzheimer's dementia. Two states, Idaho and Oklahoma, will need at least four times the number of geriatricians to meet the care needs of those projected to have Alzheimer's dementia.

Other specialists who may screen for and/or diagnose dementia include neurologists, geropsychologists, neuropsychologists, geriatric psychiatrists and advanced practice providers with geriatric specialization. However, these specialists represent a small proportion of their professions and the full health care workforce.[753] As of December 2024, there were 17,358 physicians with active neurology certifications and just 1,409 with active geriatric psychiatry certifications, according to the American Board of Psychiatry and Neurology, representing a small fraction of all physicians.[776] A 2019 American Psychological Association survey indicated that only 1.2% of psychologists identified geropsychology as their specialty.[777] In 2023, more than 385,000 nurse practitioners were licensed in the United States. Of these, 15.1% had primary care preparation in adult and geriatrics care.[778, 779] As of 2018, less than 1% of physician assistants were certified in geriatric medical care.[780]

Shortages of geriatricians and other specialists appear to be most acute in rural settings, with many rural counties facing a shortage of health care providers overall.[781-783] As noted earlier, 55% of PCPs surveyed by the Alzheimer's Association in 2019 reported that there were not enough specialists in their area to meet demand; however, among PCPs in rural areas this proportion rose to 71%. In large cities, 44% of PCPs reported shortages, while in suburban areas 54% reported shortfalls.[765] The National Center for Health Workforce Analysis projects that demand for neurologists will exceed demand every year until at least 2037, but with substantial regional variation — namely, only 21% of non-metro areas are expected to have an adequate number of neurologists while metro areas are expected to have more than enough neurologists (meeting 102% of need).[784]

Using 2020 county-level data, researchers recently assessed the density of dementia specialists altogether — including geriatricians, neurologists and geriatric psychiatrists — per 100,000 people age 65 and older, estimating that 33 to 45 dementia specialists per 100,000 older adults are needed to care for older adults with mild cognitive impairment and dementia.[785] Based on these thresholds, the researchers estimated that 34% to 59% of those age 65 and older reside in areas with potential shortfalls in dementia specialists.

The shortage of geriatricians and other relevant specialists has been attributed to a combination of factors, including a smaller percentage of working-aged adults; substantially lower pay for geriatricians and neurologists compared with many other specialist physicians; an inadequate number of clinician educators with relevant specialties on the faculties of health professional schools; limited availability of incentives to choose these specialties, such as loan forgiveness programs; and the insufficient respect and recognition accorded to geriatricians and related specialists. The challenges posed by all of these factors are exacerbated by growth in demand due to population aging.[786, 787] Some of these factors are modifiable and must be addressed to increase the number of providers available to offer specialized dementia diagnosis and care.[788]

Ongoing Dementia Care Management and Delivery

Beyond their vital role in early detection and diagnosis, PCPs play an ongoing role in caring for their patients throughout all stages of disease progression and are central to the collaborative, coordinated delivery of dementia care. They are also key players in person-centered dementia care navigation, as described in the Special Report from *2024 Alzheimer's Disease Facts and Figures*.[789] One study of nearly 2 million beneficiaries of traditional Medicare living with dementia found that PCPs were the clinician type seen by the largest percentage of those beneficiaries in the study year (2019): 87.0% of beneficiaries received care from a physician, 62.9% from a nurse practitioner and 33.1% from a physician assistant. Conversely, 13.6% were seen by a geriatric subspecialist physician.[754]

Registered nurses, licensed practical nurses, licensed psychologists, rehabilitation specialists and social workers also play vital roles in the coordination and delivery of care for people living with dementia. These professionals offer nursing, rehabilitation and supportive services across community settings, skilled nursing homes and other locations. Their services encompass medication administration, intravenous injections, wound and catheter care, physical, occupational, and speech therapy, behavioral consultation and more. Additionally, nurses and social workers most often provide care navigation, care coordination and case management services, and licensed clinical social workers and psychologists may provide therapeutic services to people living with dementia and their caregivers.

The case for coordinated care models

Several decades of research support the value of coordinated, comprehensive dementia care models that bring together different clinical and non-clinical providers to collaboratively meet the medical and psychosocial needs of people living with dementia and their caregivers.[790-792] These collaborative models have been associated with a range of benefits, including reduced behavioral symptoms, improved function and quality of life, decreased caregiver burden, and lower health care costs related to hospitalizations, emergency department visits and other outpatient visits.[791, 793, 794] Conversely, fragmented or uncoordinated care can create gaps in communication and increase the risk of medical errors and suboptimal care.[795-801]

The Alzheimer's and Dementia Care Program is one example of a health systems-based coordinated care model in which nurse practitioners with extensive training in dementia care, known as dementia care specialists (DCSs), co-manage care with PCPs and community-based partners. The first step of this model is the development of a comprehensive care plan tailored to the individual needs and goals of each patient living with dementia and their

TABLE **14**

Number of Geriatricians in 2021 and Projected Number of Geriatricians Needed in 2050 by State

State	Number of Geriatricians in 2021	Number of Geriatricians Needed in 2050 to Serve Those 65 and Older with Alzheimer's Dementia	Number of Geriatricians Needed in 2050 to Care for Those 65 and Older (with and without Dementia) Who Need Geriatrician Care
Alabama	66	201	467
Alaska	10	24	51
Arizona	115	412	911
Arkansas	60	113	265
California	802	1,708	3,715
Colorado	110	268	596
Connecticut	146	155	315
Delaware	17	55	119
District of Columbia	25	19	48
Florida	418	1,364	3,056
Georgia	139	468	1,057
Hawaii	83	81	166
Idaho	20	99	222
Illinois	303	481	1,056
Indiana	87	263	586
Iowa	50	132	287
Kansas	47	113	247
Kentucky	48	170	393
Louisiana	52	165	390
Maine	46	69	146
Maryland	224	254	548
Massachusetts	283	314	672
Michigan	196	411	887
Minnesota	134	259	553
Mississippi	29	110	256
Missouri	111	242	538

State	Number of Geriatricians in 2021	Number of Geriatricians Needed in 2050 to Serve Those 65 and Older with Alzheimer's Dementia	Number of Geriatricians Needed in 2050 to Serve Those 65 and Older (with and without Dementia) Who Need Geriatrician Care
Montana	15	53	117
Nebraska	27	78	174
Nevada	48	159	366
New Hampshire	44	71	145
New Jersey	259	377	819
New Mexico	39	96	207
New York	714	808	1,755
North Carolina	253	501	1,112
North Dakota	19	32	73
Ohio	218	468	1,022
Oklahoma	30	144	337
Oregon	100	213	479
Pennsylvania	455	550	1,182
Rhode Island	32	49	104
South Carolina	70	267	601
South Dakota	17	41	88
Tennessee	74	292	672
Texas	431	1,252	2,941
Utah	38	135	326
Vermont	20	31	65
Virginia	193	367	797
Washington	180	368	827
West Virginia	31	66	151
Wisconsin	131	265	563
Wyoming	7	22	49
U.S. Total	**7,066**	**14,656**	**32,521**

The number of geriatricians in 2021 was retrieved from the American Geriatrics Society.[772] The number of geriatricians needed assumes that 30% of people age 65 and older who have complex medical needs would benefit from geriatrician care and that each geriatrician can care for up to 700 patients. These estimates were retrieved from the American Geriatrics Society[766] and Fried & Hall.[768]

The number of geriatricians needed to serve those living with Alzheimer's dementia assumes that the prevalence rate of Alzheimer's dementia among people age 65 to 74 is approximately 5.2%, age 75 to 84 is approximately 13.8%, and age 85+ is approximately 35.8%, as reported in Figure 5, which is created from data from Rajan et al.[276] The underlying state-specific estimates of the 2050 population age 65 and older were retrieved from the University of Virginia, Weldon Cooper Center for Public Service.[774]

caregiver. The care plan is then implemented by a DCS-led team that includes PCPs, family members, other health professionals and community-based organizations.[708] This model has been found to reduce nursing home admissions of participating Medicare beneficiaries.[802] In a quasi-experimental study of 3,249 patients with dementia from 2012 through 2015, the program was associated with $601 lower costs of health care per patient per quarter ($2,404 per year), while the cost of running the program was $317 per patient per quarter ($1,268 per year). This translated to a net savings to Medicare of $284 per patient per quarter ($1,136 per year).[802]

A second example is the Care Ecosystem program, which is a collaborative, team-based dementia care program that relies on trained care navigators along with advanced practice nurses, social workers and pharmacists.[803] The program, which uses telehealth and online care management, has been shown to result in fewer ambulance rides, emergency department visits and hospitalizations, among other outcomes.[804, 805] Secondary analysis of the Care Ecosystem randomized clinical trial also found cost savings compared with usual care, with participation resulting in annual gross cost savings of approximately $6,312, based on an average monthly reduction in health care expenditures of $526 after adjusting for dementia severity and time-specific treatment effects. [806] After accounting for the estimated monthly program costs, which ranged from $86 to $105 per month ($1,032 to $1,260 annually), the estimated annual net savings ranged from $5,052 to $5,280 per person. Trends for greater cost reductions were observed in patients with recent emergency department visits and for caregivers experiencing depression.

Further demonstrating the cost-saving potential of collaborative dementia care team models, the Healthy Aging Brain Center (HABC), an interprofessional memory care clinic, showed annual gross risk-adjusted cost savings of $3,474 per person for individuals with memory impairments compared with those receiving usual primary care.[793] More than half of these savings (53%) were attributed to reduced inpatient hospital costs. This finding represents an approximate 5.6-to-1 return on the annual program cost of $618 per person. After subtracting program costs, HABC demonstrated annual net cost savings of $980 to $2,856 per person, representing an approximate 1.6 to 4.6-to-1 return on investment, depending on the proportion of costs attributed directly to patient care.

Taken together, the evidence from across these studies suggests that collaborative dementia care models can generate cost savings of just under $1,000 to approximately $5,300 per person per year after accounting for programmatic costs, depending on the model.

The Guiding an Improved Dementia Experience (GUIDE) Model was launched by the Centers for Medicare & Medicaid Services (CMS) in 2024 to test the impact of providing comprehensive, collaborative services and supports for people living with dementia and their families on a national scale. The GUIDE Model is described in the Caregiving section on page 61 and discussed in more detail later in this Workforce section (under "Looking to the Future").

Direct Care at Home, in Residential Care and in Nursing Homes

The largest segment of the health and long-term care workforce — both overall and for dementia care specifically — is the direct care workforce.[807, 808] Direct care workers — who are formally classified by the Bureau of Labor Statistics as personal care aides, home health aides and nursing assistants, but known by a wide range of job titles in the field — assist older adults and people with disabilities in private homes, community-based settings such as adult day services and residential care, and skilled nursing homes, as well as in other settings such as hospitals.[809] Across these settings, direct care workers deliver the majority of day-to-day care to patients, clients and residents living with Alzheimer's disease and other types of dementia.[753]

Impairment in completing everyday tasks is a defining feature of Alzheimer's disease and other dementias. Direct care workers provide support to those living with dementia in carrying out activities of daily living (ADLs), such as bathing, eating, toilet care and mobility. In home care settings, they also support individuals with household chores, meal preparation, attending appointments and other instrumental activities of daily living (IADLs). Under the supervision of licensed nurses or other health care professionals, home health aides and nursing assistants also perform certain clinical tasks, such as wound care, measuring vital signs and medication administration (depending on the setting and regulatory context).[810, 811]

Beyond these distinct tasks, direct care workers may play a broader role in promoting nutrition, exercise, functional ability, social engagement and emotional well-being for those living with dementia. With training in active listening, empathic response and other relevant skills, direct care workers can reduce social isolation, provide emotional support and help prevent or reduce distress associated with dementia through the delivery of person-centered, non-pharmacological interventions.[812-815]

Direct care workers also support quality outcomes and, as a result, potential cost savings. Direct care workers providing in-home care enable individuals to continue living at home and help prevent or postpone nursing home placement,[816] playing a particularly critical role for individuals with limited or no family caregiver support.[817] Across settings, they also provide care to individuals returning from a hospital stay and can help reduce the risk of readmission, as well as assist with end-of-life care transitions.[818-821] Thanks to their daily caregiving role, direct care workers are well-placed to observe and report changes in individuals' status to clinical colleagues, thereby helping to reduce the risk of emergency department visits, avoidable hospitalizations and other adverse outcomes that are especially common among people living with dementia.[822, 823] With enhanced dementia-specific training, direct care workers may also play a role in implementing non-pharmacological interventions,[824] as noted above, and reducing inappropriate antipsychotic prescribing for individuals living with dementia in nursing homes.[825]

Between 2014 and 2024, the number of direct care workers increased from 3.5 million to more than 5.3 million due to growing demand for long-term care.[809] In 2025, the Bureau of Labor Statistics Employment Projections program estimated that 772,400 additional direct care workers would be needed between 2024 and 2034 — more new workers than in any other single occupation in the United States.[809] Job opportunities are growing primarily for personal care aides and home health aides, reflecting the overwhelming preference for "aging in place" and public policies that have expanded access to home and community-based services.[826]

The need for a larger direct care workforce in the coming years is expected across the country. Long-term occupational projections developed by each state in cooperation with the Bureau of Labor Statistics indicate that double-digit percentage increases in the number of home health and personal care aide jobs are expected from 2022 to 2032 in every state except Maine (Table 15).[827] (These 10-year occupational projections take into account past employment and economic trends as well as other factors that drive the demand for jobs, such as — in the case of personal care and home health aides — the long-term care policy changes noted in the previous paragraph.) Eleven states are expected to see a 30% or more increase in the number of home health and personal care aide jobs in response to growing demand — although these jobs won't necessarily be filled without enhanced recruitment and retention efforts. What's more, these projections fall short of true workforce demand, as they do not account for current workforce shortages nor for the additional workers who will be needed through the "gray market," meaning privately paid, usually unreported employment arrangements. One study using a nationally representative sample of adults found that nearly one-third of people who arrange paid care for an older adult or a person living with dementia rely on the gray market (rather than a home care agency or other formal care provider).[828]

Although demand for direct care workers, particularly home health and personal care aides, is expected to continue increasing over time, the long-term care field is already struggling to fill existing direct care positions. Turnover rates are high in this workforce — with an estimated median rate of 79% annually for direct care workers providing home care[829] and 99% for nursing assistants in nursing homes[830] — and recruitment and retention are long-standing challenges.[831-833] Given that 28% of direct care workers are immigrants to the U.S., the recent changes to immigration policy are likely to result in further workforce attrition.[809, 834] In turn, instability in the workforce and understaffing across care settings can lead to stress, injury and burnout among direct care workers, thereby further contributing to turnover while also compromising care access and quality.[835, 836]

Challenges in the direct care workforce are driven by persistently low compensation and poor job conditions. These challenges are underpinned by racial and gender discrimination that marginalizes this workforce, which is composed predominantly of women and people of color.[809] The individuals receiving care can also be subject to ageism and ableism, and these stereotypes can extend to judgments of those who provide the care.[837] In 2024, the year for which the most recent national data are available, the median wage for direct care workers was $17.36 per hour.[809] Despite their complex and critical role in supporting the health and well-being of older adults and people with disabilities, research shows that direct care workers earned a lower median wage in 2023 than workers in other occupations with similar or lower entry-level requirements, such as janitors, retail salespeople and customer service representatives.[838] Low wages combined with high rates of part-time work perpetuate economic instability for this workforce. Thirty-eight percent of direct care workers work part-time, median annual earnings are just $26,000, and 49% of this workforce receives some form of public assistance.[809]

Entry-level and ongoing training for direct care workers varies by role and care setting. Federal regulations require nursing assistants in various care settings and home health aides employed by Medicare-certified home health agencies to complete at least 75 hours of entry-level training and 12 hours of annual continuing education (although many states have set higher training requirements).[833] Care for individuals with cognitive impairment is among the required training topics for nursing assistants, but not for home health aides. In contrast, training requirements for other direct care workers — including those working in private homes, assisted living communities, adult day services and other settings — vary widely by state and setting, or, in some cases, are non-existent.[839] With regard to dementia-

TABLE 15

Expected Growth in Home Health and Personal Care Aide Jobs, 2022 to 2032

	Number in 2022 and Projected Number Needed in 2032		Percentage Increase
State	**2022**	**2032**	**2022-2032**
Alabama	22,030	24,720	12.2
Alaska	4,550	5,260	15.6
Arizona	68,550	96,120	40.2
Arkansas	20,310	24,670	21.5
California	796,900	1,060,200	33.0
Colorado	38,300	48,710	27.2
Connecticut	47,750	57,730	20.9
Delaware	9,530	12,350	29.6
District of Columbia	11,530	13,630	18.2
Florida	72,410	88,750	22.6
Georgia	36,890	46,020	24.7
Hawaii	*	*	*
Idaho	17,960	23,500	30.8
Illinois	108,190	124,190	14.8
Indiana	44,830	54,650	21.9
Iowa	25,390	32,770	29.1
Kansas	27,140	32,990	21.6
Kentucky	24,650	30,540	23.9
Louisiana	36,540	44,950	23.0
Maine	17,090	17,770	4.0
Maryland	32,420	38,640	19.2
Massachusetts	39,480	46,500	17.8
Michigan	85,480	100,320	17.4
Minnesota	113,680	129,520	13.9
Mississippi	17,560	22,720	29.4
Missouri	79,380	91,510	15.3
Montana	8,850	11,790	33.2
Nebraska	10,120	12,360	22.1
Nevada	16,000	21,330	33.3
New Hampshire	8,760	10,780	23.1
New Jersey	94,150	115,060	22.2
New Mexico	36,890	50,200	36.1
New York	551,740	710,140	28.7
North Carolina	62,750	77,390	23.3
North Dakota	7,310	9,010	23.3
Ohio	95,690	108,260	13.1
Oklahoma	19,090	23,300	22.1
Oregon	36,900	46,170	25.1
Pennsylvania	188,340	217,220	15.3
Rhode Island	8,070	10,000	23.9
South Carolina	32,340	43,300	33.9
South Dakota	4,620	5,340	15.6
Tennessee	32,820	46,870	42.8
Texas	313,670	367,500	17.2
Utah	15,000	19,730	31.5
Vermont	7,460	9,600	28.7
Virginia	60,230	81,100	34.7
Washington	66,330	75,654	14.10
West Virginia	20,130	25,780	28.1
Wisconsin	80,600	94,000	16.6
Wyoming	3,260	4,210	29.1
U.S. Total	**3,579,660**	**4,464,824**	**24.7**

* Long-term occupational projections for home health aides and personal care aides in Hawaii were not available at the time of publication; therefore these data are missing from U.S. total projections.

Created from Projections Managing Partnership, Projections Central: Long-Term Occupational Projections (2022-2032). Available at: https://projectionscentral.org/longterm. Accessed January 15, 2025.

specific training, a 2015 review found that only 13 states had established dementia care training requirements for direct care workers who provide in-home care. According to the same review, 44 states and the District of Columbia had set dementia care training standards for assisted living staff, but those regulations only pertained to special dementia care facilities or units in 14 of those states.[840] Inadequate training for direct care workers contributes to their mischaracterization as "low-skill" workers, fails to prepare them for the complexity and challenges of their roles, undermines job satisfaction and retention, and directly impacts the provision of dementia care.

Direct care is also physically and emotionally demanding work, which is not well-reflected in the training standards or compensation for this workforce. As one indicator, data from the Bureau of Labor Statistics show that nursing assistants in nursing homes were nearly five times more likely than U.S. workers overall to experience workplace injuries in 2022 (the most recent year for which occupation-specific data on injuries in nursing homes are available).[841] Comparable occupational injury data are not available for direct care workers in home and community-based settings due to reporting limitations, but these workers are also exposed to a range of occupational risks, such as unsafe physical environments, infection hazards, interpersonal violence and occupational stress.[842-844]

Community Integration and Support

Alongside clinical providers and direct care workers, a dementia-capable community-based workforce is central to realizing dementia-friendly communities that support people with dementia to live and age in place.[845, 846]

Dementia-friendly communities were conceptualized in Japan as early as 2004 and have grown into a worldwide movement in the intervening decades.[847] In the United States, the movement began as ACT on Alzheimer's, a community-led initiative in Minnesota that began in 2013,[848] and launched nationally as Dementia-Friendly America (DFA) at the White House Conference on Aging in 2015.[849] At a global level, a dementia-capable workforce is also essential to the World Health Organization's growing Age-Friendly Cities and Communities movement, which promotes community inclusion, independence and wellbeing for all people as they age.[850]

Community health workers (CHWs) are a key part of this broader dementia-capable workforce. CHWs are frontline public health workers tasked with serving as trusted links between community members and health and social care systems. CHWs therefore help make care more accessible, of higher quality and culturally competent.[851] In the context of Alzheimer's disease and other dementias, CHWs can help dispel misconceptions and stigma, promote brain health and risk reduction, encourage earlier screening and clinical trial participation, communicate information in culturally and linguistically competent ways, and improve access and navigation to support services for individuals and family caregivers, among other contributions.[852] One recent global scoping review identified five broad roles for CHWs related to dementia: education and awareness-building; screening for dementia; screening for HIV-associated dementia; assistance with utilizing health care resources; and providing services to dementia caregivers.[853] In 2025, the federal Administration for Community Living elevated the importance of CHWs as part of the dementia care workforce by offering cooperative agreement grants to support the development and expansion of dementia-capable CHW programs within local Area Agencies on Aging and State Units on Aging.[854]

Other members of the community-based workforce who should be equipped with dementia-related knowledge, skills and competencies include librarians, who provide supportive services and programming;[855] architects and others, who design tailored floor plans, landscapes, soundscapes and sonic environments;[856, 857] adult protective service workers, who handle elder abuse cases;[858-860] police officers and other members of law enforcement agencies;[860-862] and hairdressers,[863] bus drivers, postal workers, bank tellers and faith leaders, among many others, who may routinely interact with people living with dementia and their families.[864]

With appropriate training, members of this community-based workforce are well-positioned to spot signs of cognitive impairment, direct individuals to appropriate resources or services, and engage appropriately with people living with dementia and family caregivers.[865] For instance, recognizing that Alzheimer's dementia is a significant concern among its clients, Bank of America instituted training programs for financial advisors on dementia and caregiving.[866] At the state policy level, a 2015 nationwide survey found that 10 states (Colorado, Florida, Indiana, Maryland, New Hampshire, New Jersey, Oklahoma, Oregon, South Carolina and Virginia) had passed laws that required dementia training for law enforcement personnel, with six of these states incorporating the training into missing person programs for individuals living with dementia.[860] States that have passed dementia training requirements for law enforcement and other first responders more recently include Arkansas, California, Florida, Ohio, Texas and Virginia; training topics include preventing and responding to wandering behaviors, communication techniques and alternatives to physical restraint for people living with Alzheimer's disease, other dementias or autism.[867-873]

More research is needed on the implications of dementia- and age-friendly community initiatives for workforce development, and on the effectiveness of dementia-capable workforce interventions such as the training programs described above.

Looking to the Future

In 2020, the American Public Health Association identified "strengthening the dementia care workforce" as a public health priority.[751] More recently, the National Institute on Aging (NIA) recognized the importance of building knowledge on dementia care workforce issues and dementia care outcomes by funding a five-year cooperative agreement with a national multidisciplinary team of experts who have launched the National Dementia Workforce Study (NDWS).[808, 874-877] NDWS includes a family of surveys that are focused on community clinicians and nursing home, assisted living, and home care administrators and staff. The survey data can be linked to outcomes of individuals living with dementia. Data from the first wave of surveys are now available to researchers, and NDWS will fund annual pilot research projects for all five years, with the first two cycles already underway.[878]

This section outlines three types of emerging initiatives that will continue to strengthen the dementia care workforce into the future: initiatives that improve the competence of the dementia care workforce, initiatives that enhance the coordination of care, and initiatives that incorporate technology to improve care quality and sustain individuals' quality of life.

Dementia Care Competence and Specialization

Dementia care is inadequately covered in health care training programs, both in curricula and in opportunities for clinical practice.[879-881] Yet more dementia training and opportunities to specialize are critically needed, not just to build PCPs' skills and confidence in detecting and diagnosing dementia, but also to overcome the widespread shortage of geriatricians and other specialists and to expand the direct care workforce to meet growing needs.[757, 765, 788, 882, 883]

Overall, the geriatric care principles of the Age-Friendly Health Systems movement should be integrated across all health care curricula to ensure widespread delivery of dementia-responsive care for older adults.[884-887] These principles, known as the 4Ms, include What Matters (knowing and aligning with each older adult's specific care goals and preferences); Mobility (supporting safe movement to maintain function and achieve What Matters); Mentation (preventing, identifying, treating, and managing dementia, depression and delirium); and Medication (ensuring that medication does not interfere with What Matters, Mobility or Mentation).

Moreover, training in cultural and linguistic competency is also needed to help the full dementia care workforce support individuals from diverse populations, including individuals from various racial, ethnic, and sexual and gender minority groups. Complementing this training, language-concordant and culturally tailored resources and referrals are needed to help overcome the misunderstandings, biases, misdiagnoses and related disparities experienced by people of color and other individuals in minority populations who are living with dementia and by their families.[539, 888-893]

Numerous efforts are underway to build the health care workforce that is needed to support the growing older population and individuals with Alzheimer's disease and other dementias in particular. One key example is the Geriatrics Workforce Enhancement Program (GWEP) funded by the Health Resources and Services Administration, which comprises a network of 42 individual GWEPs across 37 U.S. states.[894] The goals of this program are to educate and train the health care workforce to provide care for older adults in a way that integrates geriatrics and primary care, and to deliver community-based programs that improve health outcomes for older adults. One particular goal for the GWEPs is to provide dementia training to a broad range of health care professionals, educators, individuals and families.

Other innovative approaches to building the geriatric health care workforce include geriatric medicine fellowship training programs for mid-career physicians, and the creation of a Medicine-Geriatrics Integrated Residency and Fellowship Pathway (Med-Geri Pathway), and a combined Geriatrics and Palliative Medicine (Geri-Pal) Fellowship.[788] One successful training model is the Alzheimer's and Dementia Care ECHO® (Extension for Community Healthcare Outcomes) Program, which pairs PCPs with multidisciplinary specialist teams through telementoring to develop PCPs' knowledge and confidence in dementia care. According to an evaluation of the program, which was launched in 2018 by the Alzheimer's Association, 94% of surveyed PCPs participating in the program reported making changes in their delivery of dementia care because of the program and 87% reported higher job satisfaction.[895] Qualitative research has shown that participants value the supportive learning environment and access to resources, while also indicating that time constraints limit their ongoing engagement with the project.[896]

Coordinated, Collaborative Care Models

No single provider can address the medical, behavioral and psychosocial needs of individuals living with Alzheimer's disease and other forms of dementia. Instead, as discussed earlier in this section, growing evidence supports the need for and effectiveness of well-coordinated, collaborative models of care that provide individualized support for those living with dementia and their family caregivers.

One recent development in this area has been the launch of the voluntary national GUIDE Model by the Centers for Medicare & Medicaid Services (CMS), which has 330 participating organizations as of 2025.[749] Through this eight-year test program, participating organizations will offer multidisciplinary care and support for community-dwelling, traditional Medicare beneficiaries living with dementia, as well as their caregivers. Each multidisciplinary GUIDE team must include a care navigator to help individuals access clinical and non-clinical services and supports, such as person-centered assessments and care plans, care coordination, caregiver training and education, meals and transportation through community-based organizations, and respite care services. Participating organizations must be Medicare Part B-enrolled providers/suppliers and eligible to bill for Medicare Physician Fee Schedule services. To address inequities in dementia care, the GUIDE model offers a variety of financial and technical supports to ensure participating safety-net organizations can develop their infrastructure, improve their care delivery capabilities, and participate successfully to reach all patients, especially dually eligible populations (populations eligible for both Medicare and Medicaid) and those in underserved areas such as rural communities.[749] Evaluation of this alternative payment model will generate important evidence for how to scale-up the delivery of coordinated and comprehensive dementia care.[794, 897, 898]

Looking ahead, as new therapies for Alzheimer's and other dementias develop, new forms of multidisciplinary collaboration may also be required. For example, lecanemab and donanemab, the two disease-modifying medications approved by the U.S. Food and Drug Administration (FDA) for Alzheimer's, are administered through intravenous infusion and require careful monitoring of patients for a serious potential side effect called amyloid-related imaging abnormalities, or ARIA (see "Treatments to Slow Alzheimer's Disease" in the Overview).[51, 55] Identifying and screening candidates for treatment, monitoring their health throughout the treatment, evaluating progress and assessing whether to continue treatment all require enhanced collaboration between PCPs and specialists. New members of the multidisciplinary dementia care team are also required, including infusion nurses, radiologists and radiology technicians with special training in recognizing ARIA and specialists with expertise in managing ARIA if it occurs.

Augmenting the Workforce Through Technology

Workforce priorities described in this section include building dementia competencies across different professions, increasing the pipeline of dementia specialists such as geriatricians and neurologists, stabilizing and improving conditions for the direct care workforce, and expanding the dementia-capable, community-based workforce. As the prevalence of Alzheimer's disease and other dementias continues to increase in the context of population aging, it will also be increasingly important to leverage technology to optimize and augment the dementia care workforce.

Technology can improve access to dementia care training, for example, through e-learning programs — although evidence suggests that the effectiveness of such programs relies on the relevance of the content and the inclusion of interactive learning strategies, not just didactic content.[899] Telehealth technologies can be leveraged to improve access to care for people living with dementia, especially for those in rural areas and those with mobility limitations.[900] The study described earlier that examined the telephone-based Care Ecosystem project showed that remote interventions can improve quality of life, reduce emergency department visits, and decrease caregiver depression and burden.[804] A systematic review found that telehealth can achieve similar results on cognitive assessment and diagnosis as in-person services.[901] More research is needed to identify the benefits and potential shortfalls of telehealth, and to assess how it can be utilized appropriately in the diagnosis and treatment of individuals living with dementia, as well as for supporting their caregivers.

Furthermore, assistive, therapeutic and remote monitoring technologies, which range from smart home devices to automated medication prompts, robotic animals and devices that support personalized activities, can be used to augment the role of the dementia care workforce.[902, 903] As with telehealth, more research is needed to understand the efficacy of these myriad technologies and to address ethical concerns and unintended consequences related to privacy, autonomy and interpersonal interactions.[904] As indicated by the 2024 report of *The Lancet* Commission on dementia prevention, intervention, and care, "Technologies should, where possible, supplement rather than replace existing face-to-face care to avoid leading to harmful social isolation."[65]

The role of artificial intelligence (AI) in augmenting the dementia care workforce is also an emerging topic. Proceedings from a 2023 symposium hosted by the Johns Hopkins AI and Technology Collaboratory for Aging Research and the NIA indicate the promise of AI for improving dementia diagnosis rates, creating personalized care plans and services, providing coaching and recommendations to dementia caregivers, and more.[905] Concerns were also raised at the symposium, however, about how AI models will be regulated, what level of liability will be held by individual providers, how informed consent for collecting and utilizing personal data will be ensured, and how equitably these models will be deployed. As AI technology rapidly advances, more research will be needed to monitor its acceptability, effectiveness and potential risks in the context of dementia care and the dementia care workforce.

USE AND COST OF HEALTH CARE, LONG-TERM CARE AND HOSPICE

IN 2026, HEALTH AND LONG-TERM CARE COSTS FOR PEOPLE LIVING WITH ALZHEIMER'S AND OTHER DEMENTIAS ARE PROJECTED TO REACH $409 BILLION.

The costs of health care and long-term care for individuals living with Alzheimer's or other dementias are substantial, and dementia is one of the costliest conditions to society.[906] Total payments in 2026 (in 2026 dollars) for all individuals living with Alzheimer's or other dementias are estimated at $409 billion (Figure 15), not including the value of informal caregiving that is described in the Caregiving section. Medicare and Medicaid are expected to cover $263 billion, or 64%, of the total health care and long-term care payments for people living with Alzheimer's or other dementias. Out-of-pocket spending is expected to be $103 billion, or 25% of total payments.[A11] For the remainder of this section, costs are reported in 2025 dollars unless otherwise indicated.[A12]

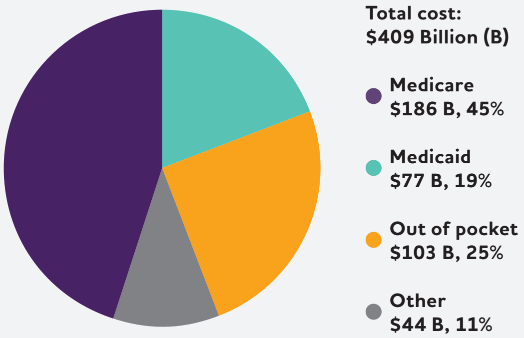
Total Cost of Health Care and Long-Term Care

Table 16 reports the average annual per-person payments for health care and long-term care services for traditional (i.e., original or fee-for-service) Medicare beneficiaries age 65 and older with and without Alzheimer's or other dementias based on data from the 2018 Medicare Current Beneficiary Survey.[A13-A15] Unless otherwise noted, cost and health care utilization statistics for Medicare beneficiaries are for traditional Medicare and do not represent those enrolled in Medicare Advantage. Total per-person health care and long-term care payments in 2025 dollars from all sources for Medicare beneficiaries living with Alzheimer's or other dementias were nearly three times as great as payments for other Medicare beneficiaries in the same age group ($46,141 per person for those with dementia compared with $15,499 per person for those without dementia).[A15, 907]

Researchers have evaluated the additional or "incremental" health care, residential long-term care and family caregiving costs of dementia (that is, the costs specifically attributed to dementia when comparing people with and without dementia who have the same coexisting medical conditions and demographic characteristics).[579, 906, 908] These studies have used different time horizons, ranging from lifetime costs (i.e., costs between the time of diagnosis and death) to annual costs. The lifetime total cost of care, including out-of-pocket expenses, Medicare and Medicaid expenditures, and informal caregiving costs, is estimated at $321,780 per person living with Alzheimer's dementia in 2015 dollars ($417,263 in 2025 dollars), more than twice the estimated lifetime cost for individuals without Alzheimer's dementia.[578] Another group of researchers found that lifetime total costs were three times higher for women compared with men living with Alzheimer's dementia, due to women having a longer duration of illness and spending more time in a nursing home.[909] Annual incremental health care and nursing home costs for individuals with dementia (that is, the additional costs compared with those for individuals without dementia) are estimated at $28,501 per person per year in 2010 dollars ($42,509 in 2025 dollars).[A16, 906] The majority of incremental costs have been attributed to informal care and out-of-pocket costs, rather than medical care and nursing home costs paid by Medicare or Medicaid.[578, 909, 910] The incremental five-year cost of care for dementia paid by Medicare has been estimated at nearly $16,000 per person in 2017 dollars ($19,501 in 2025 dollars), with nearly half of these costs incurred in the year after diagnosis and 87% concentrated in the two years after diagnosis.[910, 911] However, these estimates include costs for individuals who died during the five-year period, and the incremental costs for individuals who survive at least five years after diagnosis are even higher.

FIGURE **15**

Costs of Care by Payment Source for Americans Age 65 and Older with Alzheimer's or Other Dementias, 2026*



*Data are in 2026 dollars. "Other" payment sources include private insurance, health maintenance organizations, other managed care organizations and uncompensated care.

Created from data from the Lewin Model.[A11]

TABLE **16**

Average Annual Per-Person Payments by Payment Source for Health Care and Long-Term Care Services, Medicare Beneficiaries Age 65 and Older, with and without Alzheimer's or Other Dementias, in 2025 Dollars*

Payment Source	Beneficiaries with Alzheimer's or Other Dementias	Beneficiaries without Alzheimer's or Other Dementias
Medicare	$23,231	$8,371
Medicaid	7,158	322
Uncompensated	203	253
Health maintenance organization	2,063	2,423
Private insurance	1,622	1,012
Other payer	987	443
Out of pocket†	10,877	2,674
All sources	46,141	15,499

*Payments include payments for community-dwelling beneficiaries and beneficiaries in care residences.

†Costs that individuals paid themselves. These costs include Medicare deductibles, copayments and coinsurance; other health insurance premiums, deductibles, copayments and coinsurance; and services not covered by Medicare, Medicaid or other sources of support.

Created from unpublished data from the Medicare Current Beneficiary Survey for 2018.[A13, 907]

Several groups of researchers have found that both health care and prescription drug spending are significantly higher for people diagnosed with Alzheimer's or other dementias in the year before diagnosis, compared with spending for individuals without dementia.[912-914] However, the sources of increased spending differed across studies. In one study, the largest differences were due to inpatient and post-acute care,[913] while another study found that outpatient care, home care and medical day services were the primary drivers of higher costs, with only a small difference in inpatient care costs.[914]

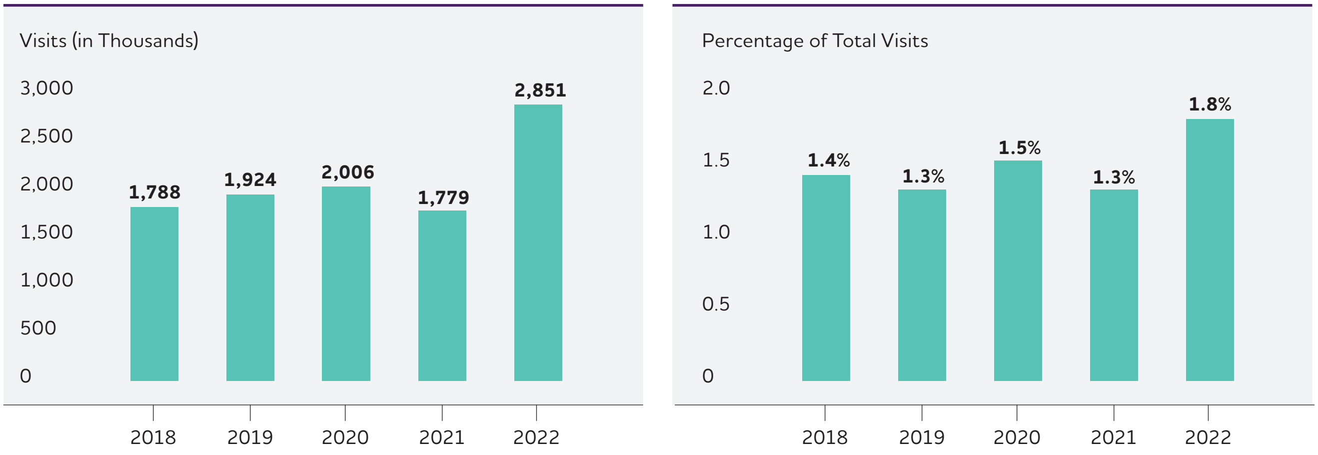
Similarly, spending spikes in the year following diagnosis. Three groups of researchers found that total health care costs after diagnosis were substantially higher than for individuals with similar characteristics who did not have Alzheimer's or other dementia, with differences ranging from $7,264 in 2017 dollars ($8,854 in 2025 dollars)[910] to $17,852 in 2014 dollars ($23,075 in 2025 dollars)[913] for individuals with traditional Medicare. In contrast, one group of researchers did not find a significant difference in health care spending in the two years after diagnosis.[915]

Higher health care costs persist beyond the year after diagnosis. One group of researchers found that incremental health care costs remain higher in the second year after diagnosis ($7,327 in additional costs in 2014 dollars [$9,751 in 2025 dollars]).[913] Another research team found that costs for individuals with dementia remained significantly higher through the fourth year after diagnosis but were no longer significantly higher in the fifth year.[910] These incremental costs decreased over time, from $4,241 in 2014 dollars ($5,169 in 2025 dollars) in year two to $1,302 ($1,587 in 2025 dollars) in year four, before rising again in the last year and last month of life.[916] One possible explanation for the spike in health care costs in the years surrounding diagnosis relates to delays in timely diagnosis. One group of researchers found that individuals with cognitive decline who obtained care from a specialist (that is, a neurologist, psychiatrist or geriatrician) were diagnosed with Alzheimer's disease more quickly than those who saw non-specialists.[917] Moreover, individuals diagnosed by specialists incurred lower Medicare costs in the year after diagnosis of Alzheimer's dementia than those diagnosed by non-specialists.

Despite having Medicare and other sources of financial assistance, individuals living with Alzheimer's or other dementias and their family members incur high out-of-pocket costs. These are expenses that individuals must pay themselves, rather than being paid by insurance or other sources. Out-of-pocket costs include Medicare deductibles, copayments and coinsurance; other health insurance premiums, deductibles, copayments and coinsurance; and services not covered by Medicare, Medicaid or other sources of support. On average, Medicare beneficiaries age 65 and older living with Alzheimer's or other dementias paid $10,877 out of pocket annually for health care and long-term care services not covered by other sources (Table 16).[907] This includes the cost of long-term nursing home care for individuals not eligible for Medicaid. One group of researchers found that out-of-pocket and informal caregiving costs for a family member with dementia totaled $203,117 in 2016 dollars ($253,779 in 2025 dollars) in the last seven years of life, compared with $102,955 in 2016 dollars ($128,634 in 2025 dollars) for those without dementia.[666] However, informal caregiving costs during this same interval were considerably higher for households with a family member with dementia living in the community than for households with a family member with dementia living in a nursing home ($231,730 versus $165,910 in 2016 dollars [$289,529 versus $207,292 in 2025 dollars]) due to Medicaid covering the cost of nursing home care for many individuals.[666]

FIGURE **16**

Emergency Department Visits for Individuals with Alzheimer's Disease, 2018 to 2022



Created from data from the National Hospital Ambulatory Medical Care Survey.[928-932]

Multiple groups of researchers have specifically examined out-of-pocket costs and found that individuals living with Alzheimer's or other dementias and their families incur substantially higher out-of-pocket costs than do individuals without dementia. Although incremental Medicare expenditures peak in the year after diagnosis and decrease in the subsequent four years, out-of-pocket costs have been shown to increase over time, from $3,104 in the first two years after diagnosis to $3,730 in years three to four after diagnosis, to $3,934 in years seven to eight after diagnosis (in 2017 dollars; $3,783, $4,546 and $4,795 in 2025 dollars).[918] Higher out-of-pocket costs for Alzheimer's and other dementias have been attributed to nursing home care, home health care and prescription drug payments.[919, 920] Furthermore, individuals living with Alzheimer's dementia spend an average of 12% of their (individual and spouse/partner) annual income on out-of-pocket health care services, excluding nursing home and informal care, compared with 7% for individuals without Alzheimer's dementia.[920] These out-of-pocket costs are a substantial financial burden on individuals living with Alzheimer's or other dementias. Recent research found that 71% of individuals with moderate dementia and 80% with severe dementia incurred out-of-pocket health care costs in the prior year. Among those with any expenditures, the median out-of-pocket cost was $2,853 (in 2023 dollars; $3,010 in 2025 dollars). The burden grows for those with nursing home care: the 31% of individuals with severe dementia who incurred nursing home expenditures spent a median of $4,118 ($4,345 in 2025 dollars), while individuals with moderate dementia and nursing home expenditures incurred $40,165 ($42,378 in 2025 dollars). The overall financial impact of these out-of-pocket expenditures is alarming: 21% of individuals with severe dementia had out-of-pocket costs that exceeded 40% of their post-subsistence income (household income less food costs), and 12% had household incomes fall below the federal poverty level after deducting these out-of-pocket costs.[921]

Another perspective to examine incremental costs for individuals living with Alzheimer's and other dementias is through the costs of care at the end of life. A recent systematic review of end-of-life costs for individuals with dementia reported that costs were especially high during the last month of life, even compared with monthly costs over the last year of life.[922] Researchers comparing end-of-life costs in the last five years of life for individuals with and without dementia found that the total cost was $287,038 per person for individuals with dementia in 2010 dollars and $183,001 per person for individuals without dementia ($428,115 and $272,945, respectively, in 2025 dollars), a difference of 57%.[923] Out-of-pocket costs represent a substantially larger proportion of total wealth for those with dementia than for people without dementia (32% versus 11%).

Use and Costs of Health Care Services

Use of Health Care Services

Unadjusted data (that is, data that do not account for differences in the characteristics of people with versus without Alzheimer's or other dementias) show that people living with Alzheimer's or other dementias have more than twice as many hospital stays per year as other older people.[475] Moreover, the use of health care services by people with other serious medical conditions is strongly affected by the presence or absence of dementia. In particular, people with coronary artery disease, diabetes, chronic kidney disease, chronic obstructive pulmonary disease, stroke or cancer who also have Alzheimer's or other dementias have higher use and costs of health care services than people with these medical conditions but no coexisting dementia. In addition to having more hospital stays, older people living with Alzheimer's or other dementias have more skilled nursing facility stays per year than other older people.

- Hospital. In 2019, there were 518 hospital stays per 1,000 Medicare beneficiaries age 65 and older living with Alzheimer's or other dementias compared with 234 hospital stays per 1,000 Medicare beneficiaries age 65 and older without these conditions.[475] Overall, 32% of Medicare beneficiaries living with Alzheimer's or other dementias have at least one hospital discharge annually compared with 15% of beneficiaries without these conditions, with average hospital stays of 5.1 days versus 4.5 days, respectively.[475] The most common reasons that people living with Alzheimer's or other dementias were hospitalized in 2022 include bacterial infections, COVID-19, urinary tract infections, neurocognitive disorders and hip fractures, accounting for 32% of hospitalizations in 2022 (Table 17).[924] Although the total number of hospitalizations for people living with Alzheimer's or other dementias decreased by approximately 22,000 (6.1%) between 2021 and 2022, the number of hospitalizations for COVID-19 decreased by only 1.3%.[924, 925] Among Medicare beneficiaries living with Alzheimer's or other dementias, approximately 22% of

TABLE **17**

Most Common Reasons (Primary Diagnoses) for Hospitalization for People with Alzheimer's or Other Dementias, 2022

Reason*	Percentage of Hospitalizations
Bacterial infections	12.7
COVID-19	5.6
Urinary tract infections	5.0
Neurocognitive disorders	4.5
Hip fracture	4.3
Acute and unspecified renal (kidney) failure	3.5
Cerebral infarction (stroke)	3.0
Pneumonia (not caused by tube feeding)	2.6
Chronic kidney disease	2.5
Septicemia	2.4
Other nervous system disorders†	2.4
Fluid & electrolyte disorders	2.1
Heart failure	2.0
Gastrointestinal hemorrhage	2.0
Complication of genitourinary device	1.9
Cardiac dysrhythmias	1.8
Aspiration pneumonitis	1.7
Traumatic brain injury	1.7
Acute myocardial infarction	1.4
Epilepsy; convulsions	1.3

*Changes in the most common reasons for hospitalization between 2021 and 2022 may reflect reclassification of some diagnosis codes into different reasons or categories rather than changes in underlying clinical conditions.

†Includes nonhereditary and nondegenerative conditions affecting the nervous system not classified elsewhere, predominantly metabolic and other encephalopathies.

Created from the Healthcare Cost and Utilization Project National Inpatient Sample for 2022.[924]

TABLE **18**

Average Annual Per-Person Payments by Type of Service for Health Care and Long-Term Care Services, Medicare Beneficiaries Age 65 And Older, with and without Alzheimer's or Other Dementias, in 2025 Dollars

Type of Service	Beneficiaries with Alzheimer's or Other Dementias	Beneficiaries without Alzheimer's or Other Dementias
Inpatient hospital	$8,340	$3,121
Medical provider*	6,182	3,990
Skilled nursing facility	4,261	429
Nursing home	15,715	608
Hospice	2,466	144
Home health care	1,973	291
Prescription medications†	5,119	3,452
Dental	571	823
Outpatient events	3,047	2,397

*"Medical provider" includes physician, other provider and laboratory services, and medical equipment and supplies.

†Information on payments for prescription medications is only available for people who were living in the community; not those living in a nursing home or assisted living residence.

Created from unpublished data from the Medicare Current Beneficiary Survey for 2018.[A13, 907]

TABLE 19

Emergency Department (ED) Visits, Hospital Readmissions, and Per Capita Medicare Payments in 2025 Dollars, Among Medicare Beneficiaries with Alzheimer's or Other Dementias

State	Number of ED Visits per 1,000 Beneficiaries*	Percentage of Hospital Stays Followed by Readmission within 30 Days*	Per Capita Medicare Fee-For-Service Payments†		
			Medicare Only	Dual Eligible	All Medicare
Alabama	1,410.8	21.2	$29,624	$32,710	$30,427
Alaska	1,477.6	19.3	31,935	33,981	32,709
Arizona	1,436.2	20.2	35,248	43,881	36,252
Arkansas	1,530.4	21.5	29,633	30,837	30,023
California	1,496.3	23.0	41,589	54,871	48,018
Colorado	1,424.8	18.6	31,000	33,098	31,484
Connecticut	1,635.4	22.7	37,023	40,062	38,105
Delaware	1,577.6	21.5	35,144	35,004	35,107
District of Columbia	1,741.7	25.6	36,014	47,446	41,598
Florida	1,551.9	23.0	35,278	44,219	37,950
Georgia	1,573.2	22.5	32,117	37,287	33,423
Hawaii	1,248.2	16.0	27,202	29,183	27,460
Idaho	1,389.2	17.2	27,072	27,261	27,108
Illinois	1,624.1	23.4	35,301	44,071	36,856
Indiana	1,514.2	21.3	31,803	33,246	32,333
Iowa	1,310.7	18.0	24,470	22,806	24,060
Kansas	1,406.0	19.8	29,723	30,301	29,865
Kentucky	1,735.5	23.1	30,858	34,207	31,576
Louisiana	1,709.9	22.1	34,306	42,432	36,727
Maine	1,665.3	19.7	26,235	26,677	26,385
Maryland	1,524.1	24.4	37,905	44,939	39,806
Massachusetts	1,668.4	24.7	38,842	40,968	39,439
Michigan	1,691.4	24.0	31,443	36,156	32,412
Minnesota	1,467.1	21.6	29,021	34,873	29,707
Mississippi	1,714.8	22.1	32,275	37,573	34,221
Missouri	1,529.6	22.6	30,409	34,210	31,038

TABLE **19** (cont.)

Emergency Department (ED) Visits, Hospital Readmissions and Per Capita Medicare Payments in 2025 Dollars Among Medicare Beneficiaries with Alzheimer's or Other Dementias

State	Number of ED Visits per 1,000 Beneficiaries*	Percentage of Hospital Stays Followed by Readmission within 30 Days*	Per Capita Traditional Medicare Payments†		
			Medicare Only	Dual Eligible	All Medicare
Montana	1,328.6	16.6	$23,374	$25,436	$23,701
Nebraska	1,153.6	18.7	27,073	31,528	27,681
Nevada	1,711.5	25.8	42,173	53,160	45,520
New Hampshire	1,493.8	20.4	30,555	32,926	30,783
New Jersey	1,456.3	22.9	41,407	43,986	42,127
New Mexico	1,563.7	20.6	29,615	33,383	30,647
New York	1,461.3	23.7	44,622	47,603	45,486
North Carolina	1,683.8	21.5	29,328	31,907	30,020
North Dakota	1,173.3	18.4	23,989	23,965	23,985
Ohio	1,618.7	22.5	32,618	35,901	33,411
Oklahoma	1,692.1	21.6	35,534	44,542	37,077
Oregon	1,628.4	18.7	26,350	31,520	27,621
Pennsylvania	1,470.5	22.0	33,880	36,163	34,246
Rhode Island	1,605.6	23.2	33,402	36,932	33,705
South Carolina	1,558.2	21.7	31,877	34,389	32,291
South Dakota	1,200.1	18.6	26,868	29,366	27,316
Tennessee	1,548.6	21.5	30,578	34,498	31,231
Texas	1,549.1	22.1	39,715	45,665	40,961
Utah	1,194.3	16.7	27,693	34,633	28,730
Vermont	1,528.4	19.6	24,742	29,865	25,885
Virginia	1,621.7	21.6	30,198	30,466	30,247
Washington	1,479.2	18.6	26,967	30,374	27,747
West Virginia	1,811.4	24.1	30,695	31,680	30,931
Wisconsin	1,519.9	19.9	29,681	30,253	29,792
Wyoming	1,445.9	17.4	30,007	27,426	29,311

*Based on Medicare utilization for 2018.

†Based on traditional Medicare utilization for 2023. Dual Eligible refers to individuals eligible for both Medicare and Medicaid.

Created from data from the U.S. Centers for Medicare & Medicaid Services.[936]

hospital stays are readmissions occurring within 30 days after discharge from another hospitalization.[926] One statewide study reported that 30-day readmission rates were 6.8 percentage points higher for patients living with Alzheimer's or other dementias than for patients without Alzheimer's or other dementias (21.5% versus 14.7%).[927]

- Emergency department. There were 2.85 million emergency department visits for people living with Alzheimer's in 2022, representing 1.8% of all emergency department visits (including visits for people of all ages) (Figure 16).[928] Between 2018 and 2022, the number of emergency department visits for individuals living with Alzheimer's disease increased by 59%, from 1.79 million to 2.85 million, outpacing the increase in emergency department visits overall (Figure 16).[928-932] The most common reasons for emergency department visits by individuals living with Alzheimer's include accidents, psychological or mental disorder symptoms, general weakness, shortness of breath, chest pain, and disorders of motor function and falls, together representing 31% of visits.[933] Furthermore, emergency department visits more frequently occur for individuals living with Alzheimer's than for other older adults. One group of researchers found that individuals living with Alzheimer's or another dementia seen in the emergency department are more likely to be admitted to the hospital or a nursing home than are Medicare beneficiaries without Alzheimer's or other dementias.[934] Additionally, individuals living with Alzheimer's or other dementias are more likely to have at least one hospitalization, have at least one subsequent emergency department visit, and be admitted to hospice in the 12 months following the initial emergency department visit.
- Skilled nursing facility. Skilled nursing facilities provide transitional care for older adults who no longer require acute inpatient hospitalization, but require nursing or rehabilitation services before they are ready to return home, such as giving intravenous antibiotics, providing wound care, and delivering physical therapy services.[935] Medicare covers 188 skilled nursing facility stays per 1,000 Medicare beneficiaries living with Alzheimer's or other dementias per year compared with 40 stays per 1,000 beneficiaries without these conditions — a rate nearly five times as high.[475] Overall, 19% of Medicare beneficiaries living with Alzheimer's or other dementias have at least one skilled nursing facility stay annually compared with 4% of Medicare beneficiaries without these conditions.[475]

Costs of Health Care Services

Average per-person payments for health care and long-term care services (hospital, outpatient, physician and other medical provider, nursing home, skilled nursing facility, hospice and home health care) and prescription medications were higher for Medicare beneficiaries living with Alzheimer's or other dementias than for Medicare beneficiaries without dementia in the same age group (see Table 18).[A13, 907]

Use and Costs of Health Care Services by State

Substantial geographic variation exists in health care utilization and Medicare payments by individuals living with Alzheimer's or other dementias (see Table 19). Emergency department visits, including visits that result in a hospital admission, range from 1,154 per 1,000 beneficiaries annually in Nebraska to 1,811 per 1,000 beneficiaries annually in West Virginia, and the percentage of hospital stays followed by hospital readmission within 30 days ranges from 16% in Hawaii to 25.8% in Nevada. Medicare spending per capita ranges from $23,701 in Montana to $48,018 in California.[936] Medicare spending per capita is substantially higher for beneficiaries who are also enrolled in Medicaid than for those with only Medicare coverage in all states except Iowa.

Use and Costs of Health Care Services Across the Alzheimer's Disease Continuum

Health care costs are higher for individuals living with dementia. In a population-based study of adults age 70 to 89, annual health care costs were significantly higher for individuals living with dementia than for those with either mild cognitive impairment (MCI) or without cognitive impairment.[937] Annual health care costs for individuals with MCI were not significantly different, however, from costs for individuals without cognitive impairment.

Impact of Alzheimer's and Other Dementias on the Use and Costs of Health Care in People with Coexisting Medical Conditions

Nearly 9 out of 10 Medicare beneficiaries living with Alzheimer's disease or other dementias have at least one other chronic condition.[475] Additionally, they are more likely than those without dementia to have other chronic conditions.[475] Overall, 2.7 times more Medicare beneficiaries with Alzheimer's or other dementias have four or more chronic conditions (excluding Alzheimer's disease and other dementias) than Medicare beneficiaries without dementia.[475] Table 20 reports the percentage of people living with Alzheimer's or other dementias who had certain coexisting medical conditions. In 2019, 46% of Medicare beneficiaries age 65 and older with dementia also had coronary artery disease, 46% had chronic kidney disease, 37% had diabetes, 34% had congestive heart failure and 20% had chronic obstructive pulmonary disease.[475]

TABLE **20**

Percentage of Medicare Beneficiaries Age 65 and Older with Alzheimer's or Other Dementias Who Have Specified Coexisting Conditions

Coexisting Condition	Percentage
Coronary artery disease	46
Chronic kidney disease	46
Diabetes	37
Congestive heart failure	34
Chronic obstructive pulmonary disease	20
Stroke	13
Cancer	10

Created from unpublished data from the National 100% Sample Medicare Fee-for-Service Beneficiaries for 2019.[475]

Medicare beneficiaries who have Alzheimer's or other dementias and a coexisting medical condition have higher average per-person payments for most health care services than Medicare beneficiaries with the same medical condition but without dementia. Table 21[A13] shows the average per-person Medicare payments for seven specific medical conditions among beneficiaries who have Alzheimer's or other dementias and beneficiaries who do not have Alzheimer's or another dementia.[A13, 475] Medicare beneficiaries living with Alzheimer's or other dementias have higher average per-person payments in all categories except physician care.

Use and Costs of Health Care Services for Individuals Enrolled in Traditional Medicare Versus Medicare Advantage

For people living with Alzheimer's or other dementias, there is a paucity of data on whether Medicare Advantage plans attract healthier enrollees, reduce access to care, reduce hospitalizations or emergency department visits, or impact quality of care compared with traditional Medicare — although a large number of studies have evaluated the effect of Medicare Advantage on health care utilization and costs overall.[941]

In a study that used the 100% sample of Medicare enrollees with either traditional Medicare or Medicare Advantage and living in the community, researchers found that individuals with traditional Medicare had significantly more hospitalizations than individuals enrolled in Medicare Advantage in the three months before and in the 12 months after a diagnosis of

Medicare Includes Multiple Types of Coverages

Medicare is a federal program for individuals age 65 and older, though individuals younger than age 65 with certain disabilities, end-stage kidney disease or amyotrophic lateral sclerosis (ALS) also qualify for Medicare. Traditional or fee-for-service Medicare generally includes Part A (hospital insurance) and Part B (medical insurance).

Part A: Also referred to as hospital insurance.[938] Individuals are eligible to receive Medicare Part A at no cost if they have worked and paid Medicare taxes for at least 10 years (i.e., have a sufficient earnings history) or a spouse, parent or child has a sufficient earnings history.

Part B: Also referred to as medical insurance. Part B covers medically necessary services and durable medical equipment to diagnose or treat a medical condition, as well as preventive services, which are services to prevent illness or detect it at an early stage when treatment is likely to work best. Part B is a voluntary program that requires enrollees to pay a monthly premium.

Part C: Medical Advantage plans. These are privately offered Medicare plans that replace Parts A and B and often include prescription drug coverage (Part D).[939] Medicare Advantage plans are voluntary and require enrollees to pay premiums. Enrollment in Medicare Advantage plans is becoming more common, with more than one-half (51%) of Medicare beneficiaries enrolled in this type of plan in 2025.[940]

Part D: Prescription drug coverage.
Part D is voluntary and requires enrollees to pay premiums.

Individuals receiving Medicare may also opt to purchase Medicare Supplement Insurance, also known as Medigap. Medigap is extra insurance individuals can buy from a private health insurance company to help pay for out-of-pocket costs not paid by Medicare, such as deductibles and copayments.

TABLE **21**

Average Annual Per-Person Payments by Type of Service and Coexisting Medical Condition for Medicare Beneficiaries Age 65 and Older, with and without Alzheimer's or Other Dementias, in 2025 Dollars

	Average Per-Person Medicare Payments					
Medical Condition by Alzheimer's/Dementia (A/D) Status	**Total Medicare Payments**	Hospital Care	Physician Care	Skilled Nursing Home Care	Home Health Care	Hospice Care
Coronary artery disease						
With A/D	**$30,045**	$ 9,310	$ 4,997	$ 4,777	$ 2,600	$ 4,037
Without A/D	**19,005**	6,732	4,897	1,481	997	448
Diabetes						
With A/D	**29,671**	9,327	5,017	4,838	2,501	3,467
Without A/D	**16,629**	5,736	4,385	1,344	879	309
Congestive heart failure						
With A/D	**33,232**	10,715	5,196	5,397	2,758	4,575
Without A/D	**26,869**	10,266	5,685	2,612	1,655	848
Chronic kidney disease						
With A/D	**30,819**	9,680	4,973	4,986	2,626	4,099
Without A/D	**20,862**	7,394	5,104	1,781	1,150	500
Chronic obstructive pulmonary disease						
With A/D	**33,811**	11,063	5,424	5,573	2,786	4,082
Without A/D	**24,089**	8,896	5,576	2,079	1,379	752
Stroke						
With A/D	**32,300**	10,071	5,261	5,316	2,746	3,988
Without A/D	**23,466**	8,042	5,424	2,556	1,645	693
Cancer						
With A/D	**29,975**	8,941	5,397	4,465	2,581	3,995
Without A/D	**19,379**	5,563	5,934	1,131	778	778

Created from unpublished data from the National 100% Sample Medicare Fee-for-Service Beneficiaries for 2019.[A13,475]

Alzheimer's or related dementia.[942] The pattern of heightened utilization for traditional Medicare enrollees was similar for outpatient visits, although the differences were smaller. Traditional Medicare enrollees had a higher mortality rate, even after adjusting for observed differences in demographic and health status.

Use and Costs of Long-Term Care Services

Long-term care services include home- and community-based services and services delivered in assisted living residences and nursing homes. An estimated 65% of older adults living with Alzheimer's or other dementias reside in the community, compared with 98% of older adults without Alzheimer's or other dementias.[907] Of those with dementia who live in the community, 74% live with someone and the remaining 26% live alone.[907] As their disease progresses, people living with Alzheimer's or other dementias generally receive more care from family members and other unpaid caregivers. Many people living with dementia also receive paid long-term care services at home; in adult day centers, assisted living residences or nursing homes; or in more than one of these settings at different times during the often long course of the disease. Medicaid is the only public program that covers the long nursing home stays that most people with dementia require in the severe stage of their illnesses.

Use of Long-Term Care Services by Setting

Most people living with Alzheimer's or other dementias who live at home receive unpaid help from family members and friends, but some also receive paid home- and community-based services, such as personal care and adult day care. Additionally, people living with Alzheimer's or other dementias make up a large proportion of all older adults who receive residential care and nursing home care.[943]

- Home health services and other home-based services. Medicare covers the following types of services: (1) medically necessary skilled nursing care, such as wound care for pressure ulcers, intravenous or nutrition therapy, and monitoring serious illness and unstable health status; (2) physical, occupational, and speech-language therapy services; and (3) medical social services in the home.[944] Additionally, individuals receiving medically necessary skilled nursing care or therapy services can also receive part-time or intermittent home care at the same time, such as help with bathing, toileting and dressing. Home health agencies provide the majority of home health care services.[945] Traditional Medicare does not cover homemaker services, such as meal preparation, or personal care services, such as help with bathing, toileting and dressing, if these homemaker services are the only care that is needed; however, Medicare Advantage plans (Medicare Part C) are allowed to offer these services as supplemental benefits.

  Thirty-six percent of individuals using home health services have Alzheimer's or other dementias.[946] Of Medicare beneficiaries age 65 and older living with Alzheimer's or other dementias, 26% have at least one home health visit paid by Medicare during the year, compared with 8% of Medicare beneficiaries age 65 and older without Alzheimer's or other dementias, and they use an average of 110 days of home care per year (including homemaker services and other services not covered by Medicare) compared with 64 days per year for individuals age 65 and older without these conditions.[475, 945] Receipt of home health services after hospital discharge has been shown to increase the likelihood of remaining in the community for at least 30 days after discharge, with greater benefits from longer durations of home health care.[947]
- Adult day services. The fourth most common chronic condition in individuals using adult day services is Alzheimer's disease or other dementias, and 25% of individuals using adult day services have Alzheimer's or other dementias.[946] Fourteen percent of adult day service centers in the United States specialized in caring for individuals with Alzheimer's disease or other dementias in 2020, up from 10% in 2016.[946, 948]
- Residential care facilities. Forty-two percent of individuals in residential care communities (i.e., housing that includes services to assist with everyday activities, such as personal care, medication management and meals), including assisted living communities, had Alzheimer's or other dementias in 2020, up from 34% in 2016.[946, 949] Sixty-one percent of residential care communities are small (four to 25 beds), and these have a higher percentage of residents living with Alzheimer's or other dementias than larger communities (51% in communities with four to 25 beds compared with 47% in communities with 26 to 50 beds and 39% in communities with more than 50 beds).[949, 950] Fifty-eight percent of residential care communities offer activities or programs for residents with Alzheimer's or other dementias.[951] Average aide staff hours per resident per day in residential care communities range from 2.2 hours in care communities with less than 25% of residents diagnosed with dementia to 2.7 hours in care communities with more than 75% of residents diagnosed with dementia.[949]
- Nursing home care. Overall, 46% of nursing home residents have Alzheimer's or other dementias,[946] although the prevalence varies when considering the short- and long-stay populations. While 36% of short-stay (less than 100 days) patients have Alzheimer's or other dementias, 58% of long-stay

(100 days or longer) patients have these conditions. Twenty-four percent of Medicare beneficiaries living with Alzheimer's or other dementias reside in a nursing home, compared with 1% of Medicare beneficiaries without these conditions.[907] At age 80, approximately 75% of people living with Alzheimer's dementia live in a nursing home compared with only 4% of the general population age 80.[478]

- Alzheimer's special care units and dedicated facilities. An Alzheimer's special care unit is a dedicated unit, wing or floor in a nursing home or other residential care community that has tailored services for individuals living with Alzheimer's or other dementias. Thirteen percent of nursing homes and 21% of assisted living and other residential care communities have a dementia special care unit.[946] Less than 1% (0.3%) of nursing homes and 11% of other residential care facilities provide care exclusively to individuals with dementia.

Long-Term Care Services Provided at Home and in the Community

In 2021, 71% of spending for long-term care services and supports was covered by public payers, including Medicaid (44%), Medicare (20%) and other public payers, including federal COVID-19 pandemic assistance (7%). Out-of-pocket payments covered 14% of these costs, including direct payments and deductibles and copayments for services covered by another payment source. Private insurance covered only 8% of long-term services and supports, and the remaining 7% of costs were covered by other private sources, including philanthropic contributions.[952]
Thirty-three percent of Medicaid's total expenditures cover long-term care services and supports.[953] Nationally, state Medicaid programs are shifting long-term care services from institutional care to care that is home- and community-based as a means to both reduce unnecessary costs and meet the growing demand for these services by older adults. The federal and state governments share the management and funding of Medicaid, and states differ greatly in the services covered by their Medicaid programs. In 2022, home- and community-based services represented the majority (65%) of the $200.4 billion (in 2022 dollars; $212.4 billion in 2025 dollars) spent by Medicaid on long-term care services and supports, with institutional care representing the remaining 35% [954] However, there is substantial variation across states in spending on home- and community-based services, ranging from 32% of total Medicaid long-term care services and supports in Mississippi to 84% of total Medicaid long-term care services and supports in Oregon, despite evidence demonstrating that Medicaid spending on these services reduces overall costs.[953]

Between 2010 and 2022, Medicaid spending on home- and community-based services increased from 48% to 65% of total long-term services and supports expenditures.[954] Similar to overall trends of increased use of home- and community-based services, total spending on home care for Medicare beneficiaries living with Alzheimer's or other dementias increased dramatically between 2004 and 2018.[907, 955] Increases in spending may have been due to a variety of factors, including more people being diagnosed with Alzheimer's dementia, more people using home care, an increase in the number of coexisting medical conditions, more intensive use of home care services and an increase in Medicaid coverage for older adults.[955] In two systematic reviews of the cost-effectiveness of enhanced home support interventions for individuals with dementia, researchers found some evidence to support occupational therapy, home-based exercise, and some psychological and behavioral treatments as potentially cost-effective, although research that has evaluated both the costs and benefits of enhanced home support interventions is scant.[956, 957]

Transitions Between Care Settings

Individuals living with dementia often move between a nursing facility, hospital and home, rather than remaining solely in a nursing facility. In a longitudinal study of primary care patients living with dementia, researchers found that individuals discharged from a nursing facility were nearly equally as likely to be discharged home (39%) as discharged to a hospital (44%).[958] Individuals living with dementia may also transition between a nursing facility and hospital or between a nursing facility, home and hospital, creating challenges for caregivers and providers to ensure that care is coordinated across settings. Other researchers have shown that nursing home residents frequently have burdensome transitions at the end of life, including admission to an intensive care unit in the last month of life and late enrollment in hospice,[959] although the number of care transitions for nursing home residents with advanced cognitive impairment varies substantially across geographic regions of the United States.[960]

Costs of Long-Term Care Services

- Home care. The median cost in 2024 for care from a nonmedical home health aide was $34 per hour and $6,483 per month ($35 and $6,688 in 2025 dollars).[961] Nonmedical home care costs increased 8% annually on average between 2021 and 2024, before adjusting for inflation.[962] The cost of homemaker services was $33 per hour and $6,292 per month ($34 and $6,491 in 2025 dollars).
- Adult day services. The median cost of adult day services was $100 per day in 2024 ($104 in 2025 dollars).[961] The cost of adult day services increased 5.6% annually on average between 2021 and 2024, before adjusting for inflation.[961,962]

- Assisted living residences. The median cost for care in an assisted living residence was $5,900 per month, or $70,800 per year in 2024 ($6,141 and $73,694 in 2025 dollars).[961] The cost of assisted living increased 9.5% annually on average between 2021 and 2024, before adjusting for inflation.[961,962]
- Nursing homes. The 2024 average cost for a private room in a nursing home was $350 per day, or $127,750 per year ($364 and $132,972 in 2025 dollars), and the average cost of a semi-private room was $305 per day, or $111,325 per year ($317 and $115,876 in 2024 dollars).[961] The cost of nursing home care increased 5.6% annually on average for a private room, before adjusting for inflation.[961,962]

Affordability of Long-Term Care Services

Few individuals living with Alzheimer's or other dementias have sufficient long-term care insurance or can afford to pay out of pocket for long-term care services for as long as the services are needed.

- Medicare beneficiaries with a dementia diagnosis have lower household incomes on average than beneficiaries without a dementia diagnosis. In 2018, 23% of community-dwelling Medicare beneficiaries with a dementia diagnosis had household incomes below the federal poverty level, and 53% had household incomes between 100% and 200% of the federal poverty level, while 15% of those without a dementia diagnosis lived below the federal poverty level and 40% had household incomes between 100% and 200% of the federal poverty level.[963]
- Asset data are not available for people with Alzheimer's or other dementias specifically, but 50% of Medicare beneficiaries age 65 and older had total savings of $110,100 or less in 2024 dollars ($112,865 in 2025 dollars), and 25% had savings of $18,950 or less in 2024 dollars ($19,426 in 2025 dollars). Differences in median savings by race and ethnicity further undermine affordability of long-term care for certain groups. Median savings for White Medicare beneficiaries were 8.5 times higher than for Black beneficiaries and more than 15 times higher than for Hispanic beneficiaries.[964]
- In a 2022 survey of adults about the affordability of long-term care, less than one-third (31%) of adults age 65 and older reported being very confident that they would have the financial resources to pay for necessary care as they age.[965] Additionally, of adults age 50 and older, nearly two-thirds reported feeling anxious about being able to afford nursing home or assisted living care, if they should need it. Although individuals from lower income households were more likely to report feeling anxious about the affordability of long-term care (77% with household incomes less than $40,000 reported being anxious about the affordability of long-term care), nearly half of individuals from households with incomes $90,000 or greater also reported being anxious about the affordability of long-term care (in 2022 dollars; $43,958 and $98,904, respectively, in 2025 dollars).

Long-Term Care Insurance

Long-term care insurance typically covers the cost of care provided in a nursing home, assisted living residence and Alzheimer's special care residence, as well as community-based services such as adult day care and services provided in the home, including nursing care and help with personal care.[972]

Based on data from the National Health Expenditure Account, it is estimated that private insurance covered only 9% ($49.1 billion) of the cost of long-term care services and supports in 2023.[952] The private long-term care insurance market has undergone dramatic changes over the past two decades. Although industry reports estimate 5.95 million individuals were covered with long-term care insurance in 2023, down from 6.36 million in 2020,[973, 974] only 57,000 new policies were sold in 2018, compared with 754,000 in 2002.[975] The average annual premium for a long-term care insurance policy with $165,000 in total benefits and 3% inflation growth ranged from $2,075 for a single male and $3,700 for a single female, age 55, in 2024 ($2,127 and $3,793 in 2025 dollars).[976]

The private long-term care insurance market has consolidated between 2000 and 2020, with 60% of policyholders being insured by one of the five largest insurers in 2020, compared to only 41% in 2000.[969, 977] Cognitive conditions are the most common final diagnosis for long-term care insurance claims lasting more than one year, representing 49% of claims, and the third most common (16%) for insurance claims lasting one year or less, after cancer and musculoskeletal conditions (31% and 25% of claims, respectively).[977]

With few older adults having private long-term care insurance and those who do often having limited benefits, the cost of community-based and residential long-term care must be covered by other payment sources or paid out-of-pocket. Medicare Advantage plans are allowed to provide supplemental benefits, such as adult day care, caregiver support and in-home support services to chronically ill beneficiaries. However, only 7% of individual plans offered in-home support services and 10% offered general supports for living (e.g., subsidies for rent, assisted living communities, or utilities) as a benefit in 2025. These supplemental benefits are more common in Medicare Advantage Special Needs Plans (SNPs; plans that are designed for Medicare enrollees with specific needs, such as individuals with a chronic condition, individuals who are also enrolled in Medicaid and institutionalized enrollees). Overall, these supplemental benefits are unlikely to offset a substantial portion of long-term care costs.

Medicare and Medicaid Support for People Living With Dementia

When individuals are diagnosed with Alzheimer's or another dementia, it is easy for them and their families to feel overwhelmed. There is so much to learn about dementia, and in the months and years ahead, they will encounter new challenges about how to best take care of the individuals living with dementia and themselves. The role of public programs such as Medicare and Medicaid in supporting the needs of individuals living with dementia can be an afterthought. However, there are important reasons for individuals and families to take time to understand these programs. These programs can affect the care received. Individuals' and families' financial well-being can also be affected, depending on whether these programs pay for specific aspects of needed care.

As described earlier in this section, Medicare is a federal program for individuals age 65 and older and other individuals with qualifying disabilities and medical conditions. Medicaid is a joint federal and state program intended for individuals with low incomes and/or low resources. Because it is a joint program, benefits vary by state.[966] Those who are enrolled in both Medicare and Medicaid are sometimes referred to as being "dually eligible." (The information that follows reflects what Medicare and Medicaid covered at the time of printing, but government programs, coverage and coverage requirements are subject to change.)

One main difference between Medicare and Medicaid that is of special relevance to people living with dementia is that Medicaid covers the cost of long-term care (i.e., stays of more than 90 days) in a nursing home while Medicare does not cover this cost.[967] As noted in the Mortality and Morbidity section, a person who lives from age 70 to age 80 with Alzheimer's dementia will spend an average of 40% of this time in the severe stage.[478] Much of this time will be spent in a nursing home. At age 80, approximately 75% of people with Alzheimer's dementia live in a nursing home. While Medicaid covers the cost of a long-term nursing home stay, only individuals with low income and assets qualify for Medicaid (see "Medicaid Costs"). Nursing home care is costly. The 2024 average cost for care in a nursing home ranges from $111,325 to $127,750 per year for a private and semi-private room, respectively ($115,876 to $132,972 per year in 2025 dollars).[961]

Results from a 2022 survey about the affordability of long-term care revealed that 23% of adults believed that Medicare would cover the cost of nursing home care, and 28% were not sure who would pay for nursing home care. Even more concerning, 45% of individuals age 65 and older believed that Medicare would cover the cost of nursing home care.[965] It is especially important to know that Medicare does not cover custodial care, that is, care to assist with activities of daily living, such as dressing and bathing. Most nursing home care is custodial care, and therefore is not covered by Medicare.

While Medicare does not cover long-term care in a nursing home, it does cover care in a long-term care hospital, post-acute skilled nursing facility care, and hospice care. A long-term care hospital is an acute care hospital that specializes in caring for people who stay more than 25 days, on average. A long-term care hospital provides specialized care, such as respiratory therapy, pain management and treatment for head trauma.[968] Benefits work in the same way that Medicare covers other acute care hospitalizations.

Medicare also covers post-acute skilled nursing care, which is nursing and therapy care that must be performed or supervised by medical professionals, such as registered or licensed nurses.[969] For Medicare to cover skilled nursing care, the Medicare beneficiary must have a qualifying hospital stay, a physician must decide that skilled care is needed, and the medical condition requiring skilled care must be related to the hospitalization.[970] Traditional Medicare (Part A) covers the first 20 days of skilled nursing care with $0 coinsurance for each benefit period. For the next 80 days of skilled nursing care (day 21 to day 100), the beneficiary pays $217 per day in coinsurance in 2026.[971]

For those who are qualified for and enrolled in Medicaid, the program covers some services that Medicare either does not cover or only partially covers, such as nursing home care as mentioned earlier and home- and community-based care.

Despite having Medicare and other sources of financial assistance, individuals living with Alzheimer's or other dementias and their family members still incur high out-of-pocket costs. These are costs individuals themselves must pay. They are for Medicare deductibles, copayments and coinsurance; other health insurance premiums, deductibles, copayments and coinsurance; and services not covered by Medicare, Medicaid or other sources of support. On average, individual Medicare beneficiaries age 65 and older living with Alzheimer's or other dementias paid $10,877 out of pocket annually for health care and long-term care services not covered by other sources.[907] This excludes the cost of long-term nursing home care for individuals not eligible for Medicaid. For more details, see Total Cost of Health Care and Long-Term Care at the beginning of this section.

For more information about Medicare and Medicaid benefits for individuals living with dementia, visit alz.org. Visit Medicare.gov and Medicaid.gov for additional details about Medicare and Medicaid.

TABLE **22**

Total Medicaid Payments for Americans Age 65 and Older Living with Alzheimer's or Other Dementias by State in 2025, in 2025 Dollars

State	2025 (in millions of dollars)
Alabama	$1,277
Alaska	125
Arizona	617
Arkansas	514
California	5,931
Colorado	893
Connecticut	1,344
Delaware	354
District of Columbia	153
Florida	3,912
Georgia	1,806
Hawaii	323
Idaho	222
Illinois	2,492
Indiana	1,397
Iowa	897
Kansas	615
Kentucky	1,075
Louisiana	1,058
Maine	311
Maryland	1,739
Massachusetts	2,301
Michigan	1,969
Minnesota	1,231
Mississippi	826
Missouri	1,288
Montana	$230
Nebraska	465
Nevada	314
New Hampshire	380
New Jersey	2,962
New Mexico	316
New York	7,144
North Carolina	1,844
North Dakota	244
Ohio	3,330
Oklahoma	692
Oregon	359
Pennsylvania	4,565
Rhode Island	640
South Carolina	927
South Dakota	240
Tennessee	1,560
Texas	4,474
Utah	267
Vermont	166
Virginia	1,435
Washington	780
West Virginia	590
Wisconsin	1,047
Wyoming	126

Created from data from the Lewin Model.[A11]

To address the dearth of private long-term care insurance options and the high out-of-pocket cost of long-term care services, Washington became the first state in the country to create a public state-operated long-term care insurance program.[978] The Long-Term Services and Supports Trust Program (WA Cares Fund) is funded by a payroll tax on employees of 58 cents per $100 earned that began in July 2023, and self-employed individuals can choose to opt in to the program. The program is structured to pay up to $36,500 in lifetime benefits (adjusted annually for inflation) beginning in July 2026.[979] Several other states have considered a long-term care payroll tax to fund similar programs, but none have yet passed legislation.[980]

Medicaid Costs

Medicaid covers nursing home care and long-term care services in the community for individuals who meet program requirements for level of care, income and assets.[981] To receive coverage, beneficiaries must have low incomes. Beneficiaries with financial resources above Medicaid thresholds may spend down their assets and income to become eligible for coverage. Once enrolled, most nursing home residents with Medicaid must spend all of their Social Security income and any other monthly income, except for a very small personal needs allowance, to pay for nursing home care. Medicaid only makes up the difference if the nursing home resident cannot pay the full cost of care or has a financially dependent spouse. Although Medicaid covers the cost of nursing home care, its coverage of many other long-term care and support services, such as assisted living care, home-based skilled nursing care and help with personal care, varies by state.

Twenty-four percent of older individuals living with Alzheimer's or other dementias who have Medicare also have Medicaid coverage, compared with 10% of individuals without dementia.[907] Because Medicaid pays for nursing home and other long-term care services, the high use of these services by people with dementia translates into high costs to Medicaid. Average annual Medicaid payments per person for Medicare beneficiaries living with Alzheimer's or other dementias ($7,158) were 22 times as great as average Medicaid payments for Medicare beneficiaries without Alzheimer's or other dementias ($322) (see Table 16).[907] Much of the difference in payments for beneficiaries living with Alzheimer's or other dementias compared with other beneficiaries is due to the costs associated with nursing home care.

Dual eligible SNPs (D-SNPs) were first offered as Medicare Advantage plans two decades ago (in 2006) as a means to better coordinate benefits between Medicare and Medicaid for dually-eligible individuals.[982] Between 2018 and 2025, D-SNP enrollment increased from 2.2 million to 6.0 million enrollees across 35 states, with 61% of enrollees in plans provided by three insurers — UnitedHealth Group, Humana and Elevance Health.[983] D-SNPs are required to coordinate benefits between Medicare and Medicaid, and in theory, should improve outcomes for dually eligible individuals compared with non-D-SNP Medicare Advantage plans. Recent research found that D-SNP enrollees with Alzheimer's or other dementias had similar rates of preventable hospitalizations and avoidable ED visits, compared with those enrolled in non-D-SNP Medicare Advantage plans, but had modestly lower 30-day readmission rates.[984] However, outcomes were better for individuals enrolled in fully-integrated D-SNP plans, which include plans in organizations that also offer a Medicaid plan. Compared with non-D-SNP Medicare Advantage plans, fully-integrated D-SNP plans had lower rates of preventable hospitalizations (9.0% versus 10.3%) and lower all-cause 30-day readmission rates (16.8% versus 23.9%).

Total Medicaid spending for people living with Alzheimer's or other dementias is projected to be $77 billion in 2026.[A11] Estimated state-by-state Medicaid spending for people living with Alzheimer's or other dementias in 2025 is reported in Table 22.

Use and Costs of Care at the End of Life

Hospice care provides medical care, pain management, and emotional and spiritual support for people who are terminally ill, including people with Alzheimer's or other dementias, either in a care residence or at home. Hospice care also provides emotional and spiritual support and bereavement services for families. The main purpose of hospice is to allow individuals to die with dignity and without pain and other distressing symptoms that often accompany terminal illness. Traditional Medicare is the primary source of payment for hospice care, but private insurance, Medicaid and other sources also pay for hospice care. Medicare beneficiaries enrolled in Medicare Part A (i.e., Medicare's hospital insurance) can choose to enroll in Medicare's hospice benefit if a hospice physician of the individual's attending physician certifies that the individual is terminally ill (i.e., expected to live six months or less), and the individual elects to receive palliative or comfort care rather than curative treatment. Hospice care replaces other Medicare-covered benefits for treating the terminal illness and related conditions.[985] For individuals enrolled in Medicare Advantage plans who also enroll in hospice, traditional Medicare (not the Medicare Advantage plan) covers hospice services and costs related to the terminal diagnosis, while the Medicare Advantage plan continues to cover the costs of care for non-terminal conditions.

TABLE **23**

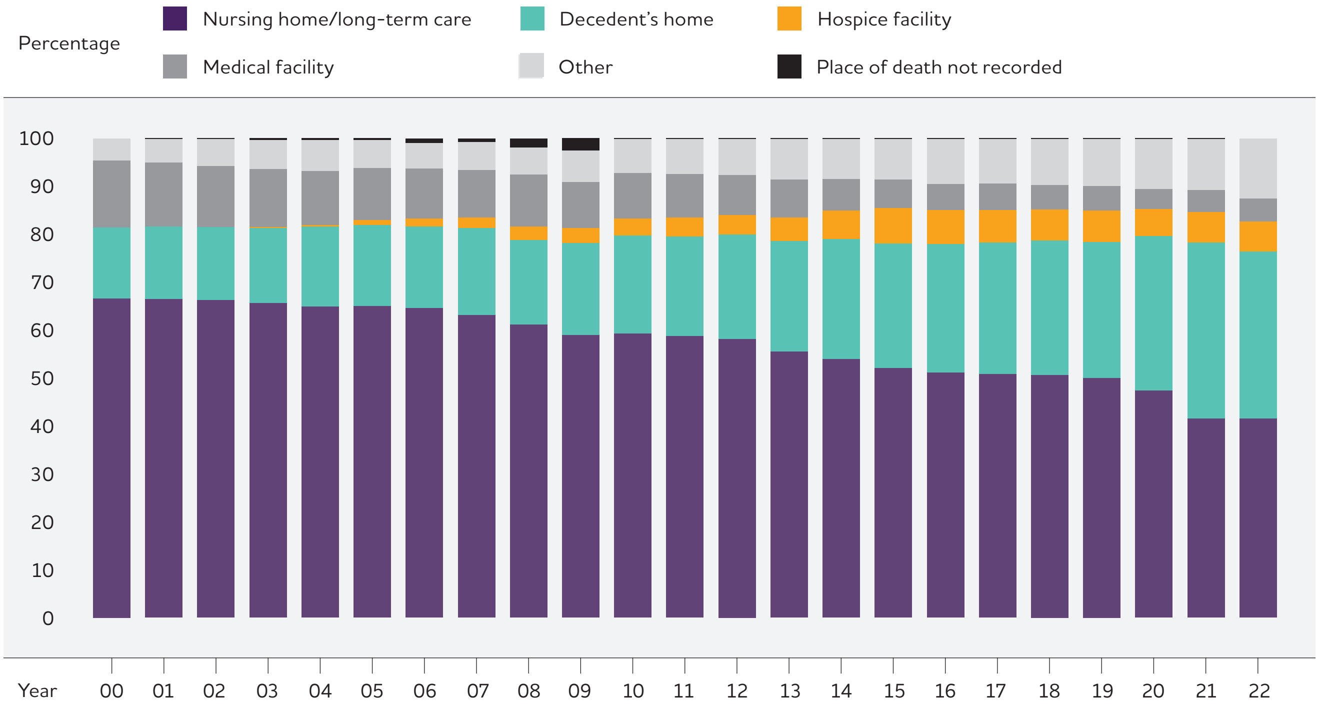
Number and Percentage of Medicare Beneficiaries Admitted to Hospice with a Primary Diagnosis of Dementia by State, 2017

State	Number of Beneficiaries	Percentage of Beneficiaries
Alabama	5,867	18
Alaska	95	14
Arizona	7,229	18
Arkansas	3,133	18
California	30,045	20
Colorado	3,254	15
Connecticut	2,380	15
Delaware	716	12
District of Columbia	263	18
Florida	19,897	15
Georgia	10,435	21
Hawaii	943	16
Idaho	1,566	17
Illinois	9,795	18
Indiana	5,922	17
Iowa	3,278	17
Kansas	2,770	18
Kentucky	2,895	15
Louisiana	4,786	19
Maine	1,494	19
Maryland	4,072	17
Massachusetts	7,245	23
Michigan	9,001	16
Minnesota	5,399	21
Mississippi	3,547	20
Missouri	5,991	17
Montana	507	11
Nebraska	1,648	18
Nevada	2,167	17
New Hampshire	1,007	17
New Jersey	8,207	23
New Mexico	1,523	15
New York	7,669	16
North Carolina	8,486	17
North Dakota	468	18
Ohio	12,656	17
Oklahoma	4,102	18
Oregon	3,565	17
Pennsylvania	12,384	17
Rhode Island	1,657	25
South Carolina	6,038	20
South Dakota	421	13
Tennessee	6,435	19
Texas	26,672	22
Utah	2,506	19
Vermont	543	17
Virginia	6,440	19
Washington	5,459	20
West Virginia	1,552	15
Wisconsin	5,086	16
Wyoming	89	7
U.S. Total	**278,192**	**18**

Created from data from the U.S. Centers for Medicare & Medicaid Services.[988]

FIGURE **17**

Place of Death due to Alzheimer's Disease, 2000 to 2022



Created from data from the National Center for Health Statistics.[1007]

Medicare pays for nearly all costs of care related to the terminal illness for individuals receiving hospice care. Individuals may pay a copayment for outpatient prescription drugs for pain and symptom management (up to $5 per prescription) and 5% of the Medicare-approved amount for inpatient respite care.[986]

Nearly two-thirds (63%) of Medicare beneficiaries with Alzheimer's or other dementias used hospice in their last six months of life in 2017 compared with 36% of Medicare decedents without Alzheimer's or other dementias.[987] In 2017, dementia, including Alzheimer's dementia, was the second most common primary diagnosis for Medicare beneficiaries using hospice care, representing 18% of Medicare beneficiaries receiving hospice care (Table 23).[988] Alzheimer's or other dementias are even more common in individuals receiving hospice care when taking into account the disease as a coexisting or secondary condition. Forty-five percent of hospice users in 2020 had a diagnosis of Alzheimer's or other dementias.[946]

Patterns of hospice use for individuals with dementia differ from patterns for individuals without dementia in at least two notable ways. The average number of days of hospice care for individuals with a primary diagnosis of dementia was 50% higher than for individuals with other primary diagnoses, based on data from the 2008 to 2011 National Hospice Survey.[989] Individuals with a primary diagnosis of dementia use an average of 112 days of hospice care versus 74 days for individuals with other primary diagnoses. Recently, researchers found that individuals with dementia as either the primary hospice diagnosis or as a secondary condition were more likely than other hospice users to be enrolled in hospice for more than six months.[990] However, long hospice stays place individuals with dementia at risk for disenrollment, and researchers have found that individuals with dementia are more likely to be disenrolled after more than six months in hospice than individuals with other diagnoses.[989, 990] Reasons for disenrollment include admission to an acute care hospital, loss of eligibility because the individual was no longer terminally ill, and failure to recertify for hospice.[991] Hospice providers are required to assess individuals every 60 days, beginning at six months, to ensure they continue to meet eligibility requirements. These assessments, coupled with Medicare payment rates that are roughly 20% lower after the first 60 days, may contribute to disenrollment; however, more research is needed to understand the implications of these policies for individuals with dementia in hospice.[992, 993]

Overall, 12.2% of Medicare beneficiaries with Alzheimer's had at least one hospice claim in 2018, compared with 1.4% of Medicare beneficiaries without the disease, translating into per-person hospice payments (for all beneficiaries, regardless of whether they used any hospice services) of $2,466 for individuals with Alzheimer's compared with $144 for all other Medicare beneficiaries.[907] In fiscal year 2026, the routine home care rates are $231.13 per day for days 1 to 60 and $182.18 per day for days 61 and beyond.[994] Additionally, there is a service intensity add-on payment for visits by a registered nurse or social worker in the last seven days of life ($69.17).

Intensity of care at the end of life has decreased over the past two decades as hospice enrollment has increased. For Medicare beneficiaries with advanced dementia who receive skilled nursing home care in the last 90 days of life, those who are enrolled in hospice are less likely to die in the hospital.[995] Additionally, those enrolled in hospice care are less likely to be hospitalized in the last 30 days of life and more likely to receive regular treatment for pain.[996, 997] Satisfaction with medical care is higher for families of individuals with dementia who are enrolled in hospice care than for families of individuals with dementia not enrolled in hospice care.[998] Recent attention has been given to "live discharge" from hospice — that is, individuals discharged alive from hospice or revoking hospice, to return to curative treatment, sometimes due to changing prognoses that extend beyond six months. A recent systematic review found that patients with an Alzheimer's diagnosis were more likely to have a live discharge from hospice compared to not having the diagnosis.[999]

Despite the important role of end-of-life care for individuals with Alzheimer's, differences in hospice use by race/ethnicity exist. One group of researchers found substantially smaller proportions of Black and Hispanic Medicare beneficiaries with dementia enrolled in hospice in the last six months of life compared with White Medicare beneficiaries with dementia (38% and 43% versus 51%, respectively).[1000] Furthermore, larger proportions of Black and Hispanic beneficiaries with dementia had at least one emergency department visit (80% and 77%, respectively) and at least one hospitalization (77% for both groups) compared with White beneficiaries with dementia (71% and 68%, respectively) in the last six months of life.[1000] Black and Hispanic beneficiaries were also more likely to have an emergency department visit and/or a hospitalization after hospice enrollment.

Researchers have found similar reductions in hospitalizations at the end of life for individuals receiving palliative care. For nursing home residents with moderate-to-severe dementia, those who received an initial palliative care consultation between one and six months before death had significantly fewer hospitalizations and emergency department visits in the last seven and 30 days of life compared with those who did not receive palliative care.[1001] Individuals with an initial palliative care consultation within one month of death also had significantly fewer hospitalizations in the last seven days of life compared with those who did not receive palliative care.[1001] One essential component of palliative care is advance care planning (i.e., a plan for future medical care that includes the patient's goals and preferences, should the patient become unable to make their own decisions). Although Medicare reimburses physicians for visits related to advance care planning, these visits rarely occur. In 2017, less than 3% of traditional Medicare beneficiaries had at least one claim for advance care planning.[1002] However, compared with individuals without newly diagnosed conditions, Medicare beneficiaries with newly diagnosed Alzheimer's were 1.3 times as likely to have one or more claims for advance care planning. Racial/ethnic disparities in the completion of advance care planning in the last six months of life are concerning. One group of researchers found that the proportion of Black and Hispanic Medicare beneficiaries with dementia who had completed advance care planning was less than half that of White beneficiaries.[1000]

Life-Sustaining Interventions at the End of Life

Life-sustaining interventions, such as mechanical ventilation, tracheostomy, tube feeding and resuscitation can be especially harmful to individuals with Alzheimer's. Although these interventions may not be consistent with patient preferences, individuals with Alzheimer's may be at greater risk for receiving these treatments. One group of researchers found that Medicare beneficiaries with advanced dementia who lived in the community were 1.8 times as likely to receive life-sustaining treatments in the last three months of life, compared with individuals without dementia living in the community.[1003] Individuals with frequent transitions between health care settings are more likely to have feeding tubes at the end of life, even though feeding tube placement does not prolong life or improve outcomes.[1004] The odds of having a feeding tube inserted at the end of life vary across the country and are not explained by severity of illness, restrictions on the use of artificial hydration and nutrition, ethnicity or gender. With the expansion of Medicare-supported hospice care, the use of feeding tubes in the last three to six months of life has decreased for individuals with Alzheimer's or other dementias.[987, 1005] Finally, with the increased focus on the lack of evidence supporting feeding tube use for people with advanced dementia, the proportion of nursing home residents receiving a feeding tube in the 12 months before death decreased from nearly 12% in 2000 to less than 6% in 2014.[1006] However, individuals with advanced dementia are significantly more likely to receive tube feeding in the last three months of life compared with those without dementia.[1003]

Place of Death for Individuals with Alzheimer's Disease
Between 2002 and 2023, the proportion of individuals with Alzheimer's who died in a nursing home decreased from 67% to 46%, and the proportion who died in a medical facility decreased from 14% to 5%. During the same period, the proportion of individuals who died at home increased from 15% to 33% (Figure 17).[1007]

Beyond where patients die, research has also examined survival outcomes after acute care. A recent study of discharge location and mortality after an intensive care unit stay for individuals living with Alzheimer's or other dementias found that patients with Alzheimer's had 1.5 times the odds of death in the same calendar month and 1.95 times the odds of death within one year of discharge compared to patients without the disease.[1008]

Use and Costs of Health Care and Long-Term Care Services Among Populations

Among Medicare beneficiaries living with Alzheimer's or other dementias, Black beneficiaries had the highest unadjusted Medicare payments per person per year, while White beneficiaries had the lowest payments ($29,406 versus $23,582, respectively) (Table 24). The largest difference in payments was for hospital care, with Black Medicare beneficiaries incurring 1.6 times as much in hospital care costs as White beneficiaries ($9,908 versus $6,372).[475] White beneficiaries had the highest hospice payments, however, of all racial and ethnic groups. A study of racial and ethnic differences in health care spending using the Medical Expenditure Panel Survey found similar patterns in unadjusted total spending.[1009] However, after adjusting for socioeconomic characteristics and functional status, total health care spending did not differ significantly among groups.

In a recent study of racial and ethnic differences in the trajectories of Medicare expenditures, researchers found that non-Hispanic Black individuals with dementia had the highest Medicare expenditures overall and highest expenditures in the last year of life ($51,294 in 2016 dollars for non-Hispanic Black, $47,469 for Hispanic, and $39,499 for White Medicare beneficiaries [$64,088, $59,309, and $49,351 in 2025 dollars, respectively]).[1010] The higher spending for Black individuals was attributed to more emergency department visits, inpatient hospitalizations, and intensive care in the last year of life.

Recent research has demonstrated that historically marginalized nursing home residents with severe cognitive impairment are at heightened risk for poor quality of care in the nursing home compared with other nursing home residents with similar levels of cognitive impairment. In a study that included nearly 129,000 nursing home residents with severe cognitive impairment, one group of researchers found that rates of potentially avoidable hospitalizations were 48% higher for Black residents and 28% higher for Hispanic residents compared with White residents with similar levels of cognitive impairment.[1011] Rates were also higher for residents who were Asian, American Indian or Alaskan Native, and multiple races; however, differences were not significant, likely due to the relatively small sample size in these groups.

In a study of Medicare-Medicaid dually eligible beneficiaries diagnosed with Alzheimer's dementia, researchers found significant differences in the costs of care by race and ethnicity.[1012] These results demonstrated that Black individuals had significantly higher costs of care than White or Hispanic individuals, primarily due to more inpatient care and more comorbidities. These differences may be attributable to later-stage diagnosis, which may lead to higher levels of disability while receiving care; delays in accessing timely primary care; lack of care coordination; duplication of services across providers; or inequities in access to care. However, more research is needed to understand the reasons for this health care disparity.

Use of Potentially Avoidable Health Care Services

Preventable Hospitalizations and Emergency Department Care

Preventable hospitalizations are one common measure of health care quality. Preventable hospitalizations are hospitalizations for conditions that could have been avoided with better access to, or quality of, preventive and primary care. Unplanned hospital readmissions within 30 days are another type of hospitalization that potentially could have been avoided with appropriate post-discharge care. In 2013, 21% of hospitalizations for traditional

This report keeps the population identifiers used in source documents when describing findings from specific studies.

TABLE **24**

Average Annual Per-Person Payments by Type of Service and Race and Ethnicity for Medicare Beneficiaries Age 65 and Older, with Alzheimer's or Other Dementias, in 2025 Dollars

Race and Ethnicity	Total Medicare Payments Per Person	Hospital Care	Physician Care	Skilled Nursing Care	Home Health Care	Hospice Care
White	$23,582	$6,372	$3,866	$3,611	$2,032	$4,396
Black	29,406	9,908	4,700	4,752	2,093	3,092
Hispanic	27,202	8,621	4,461	4,122	2,520	3,630
Other	24,173	7,987	4,065	4,012	2,081	2,993

Created from unpublished data from the National 100% Sample Medicare Fee-for-Service Beneficiaries for 2019.[A13, 475]

Medicare enrollees with Alzheimer's or other dementias were either unplanned readmissions within 30 days or for an ambulatory care-sensitive condition (a condition that was potentially avoidable with timely and effective ambulatory — that is, outpatient — care).[1013] The total cost to Medicare of these potentially preventable hospitalizations was $4.7 billion (in 2013 dollars; $6.4 billion in 2025 dollars).[1013] Of people with dementia who had at least one hospitalization, 18% were readmitted within 30 days; and of those who were readmitted within 30 days, 27% were readmitted two or more times.[1013] Ten percent of Medicare enrollees had at least one hospitalization for an ambulatory care-sensitive condition, and 14% of total hospitalizations for Medicare enrollees with Alzheimer's or other dementias were for ambulatory care-sensitive conditions.[1013]

Based on Medicare administrative data from 2013 to 2015, 23.5% of diagnosed individuals with Alzheimer's or other dementias had at least one preventable hospitalization.[1014] A substantially higher proportion of Black older adults (31%) had preventable hospitalizations than Hispanic and White older adults (22% for each group).

Based on data from the Health and Retirement Study (HRS) and Medicare, after controlling for demographic variables, clinical characteristics (e.g., presence of chronic medical conditions and number of hospitalizations in the prior year) and health risk factors, individuals with dementia had a 30% greater risk of having a preventable hospitalization than those without a neuropsychiatric disorder (that is, dementia, depression or cognitive impairment without dementia).[1015] Moreover, individuals with both dementia and depression had a 70% greater risk of preventable hospitalization than those without a neuropsychiatric disorder.[1015] Another group of researchers found that individuals with dementia and a caregiver with depression had 73% higher rates of emergency department use over six months than individuals with dementia and a caregiver who did not have depression.[1016]

Medicare beneficiaries who have Alzheimer's or other dementias and a serious coexisting medical condition (for example, congestive heart failure) are more likely to be hospitalized than people with the same coexisting medical condition but without dementia (Figure 18).[475] One research team found that individuals hospitalized with heart failure were more likely to be readmitted or die after hospital discharge if they also had cognitive impairment.[1017] Another research team found that Medicare beneficiaries living with Alzheimer's or other dementias had more potentially avoidable hospitalizations for diabetes complications and hypertension, meaning that the hospitalizations could possibly have been prevented through proactive care management in the outpatient setting.[1018] A third research team found that having depression, rheumatoid arthritis or osteoarthritis was associated with higher emergency department use in Medicare beneficiaries with possible or probable dementia and two or more other chronic conditions.[1019]

Differences in health care use between individuals with and without dementia are most prominent for those residing in the community. Based on data from the HRS, community-residing individuals living with dementia were more likely to have a potentially preventable hospitalization, an emergency department visit that was potentially avoidable and/or an emergency department visit that resulted in a hospitalization than community-residing individuals without dementia.[1020] For individuals residing in a nursing home, there were no differences between those with and without dementia in the likelihood of being hospitalized or having an emergency department visit.

Health Care Delivery Models with Skilled Nursing Facilities

Changes in health care delivery and payment models, such as the integration of care across different health care settings and the structure of health care payments, may impact health care utilization for individuals living with Alzheimer's disease or other dementias. Research has shown modest differences in outcomes for skilled nursing facilities that share providers with at least one hospital versus those that have dedicated providers within the skilled nursing facilities. An analysis of Medicare claims data for 2008 to 2016 showed that skilled nursing facilities that shared providers with at least one hospital were more likely to have an Alzheimer's unit, had fewer 30-day readmissions, and had more patients discharged to the community. The skilled nursing facilities that maintain these relationships have modestly better outcomes,[1021] although there has been a decline in hospital-skilled nursing facility linkages in the past two decades due to a shift toward dedicated hospitalists and skilled nursing facility providers.

The COVID-19 Pandemic and Health Care Utilization and Costs

The COVID-19 pandemic disproportionately affected Americans living with Alzheimer's and other dementias. Individuals living and working in care communities were extremely vulnerable to COVID-19 due to the communal nature of these settings. Overall, 21% of all U.S. COVID-19 deaths occurred in either residents or staff of long-term care facilities.[1022]

Of all people with traditional Medicare coverage who were hospitalized due to COVID-19 through November 2021, 27% had a diagnosis of Alzheimer's disease or another dementia.[1023] Even after adjusting for demographic characteristics and other COVID-19 risk factors (including living in long-term care or other care communities), individuals with Alzheimer's were at higher risk for contracting and dying of COVID-19.[1024, 1025]

There remains a lack of evidence on how health care utilization changed during the pandemic for individuals living with Alzheimer's and other dementias. For example, one area of concern is the effect of not receiving some types of health care because of service and other limitations related to COVID-19. However, we do know that individuals diagnosed with dementia had the highest rates of hospitalization for COVID-19 compared with individuals with any of the 20 other common chronic conditions analyzed (including chronic kidney disease, diabetes, hypertension and obesity) in 2020.[1026] This risk was not limited to congregate settings such as assisted living residences and nursing homes. Individuals with a diagnosis of Alzheimer's who were living in the community were more than 3.5 times as likely to be hospitalized for COVID-19 as individuals without Alzheimer's who were living in the community.[1026] One group of researchers found that individuals with Alzheimer's hospitalized for COVID-19 were less likely to be admitted to the intensive care unit than those without Alzheimer's who were hospitalized for COVID-19. However, among those admitted to the intensive care unit, individuals with Alzheimer's stayed an average of 1.7 days longer than age-matched counterparts in the intensive care unit.[1027]

Looking to the Future

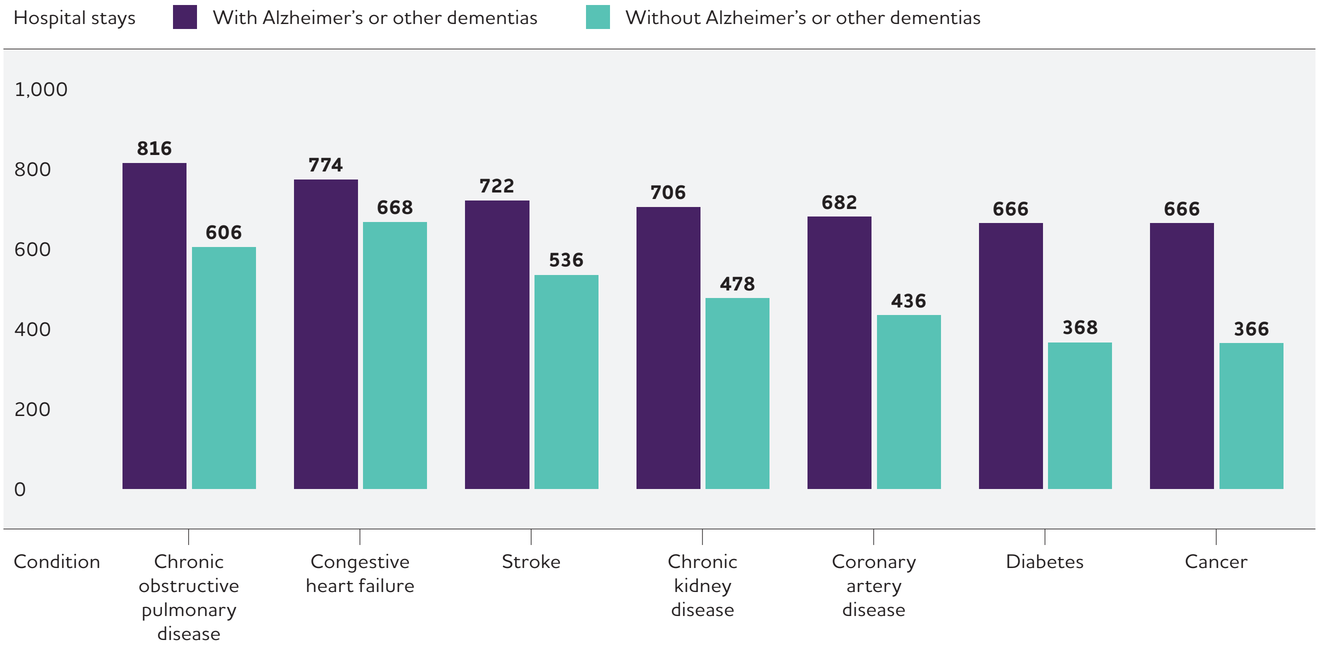
Without taking into account the recently approved drug treatments that slow cognitive decline and any potential future treatment breakthroughs, total annual payments for health care and long-term care for people with Alzheimer's or other dementias are projected to increase from $409 billion in 2026 to just under $1 trillion in 2050 (in 2026 dollars). This dramatic rise includes 2.4-fold increases in both government spending under Medicare and Medicaid and in out-of-pocket expenses.[A11] Concurrent with this large projected increase, the Medicare Hospital Insurance Trust Fund, which covers spending for Medicare Part A (hospital care), is projected to go into a deficit, based on projections of growth, overall health care spending trends and population aging.[1028]

Potential Impact of Changing the Trajectory of Alzheimer's Disease

While there are currently no treatments approved by the U.S. Food and Drug Administration (FDA) that prevent or cure Alzheimer's disease, two drugs that change the underlying biology of Alzheimer's disease and slow disease progression for some people have recently become available (lecanemab and donanemab). By slowing disease progression, these drug treatments are expected to extend the time that individuals experience mild cognitive impairment or mild dementia due to Alzheimer's disease. In its 2023 report, the Institute for Clinical and Economic Review (ICER) determined that lecanemab had a low value for money at a list price of $26,500 per year and recommended a price range of $8,900 to $21,500 per year given its demonstrated health benefits.[1029] A subsequent analysis of the estimated long-term value of lecanemab reported that 18 months of lecanemab could yield savings of $21,398 to $37,943 per person (in 2022 dollars; $22,681 to $40,219 in 2025 dollars) through reduced medical costs and caregiving costs, increased earnings, and improved patient and caregiver quality of life.[1030] However, these projected values do not account for potentially higher costs associated with longer overall survival living with dementia.

FIGURE **18**

Number of Hospital Stays per 1,000 Medicare Beneficiaries Age 65 and Older with Specified Coexisting Medical Conditions, with and without Alzheimer's or Other Dementias, 2019



Created from unpublished data from the National 100% Sample Medicare Fee-for-Service Beneficiaries for 2019.[475]

Although these treatments, and others on the horizon, have the potential to improve quality of life for millions of adults and their families, there are some considerations. For example, while lecanemab demonstrated clinically significant changes in cognition and function, its effects in the short term may be imperceptible to those being treated.[1031] Additionally, people who receive lecanemab and donanemab are at risk of developing a serious side effect known as ARIA — amyloid-related imaging abnormalities with edema or effusions. Another concern is the affordability of treatment to both payers, such as Medicare, and to individuals and their families, who may bear out-of-pocket costs due to deductibles, copayments and coinsurance.[1032] Additionally, the current market price of treatment is high, at $26,500 per person per year.[1033, 1034] Lack of affordability of Medicare supplemental insurance is also likely to widen disparities in access to treatment for Medicare enrollees with low incomes given these market prices.

From a societal perspective, the number of people eligible for and the total cost of these treatments is a potential concern. The Centers for Medicare & Medicaid Services covers the cost of the medications for Medicare beneficiaries diagnosed with MCI due to Alzheimer's disease or mild dementia due to Alzheimer's dementia who have documented evidence of beta-amyloid accumulation in the brain and whose physicians participate in a qualifying patient registry with an appropriate clinical team and follow-up care.[1035] According to Medicare, beneficiaries with traditional Medicare will pay the standard 20% coinsurance of the Medicare-approved amount once they meet their Part B deductible. Costs may be different for people with Medicare supplemental coverage (such as a Medigap plan) or other secondary insurance, or those enrolled in a Medicare Advantage plan. Medicare advises beneficiaries to contact their plan for more specific cost information. A recent analysis of the projected Medicare spending on lecanemab reported that traditional Medicare enrollees without supplemental insurance would pay $6,637 annually in coinsurance for lecanemab treatment, including scans, and related care.[1036]

Although lecanemab and donanemab are for individuals with MCI due to Alzheimer's disease or mild dementia due to Alzheimer's disease, the actual number of people who may be eligible to receive the treatments is projected to be much smaller due to strict eligibility criteria. One group of researchers applied the clinical trial eligibility criteria to a sample of adults with dementia or MCI and a positive brain amyloid PET scan and found that only 8% of the sample would meet the lecanemab clinical trial inclusion and exclusion criteria.[1037]

Before the approval of lecanemab and donanemab, several groups of researchers had estimated the health and long-term care cost implications of hypothetical interventions that either slow the onset of dementia or reduce the symptoms.[578, 1038-1040] One analysis assumed a treatment that delayed onset of Alzheimer's by five years would reduce total health and long-term care spending for people with Alzheimer's by 33%, including a 44% reduction in out-of-pocket payments by 2050,[1038] and another study projected a 14% reduction in total health care spending for people age 70 and older with Alzheimer's from a one-year delay, a 27% reduction from a three-year delay, and a 39% reduction from a five-year delay by 2050.[1039] Beyond the single-year costs, the study also found that a delay in onset may increase total lifetime per capita health care spending due to longer life associated with delaying the onset of dementia, although the additional health care costs may be offset by lower informal care costs. Finally, a third study estimated that a treatment slowing the rate of functional decline among people with dementia by 10% would reduce total average per-person lifetime costs by $3,880 in 2015 dollars ($5,031 in 2025 dollars), while a treatment that reduces the number of behavioral and psychological symptoms by 10% would reduce total average per-person lifetime costs by $680 ($882 in 2025 dollars).[578] However, these studies did not take into account the current market price for FDA-approved drugs.

Therapies that change the course of the disease may not be the only way to reduce health and long-term care costs. The Alzheimer's Association commissioned a study of the potential cost savings of early diagnosis,[1040] assuming that 88% of individuals who will develop Alzheimer's disease would be diagnosed in the MCI phase rather than the dementia phase or not at all. Approximately $7 trillion could be saved in medical and long-term care costs for individuals who were alive in 2018 and will develop Alzheimer's disease. Cost savings were the result of (1) a smaller spike in costs immediately before and after diagnosis during the MCI phase compared with the higher-cost dementia phase, and (2) lower medical and long-term care costs for individuals who have diagnosed and managed MCI and dementia compared with individuals with unmanaged MCI and dementia.

The savings from a treatment or an earlier diagnosis may depend on structural changes to the health care system. Capacity constraints — such as a limited number of qualified providers and facilities — could severely restrict access to new treatments.[1041, 1042] For example, modeling by the RAND Corporation in 2017 showed that with an anti-amyloid therapy for people in the MCI and early dementia stages of the disease, approximately 2.1 million individuals with MCI due to Alzheimer's disease would develop Alzheimer's dementia between 2020 and 2040 while on waiting lists for treatment.[1041] This model assumed that the hypothetical treatment would require infusions at infusion centers and PET scans to confirm the presence of amyloid in the brain to support initiation of treatment with an anti-amyloid medication.

More research is needed about how changing the trajectory of Alzheimer's disease will affect the use and costs of care for the disease both individually and for the society as a whole. Although the new drug treatments have been shown to slow cognitive decline, the aggregate impact on health care use and costs is not yet known.

SPECIAL REPORT

BRAIN HEALTH IN AMERICA: UNDERSTANDING AND SUPPORTING LIFELONG COGNITIVE HEALTH

As more Americans live into their late 70s and beyond, public interest in proactively building and maintaining brain health is growing.[1043] But brain health (how well we think, learn and remember) is relevant long before the later stages of adulthood. There is increasing recognition that these cognitive functions are shaped throughout life. This year's Special Report offers new insight into how Americans understand, prioritize and act on the desire to sustain brain health across the lifespan.

It's never too early — or too late — to start prioritizing brain health

Public attention and scientific research often concentrate on disorders affecting cognitive function in older adults, such as MCI due to Alzheimer's disease, Alzheimer's disease and other dementias. While most of the 7.4 million individuals living with clinical Alzheimer's dementia and the estimated 4.2 million Americans with MCI due to Alzheimer's are 65 and older, research shows that physiological changes marking the earliest stages of Alzheimer's disease can begin up to 20 years before measurable cognitive impairment.[13-15] Because these early changes may be influenced, in part, by lifestyle behaviors during younger years, the benefits of nurturing brain health are not just for older adults, but important across the entire lifespan.

Supporting Brain Health by Acting on Modifiable Factors With Lifestyle Choices and Behaviors

Cognitive decline, mild cognitive impairment (MCI) due to Alzheimer's disease, Alzheimer's disease and other causes of dementia are not an inevitable part of aging. We are learning more and more about the impact of non-modifiable risk factors such as age, genetics and family history on brain health. Researchers have also identified numerous modifiable factors with strong evidence connecting them to lower risk of cognitive decline and dementia (see Figure 2, page 17). These are reflected in the Alzheimer's Association *10 Healthy Habits for Your Brain*, which highlights key areas that influence cognitive well-being (Figure 19)[1044]:

1. Traumatic brain injury.
2. Smoking.
3. Physical activity.
4. Cognitive engagement.
5. Hypertension (high blood pressure).
6. Diabetes.
7. Sleep.
8. Formal education.
9. Diet/nutrition.
10. Weight.

These healthy habits are likely familiar, as most overlap with recommendations for improving and maintaining physical health — such as controlling blood pressure, managing blood sugar, maintaining a healthy weight, eating a nutritious diet, staying physically active, getting enough restful sleep and avoiding smoking. Cognitive engagement is about keeping mentally active through new and challenging activities (e.g., taking classes, learning new skills or a new language, reading difficult material or learning to play a challenging strategy game).

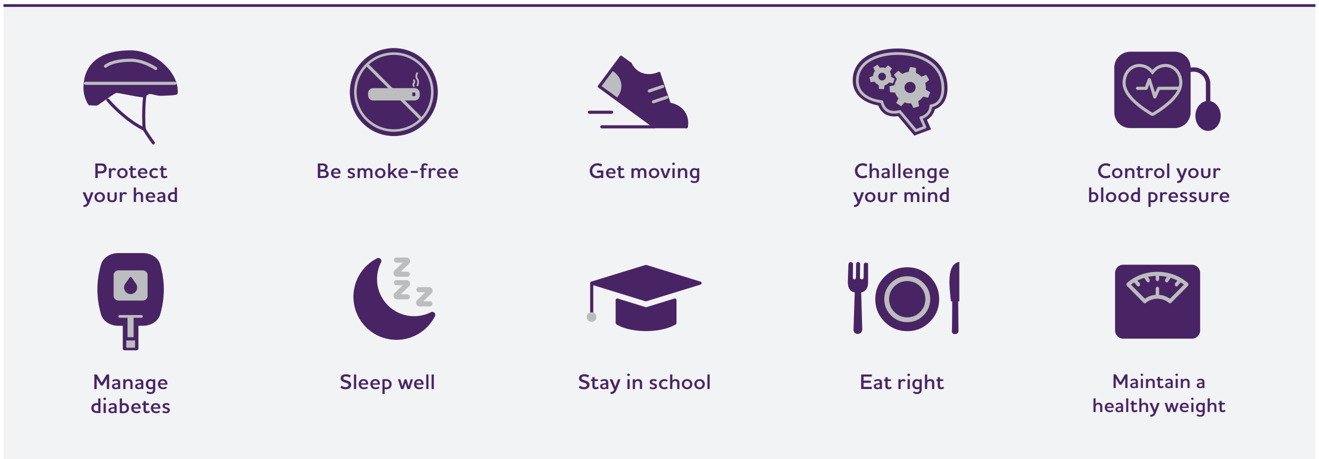
One notable report estimated that nearly half of all dementia cases globally could be attributed to modifiable risk factors.[65] Knowing these factors can help people take meaningful, practical steps to reduce their risk of cognitive decline and support cognitive health across the lifespan. Adopting healthy lifestyle habits may also meaningfully influence both short-term and long-term physical health. Some of these lifestyle behaviors are relatively straightforward to adopt, while others, such as managing chronic conditions or engaging in cognitively-stimulating activities, are multifaceted and may require support from a physician or a structured program.

The U.S. POINTER Study Substantiated the Power of Lifestyle Changes to Impact Brain Health

One of the strongest examples of how lifestyle changes affect brain health comes from the U.S. Study to Protect Brain Health Through Lifestyle Intervention to Reduce Risk

FIGURE **19**

10 Healthy Habits for Your Brain



(U.S. POINTER). U.S. POINTER is the first large-scale, randomized controlled clinical trial in the United States to demonstrate that an accessible and sustainable healthy lifestyle intervention that addresses multiple factors simultaneously can protect cognitive function.[268] The study evaluated a multi-domain "Brain Health Recipe" (Figure 20) of lifestyle changes targeting four modifiable risk factors associated with cognitive decline:

- Physical exercise.
- Cognitive exercise.
- Cardiovascular health monitoring.
- Nutrition.

Over two years, the multi-site trial randomized more than 2,100 study participants at elevated risk for cognitive decline to either a structured program that incorporated the brain health recipe shown in Figure 20 or a self-guided intervention in which individuals made their own plans focusing on the same four lifestyle factors.[268,1045] The structured intervention included[1045]:

- 38 facilitated peer group sessions that also provided an opportunity for social engagement.
- Prescribed aerobic, resistance and flexibility exercise with measurable goals.
- Adherence to the MIND diet (Mediterranean-DASH Intervention for Neurodegenerative Delay, a combination of a Mediterranean diet and the Dietary Approaches to Stop Hypertension [DASH] diet).
- Cognitive training.
- Semiannual clinical reviews of cardiovascular risk markers (cholesterol, hemoglobin A_{1C} and blood pressure) with goal setting.

The self-guided group received educational materials, attended six peer meetings over two years, and underwent annual health monitoring without individualized coaching.[1045] Participants in the study largely reflected the racial and ethnic diversity of the U.S. population.[1046]

Both groups had improved cognitive function at the end of two years, with the structured group having a statistically-significant greater improvement in cognition compared with the self-guided group.[268] Compared with the self-guided group, those in the structured program had cognitive scores equivalent to those of people who were up to two years younger.[268]

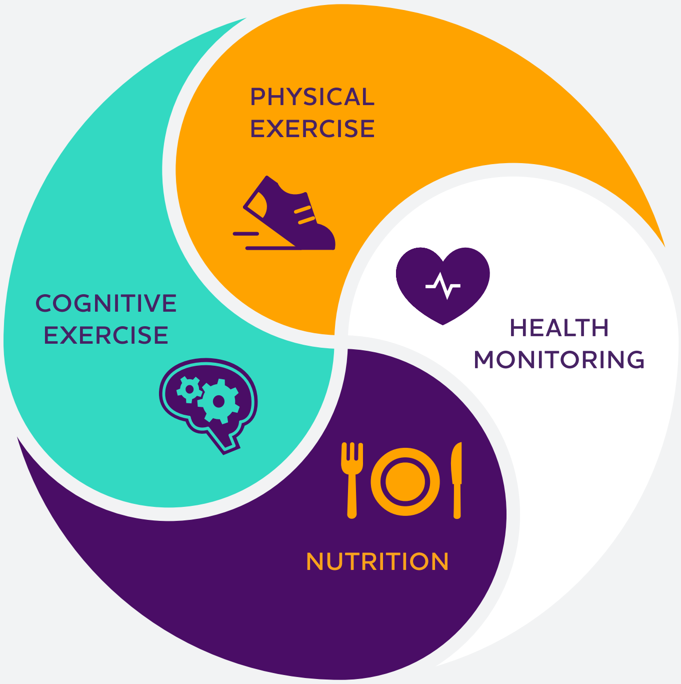
Midlife Is an Important Window for Long-Term Brain Health

Many health conditions that influence cognitive function later in life, such as obesity, high blood pressure, diabetes and changes in sleep, first appear or become more common during midlife (see Potentially Modifiable Risk Factors section starting on page 19).[87, 105, 107-112,127-130] This period is also one in which many individuals begin paying closer attention to their overall physical health, making midlife an important window for establishing habits that sustain brain health.

Daily behaviors typically associated with physical health — for example, regular movement, restorative sleep and nutritious eating — also play a central role in maintaining cognitive function and delaying cognitive decline. Modifiable cardiovascular-related risk factors are

FIGURE 20

U.S. POINTER Brain Health Recipe*



● **Physical Exercise**
30–35 minutes of moderate-to-intense aerobic activity four times a week, plus strength and flexibility exercises twice a week.

○ **Health Monitoring**
Regular check-ins on blood pressure, weight and lab results.

● **Nutrition**
Adherence to the MIND diet, which emphasizes dark leafy greens, berries, nuts, whole grains, olive oil and fish, and limits sugar and unhealthy fats.

● **Cognitive Exercise**
Computer-based brain training program three times a week for 30 minutes, plus regular engagement in other intellectually challenging and social activities.

* U.S. POINTER = U.S. Study to Protect Brain Health Through Lifestyle Intervention to Reduce Risk. U.S. POINTER participants followed either a self-guided or structured lifestyle program. The two interventions both focused on the same lifestyle domains, but differed in structure, accountability and support provided. MIND = Mediterranean-DASH Intervention for Neurodegenerative Delay.

Created from data from Baker et al.[268]

especially important during this stage of life, and research shows a clear connection between mid-to-late-life heart health and the risk of cognitive decline.[121]

The concept of cognitive reserve also becomes particularly relevant during midlife, when its long-term implications are more apparent. Cognitive reserve refers to the brain's ability — developed through formal education, having a mentally stimulating job and engaging in mentally stimulating activities — to make flexible and efficient use of cognitive networks (networks of neuron-to-neuron connections) to enable a person to continue to carry out cognitive tasks despite changes to the brain.[179,180] Cognitive reserve works like a mental savings account: the more one adds to the account throughout life, including in their late 30s through their early 60s, the more they can withdraw later if the brain is affected by cognitive-related diseases.

The goals and opportunities for supporting brain health may also differ between midlife and older adulthood. While later life has often emphasized protecting cognitive function and detecting early signs of decline, midlife offers a crucial opportunity to build long-term resilience. By adopting healthy lifestyle behaviors during this period, individuals could make lasting investments in their brain health.

What Americans Know About Brain Health and Brain-Healthy Lifestyle Choices

To better assess public perceptions of brain health — and the relationship between physical health, lifestyle behaviors and cognitive function — the Alzheimer's Association commissioned the University of Michigan (U-M) National Poll on Healthy Aging. The poll, directed by the U-M

Institute for Healthcare Policy & Innovation, surveyed a nationally representative sample of U.S. adults age 40 and older. The survey examined how people think about brain health, which behaviors they believe contribute to it, their current engagement in brain-healthy habits, and their preferences for receiving information and tools to support long-term cognitive health.

Key Findings

Perceptions of brain health

Americans age 40 and older show strong interest in brain health but lack clear guidance on how to support it.

- More than 4 in 5 adults (82%) associated "good brain health" with being able to think clearly and make good decisions, reflecting a functional, ability-based view of brain health.
- Nearly 9 in 10 (88%) said maintaining brain health as they age is very important, and 99% viewed brain health as equally or more important than physical health.
- Yet despite its perceived importance, fewer than 1 in 10 (9%) reported knowing "a lot" about ways to maintain brain health — signaling a significant knowledge gap.

Importance of brain health behaviors

Lifestyle behaviors are seen as critical yet not fully linked to dementia risk reduction.

- Three in 4 Americans (75%) believed lifestyle behaviors (e.g. diet, physical activity, sleep and mentally stimulating activities) play a very important role in maintaining brain health as they age.
- However, fewer than half of adults age 40 and older (46%) strongly associate lifestyle behaviors with reducing the risk of Alzheimer's disease or other dementias.
- Adults rated other key behaviors as "very important" for supporting brain health as they age, including:
  - Protecting against head injuries (82%).
  - Not smoking (72%).
  - Managing stress (71%).
  - Treating depression (71%).

Engagement in brain health behaviors

While Americans age 40 and older overwhelmingly believe lifestyle behaviors support brain health, many do not practice them consistently.

- Despite strong beliefs in the importance of lifestyle behaviors, engagement is inconsistent.
  - Sleep: Only half of adults (50%) get at least 7 hours of sleep daily/most days; 31% only one to three times per week.
  - Diet: About 2 in 5 (39%) follow a healthy diet daily/most days; 40% only one to three times per week.
  - Mental stimulation: About 2 in 5 (42%) perform some sort of activity daily/most days; 27% only one to three times per week.
  - Exercise: 1 in 3 (34%) are physically active daily/most days; 36% only one to three times per week.
- About 1 in 3 survey participants said they engaged in mentally stimulating activities (31%) or physical exercise (30%) less than once a week or never.
- For adults who do engage in these habits at least weekly, maintaining brain health is a major motivator:
  - 83% said brain health motivates them to get enough sleep and do mentally stimulating activities.
  - 80% said it motivates their physical activity.
  - 79% said it motivates their healthy eating.

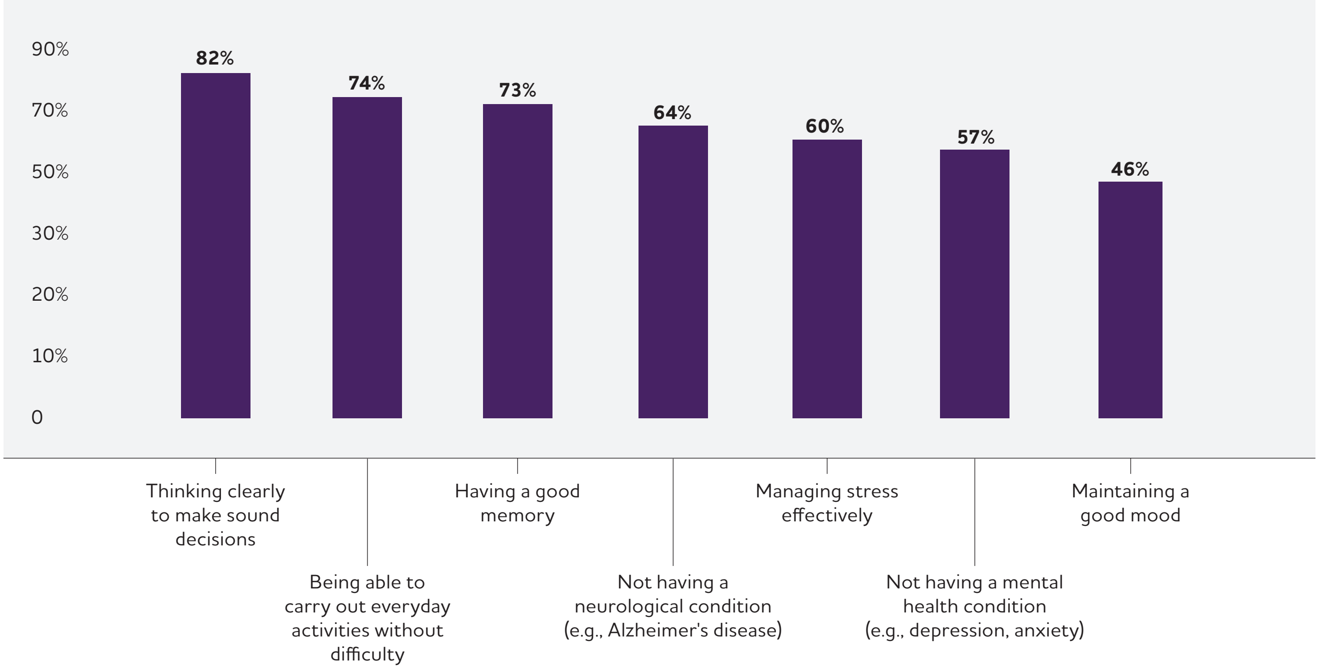
U.S. POINTER study and brain health lifestyle programs

There is high interest in brain health programs, but cost and logistics are major barriers.

- Awareness of U.S. POINTER, a major lifestyle-based brain health intervention research study, was low, with only 11% of Americans age 40 and older reporting familiarity.
- However, interest in brain health programs modeled after U.S. POINTER was strong, with nearly 3 in 4 Americans (73%) saying they were somewhat or very interested in participating.
- Adults preferred flexible formats that give them control over their effort:
  - 40% prefer self-guided activities at home.
  - 39% want a hybrid of self-guided and in-person sessions.
  - 8% prefer fully in-person programs with coaches and peers.
- Americans also rated how likely they were to engage in key U.S. POINTER program components, with cognitive exercise being the highest:
  - Cognitive exercise (57%).
  - Health monitoring (46%).
  - Nutrition (36%).
  - Physical exercise (26%).
- Cost was the most influential factor driving decisions to participate in a brain health lifestyle program (73%), followed by program location (67%), personal motivation (59%) and insurance coverage (58%).

FIGURE 21

What Good Brain Health Means to Adults Age 40 and Older



Importance of Midlife Engagement

Midlife may be an opportune time to act for better brain health.

- Many adults identified midlife (ages 35–64) as the critical window for action:
  - Nearly 2 in 5 (38%) said people should begin taking steps to support their brain health between ages 35–64.
  - Almost 1 in 2 (46%) said participation in a formal program should begin during this same period.
- About 1 in 3 Americans said doing things to support brain health should be a lifelong endeavor, with action appropriate at any age.

Interest in resources and tools for brain health

Americans age 40 and older want guidance on brain health from trusted health care professionals, but these conversations rarely occur.

- Two in 3 Americans (66%) said they prefer to learn about brain health from their health care provider, and most individuals (86%) want brain health information during routine care.
- Yet only 14% of adults report having a conversation about maintaining brain health with their physician; even fewer (11%) have discussed ways to reduce the risk of Alzheimer's and other dementias.

Survey Results

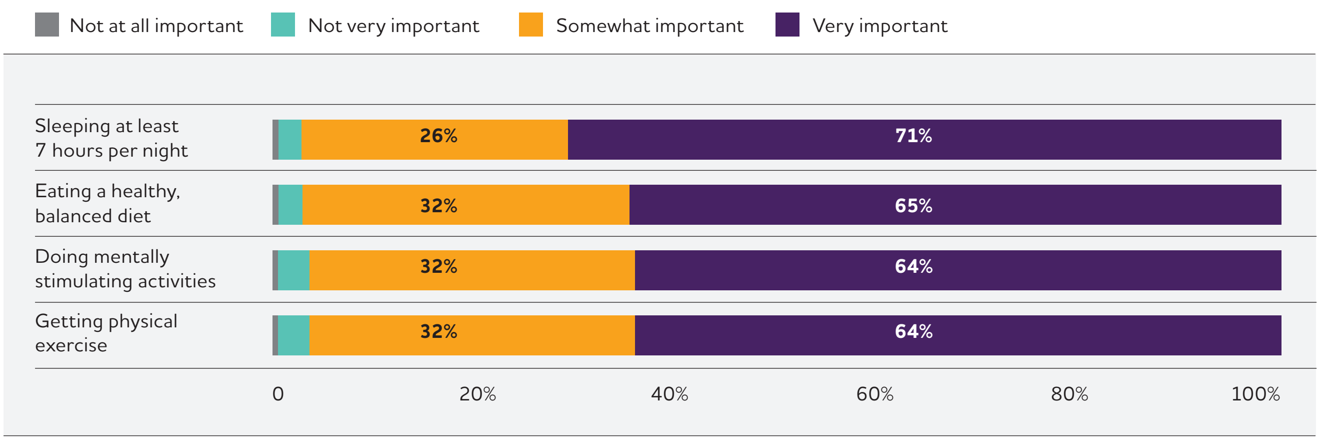
A survey of 3,829 U.S. adults age 40 and older was conducted from December 29, 2025, to January 13, 2026. The sample was sourced via NORC's AmeriSpeak Panel at the University of Chicago. AmeriSpeak is a probability-based panel of all U.S. households. The full sample included oversampling of adults identifying as American Indian or Alaska Native (n=162), Asian (n=298), Black (n=495) and Hispanic (n=485) for robust analysis of subgroups. The final data were weighted by select criteria to match population totals from the U.S. Census Bureau. The survey was offered in English as an online or phone survey.

Americans age 40 and older primarily view good brain health as functional ability rather than the absence of disease or mental well-being

Survey participants overwhelmingly defined brain health in terms of what they can do, emphasizing cognitive ability and day-to-day functioning rather than emotional well-being or the absence of disease. Survey participants most often associated good brain health with thinking clearly to make sound decisions (82%), carrying out everyday activities without difficulty (74%) and having a good memory (73%) (Figure 21). These findings suggest that Americans view good brain health as fundamental to self-reliance, autonomy and control over their lives as they age. Functional abilities were rated higher than not having

FIGURE 22

Perceived Importance of Health Behaviors in Maintaining Brain Health



a neurological condition (64%) or a mental health condition (57%). Similarly, cognitive performance outweighed responses related to emotional and psychological well-being. While 60% cited managing stress as part of good brain health and 57% mentioned not having a mental health condition such as depression or anxiety, fewer respondents associated brain health with maintaining a good mood, which was rated lowest at 46%.

Americans have high confidence in their own brain health, although there is minimal understanding of how to support it

When asked to self-rate their current brain health, responses skewed heavily positive, with the majority (90%) reporting good to excellent brain health. More than 1 in 2 adults (55%) said it was excellent (13%) or very good (42%), and another 35% considered their brain health to be good. Only 1 in 10 adults viewed their brain health as suboptimal (fair, 9% or poor, 1%).

However, this high baseline confidence in the state of their own brain health contrasted sharply with participation in activities that are important to brain health or understanding of how to actively preserve cognitive function. Very few survey participants (9%) claimed to know a lot about ways to maintain brain health. The vast majority admitted to knowing only some (51%), a little (31%) or nothing (8%).

Brain health is viewed as universally important and on par with physical health

When asked about the overall value of keeping their cognitive abilities strong as they age, nearly all adults 40 and older (99%) reported that it is important, with most reporting it was very important (88%). Furthermore, respondents viewed brain health as being just as critical as physical health, if not more so. When asked to compare, nearly 9 in 10 adults (87%) said maintaining brain health is equally important as maintaining physical health, 12% considered brain health to be more important, and only 1% placed physical health above brain health.

Americans age 40 and older overwhelmingly believe lifestyle behaviors support brain health, but many do not practice them consistently

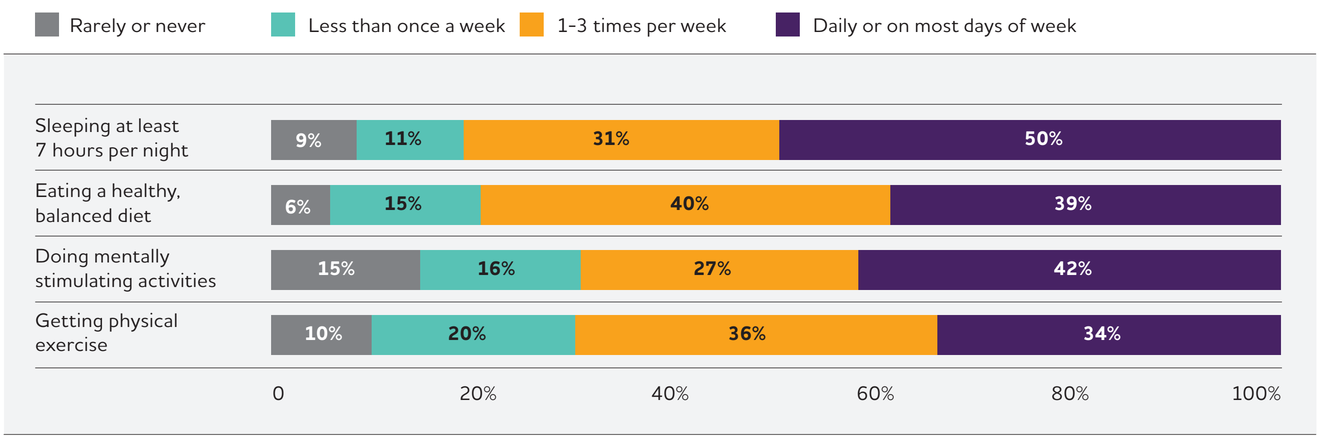
Americans overwhelmingly believe that everyday lifestyle behaviors — such as good sleep, healthy diets, physical activity and mentally stimulating activities — are important for preserving brain health. Nearly all adults surveyed (99%) said these habits matter for overall cognitive well-being, with 3 in 4 (75%) rating them as very important and the remaining 24% viewing them as somewhat important.

Sleep emerged as the most valued lifestyle behavior, with nearly 3 in 4 (71%) saying it was very important to maintain brain health (Figure 22). Respondents also placed strong importance on eating a healthy, balanced diet (65%), doing mentally stimulating activities (64%) and getting physical exercise (64%).

Despite these strongly held beliefs, engagement in these behaviors was inconsistent. Sleep was the most consistent habit, but even then, only half of adults (50%) reported getting at least 7 hours of sleep daily or on most days, with another 31% doing so only one to three times a week (Figure 23).

FIGURE **23**

Engagement in Brain Health Behaviors in the Past Year



Participation in other healthy behaviors was even less consistent:

- Eating a healthy diet: 39% daily/most days; 40% one to three times a week.
- Doing mentally stimulating activities: 42% daily/most days; 27% one to three times a week.
- Getting physical exercise: 34% daily/most days; 36% one to three times a week.

About 1 in 3 adults said they rarely or only occasionally engage in mentally stimulating activities or physical exercise. For mental stimulation, 15% report doing it rarely or never and 16% less than once a week. Similarly, 10% of adults reported rarely or never exercising, and 20% less than once a week (Figure 23).

For adults who practiced these behaviors at least weekly, keeping their brain healthy was a strong motivator. Four in 5 adults (83%) said maintaining brain health motivates them to get enough sleep and to do mentally stimulating activities, with 45% in both categories saying it motivated them a lot. Brain health was also cited as a significant motivator for those getting regular physical exercise (80%, some or a lot) and eating a balanced diet (79%, some or a lot).

When presented with a broader list of modifiable health factors, survey participants prioritized physical safety and mental health (Table 25). Protecting against head injuries was the highest-rated factor overall, with 4 in 5 adults (82%) rating it as very important for maintaining brain health. Avoiding harmful habits and addressing mental well-being were also seen as crucial, with not smoking (72%), managing stress (71%) and treating depression (71%) rounding out the top strategies.

Americans age 40 and older worry about Alzheimer's disease and dementia, but are slightly less convinced of the role of healthy lifestyle behaviors in lowering their risk

Worry about Alzheimer's disease and other dementia is widespread, yet many adults remain uncertain about whether adopting healthy lifestyle behaviors can reduce their risk of dementia. Among adults age 40 and older, 68% said they were worried about developing Alzheimer's disease or other dementia, with 1 in 5 (20%) classifying themselves as very worried and 48% as somewhat worried. Only 1 in 3 (32%) report not being worried. Despite this concern, confidence in the ability of everyday habits to lower their risk of Alzheimer's or other dementia is more modest. While nearly all adults (93%) believe lifestyle behaviors are at least somewhat important in reducing dementia risk, fewer than half (46%) viewed habits such as sleep, diet and physical activity as very important. Nearly half (47%) consider them only somewhat important and 8% said they were not important. These findings suggest that many Americans have limited awareness of the scientific evidence demonstrating that individuals who address modifiable risk factors may help decrease their risk of Alzheimer's disease or another type of dementia.

There is high interest in brain health programs despite limited research awareness, with cost a primary driver of program participation

Despite low awareness of current clinical research on lifestyle programs and brain health, there is robust enthusiasm for such programs among Americans age 40 and older. Survey participants were largely unfamiliar with the U.S. POINTER study (88% not very or at all familiar). More than half (57%) also reported low familiarity with lifestyle and brain health research more broadly. Despite this low awareness and uncertainty about the impact of lifestyle behaviors on dementia risk as discussed previously, nearly 3 in 4 adults (73%) were somewhat or very interested in participating in a brain health program modeled after U.S. POINTER (24% very; 49% somewhat; Figure 24). For a reminder of the U.S. POINTER components, refer to Figure 20.

However, translating this broad interest into actual participation hinges heavily on practical logistics. For 3 in 4 adults (73%) financial cost was cited as the most significant consideration to joining a program. Other deciding factors of participation included (marked very important; Figure 25):

- Location of program (67%).
- Personal motivation (59%).
- Insurance coverage (58%).
- Coverage through employer (51%).
- Length of program (49%).
- Recommendation from health care provider (31%).
- Recommendation from family or friends (15%).

Figure 25 shows the full range of responses and how survey participants rated each factor. Overall, the findings suggest that while adults are highly receptive to structured brain health programs, widespread participation will require addressing cost and logistical barriers. Traditional social influences (recommendations from physicians or family) carried less weight.

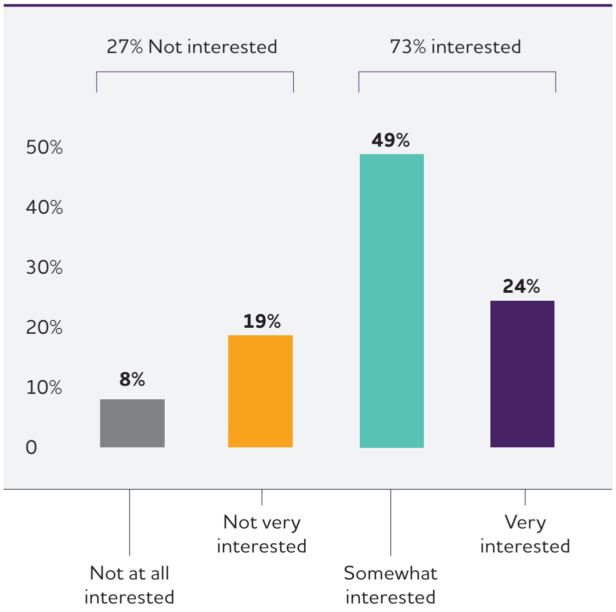
TABLE **25**

Perceived Importance of Other Factors in Maintaining Brain Health

Factors	Rated as Very Important
Protecting against head injuries	82%
Not smoking	72%
Managing stress	71%
Treating depression	71%
Controlling blood pressure	67%
Avoiding falls	65%
Maintaining a healthy weight	57%
Socializing with others	55%
Limiting alcohol	55%
Addressing hearing loss	54%
Managing cholesterol	51%

FIGURE **24**

Interest in Participating in a Brain Health Program



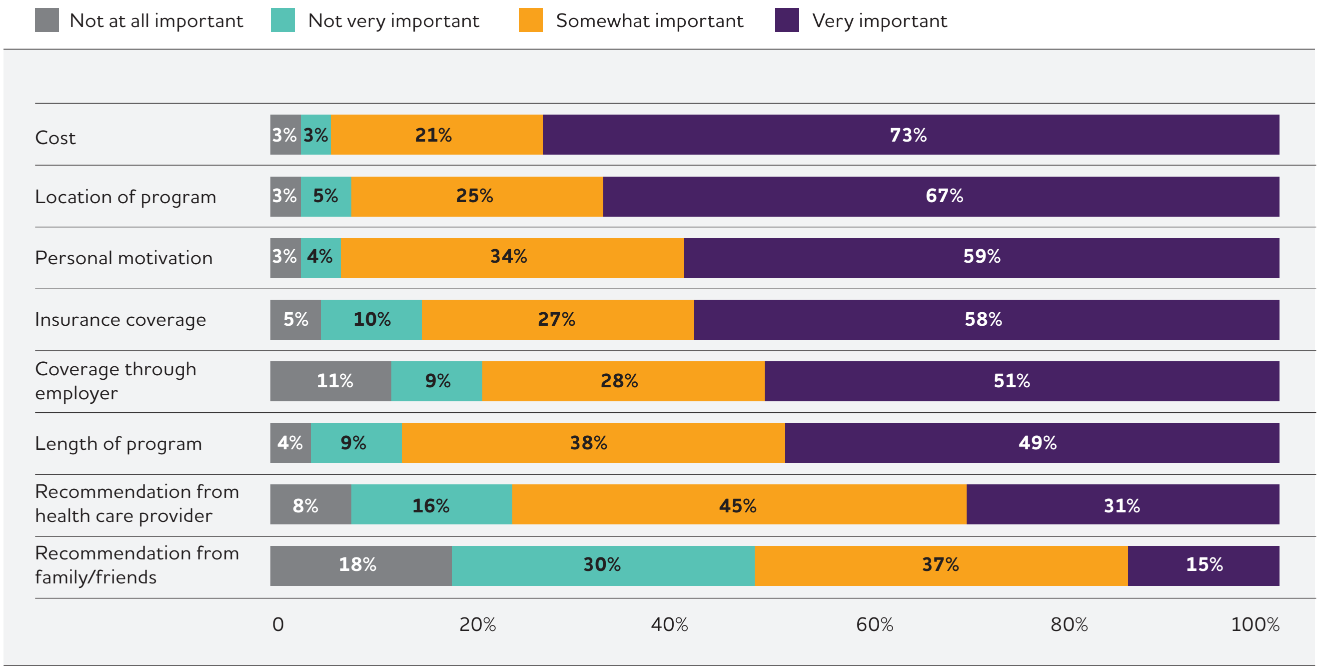
Midlife is viewed as the prime time to begin addressing cognitive health through flexible, self-guided brain health programs

More than 1 in 3 adults (38%) believe people should start taking active, self-guided steps to support their brain health in the 35-to-64 midlife window, and 46% said participation in a formal brain health program should begin during this time (Figure 26). Nearly 1 in 4 respondents (24%) felt individuals should start taking everyday steps to support brain health before age 35. Adults age 40 to 64 were significantly more likely than those 65 and older to say people should begin taking steps to mitigate cognitive decline before age 50. Approximately 1 in 3 adults viewed brain health as a lifelong endeavor, stating that individuals should take personal action (29%) and participate in programs (26%) at any age.

When asked what they wanted to gain from participating in brain health lifestyle activities, participants prioritized decreasing the likelihood of disease and enhancing cognitive function. Approximately 3 in 4 survey participants cited lowering the risk of Alzheimer's disease or other dementia (74%) and achieving better memory and thinking skills (72%) as top goals. Many were also motivated by broader health improvements, including:

FIGURE 25

Importance of Factors in Deciding to Participate in a Brain Health Lifestyle Program



- Improved physical fitness and strength: 60%.
- Better control of health factors: 55%.
- Better sleep quality: 53%.
- Reduced stress: 48%.
- Healthier eating habits: 47%.
- Stronger social connections: 22%.

When it comes to specific activities that might be part of a brain health program, respondents were most receptive to workouts for the mind. Over half (57%) said they would be very likely to engage in cognitive exercises, and 46% were very likely to engage in health monitoring. In contrast, fewer adults said they would be very likely to participate in the nutrition (36%) and physical exercise (26%) components of a structured program, suggesting many adults age 40 and older still characterize brain health as a cognitive activity, rather than something that is addressed holistically through attention to physical health as well.

Finally, adults strongly prefer flexibility in how these programs are delivered, with 4 in 5 (79%) favoring either fully self-guided activities at home (40%) or a combination of in-person and self-guided activities (39%). Only 8% preferred fully in-person programs. This strong preference for flexible, self-guided formats suggests that many adults want brain health programs they can adapt to their own circumstances, an approach that may be especially appealing during midlife.

Americans age 40 and older want guidance on brain health from trusted health care professionals, but these conversations rarely occur

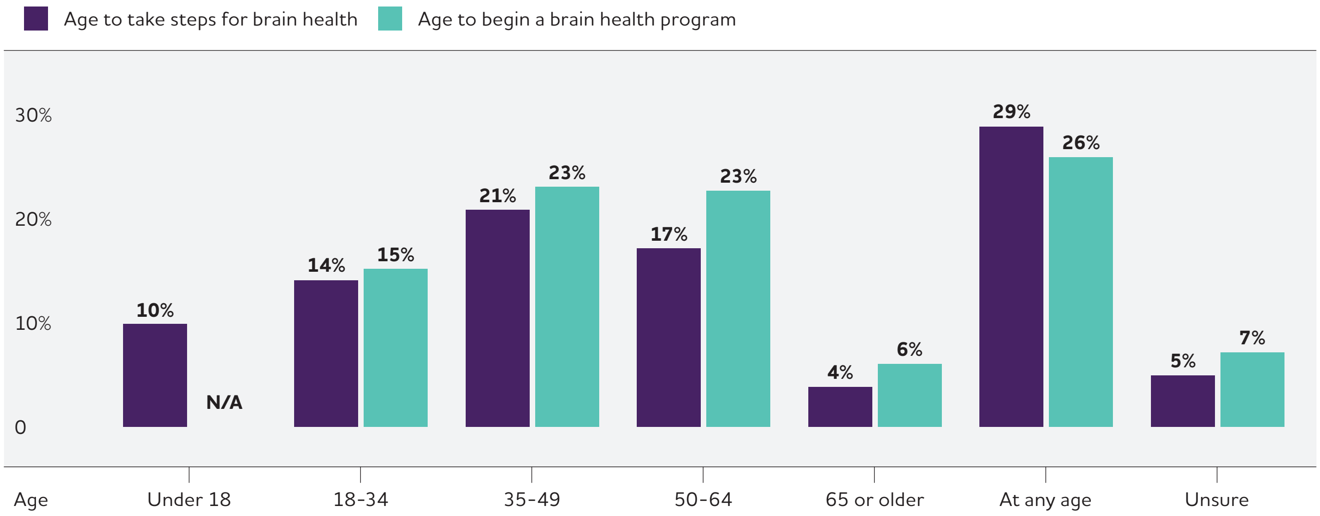
When asked about how they'd like to learn about brain health, 2 in 3 respondents (66%) identified their health care provider as their top source for information (Figure 27). Although there was strong trust in health care providers as the primary source for brain health information, only 14% of adults have discussed this topic with their provider. This may be a reflection of limited public awareness and the absence of established clinical guidance on brain health. It also spotlights a major opportunity to integrate brain health into routine care as guidance and tools become more available.

Respondents also expressed a clear desire for health care providers to initiate brain health conversations proactively. Nearly 9 in 10 (86%) said they want brain health education during an annual exam, regardless of whether they are experiencing memory issues. Many also supported other proactive approaches, including:

- After a cognitive screening shows memory and thinking problems: 41%.
- A health care visit devoted just to discussing brain health: 36%.
- An information session offered by a health system/ health care provider: 35%.
- Communication from a patient portal: 33%.
- After being diagnosed with dementia: 19%.

FIGURE 26

Suggested Age at Which People Should Take Steps to Support Brain Health or Participate in a Brain Health Lifestyle Program



Only 2% of those surveyed were not interested in brain health information from their health care provider.

Alongside clinical guidance, respondents showed strong interest in self-directed learning, including articles or other written materials (49%), online webinars or videos (33%), and apps on a smartphone or tablet (29%) (Figure 27).

Employed adults show openness to brain health education through workplace offerings

Workplaces also emerged as a possible channel for reaching adults with brain health information. Among employed respondents, 18% said they would be interested in receiving brain health information through their workplace or employee wellness programs (Figure 27). Overall, practical, accessible formats were favored. Among adults interested in workplace programs, more than 3 in 4 (77%) adults wanted lifestyle tips and tools, 63% were interested in one-on-one brain health coaching and 61% desired referrals to health clinics. Group activities focused on brain health (52%) and guest speakers or expert talks (40%) were also popular options for workplace integration.

Age, gender, race and ethnicity, family history of dementia, education and household income influenced some responses

Adults shared different perspectives and experiences depending on their age, gender, race and ethnicity, family history of Alzheimer's disease or dementia, education and household income.

Age

Adults age 40 to 64 expressed greater worry about developing Alzheimer's disease than older Americans (23% vs. 15% said they were "very worried"). More than 2 in 3 adults 65 and older (67%) said they know some or a lot about ways to support brain health compared with 56% of adults 40 to 64. Adults age 65 and older also reported more regular engagement in all healthy behaviors. In addition, adults 40 to 64 showed stronger interest in a brain health program (28% vs. 20%) and were more inclined to say such programs should begin in midlife than Americans 65 and older.

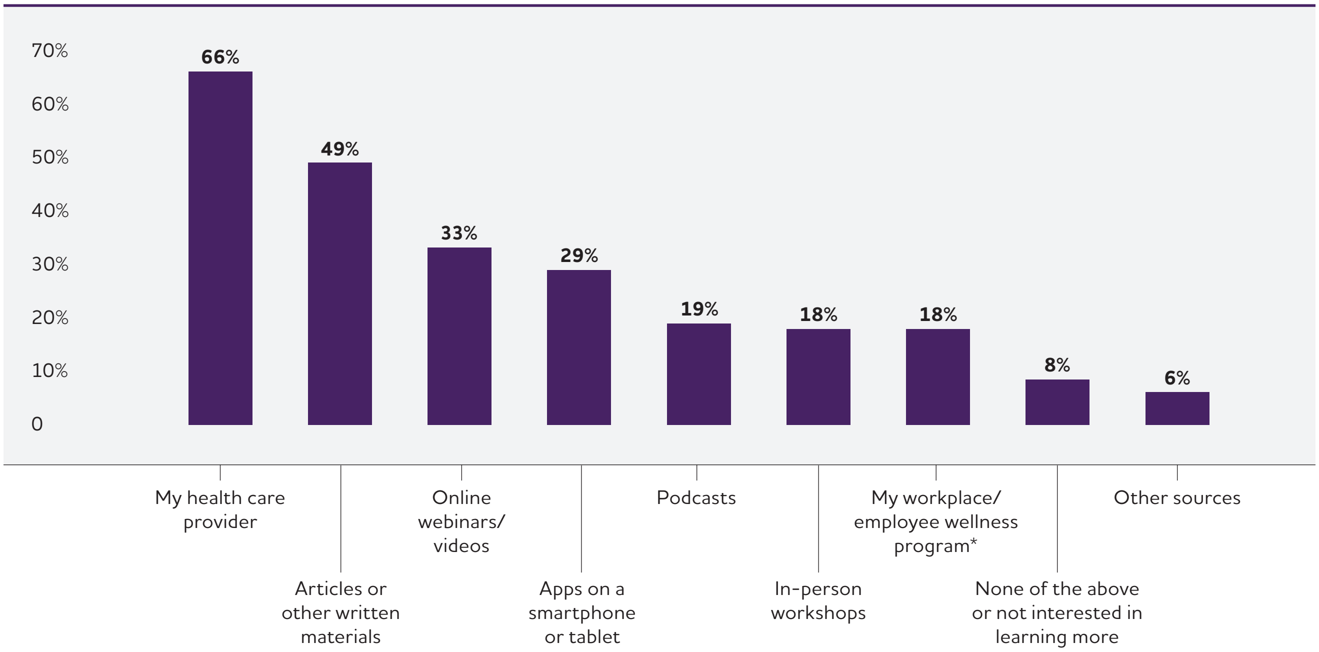
Gender

Women expressed greater concern about developing Alzheimer's than men (23% vs. 16% said they were "very worried"), and were more likely to say they knew some or a lot about ways to support brain health (65% vs. 56%). Women also reported slightly more interest in participating in brain health programs than men (76% vs. 70%).

Women consistently rated lifestyle behaviors as very important at higher levels than men and reported that maintaining brain health motivated them a lot to eat a healthy and balanced diet (40% vs. 30%) and do mentally stimulating activity at least weekly (51% vs. 39%).

FIGURE 27

Sources of Information About Brain Health



*This item was shown only to those who indicated they were employed (n=1,908).

Race and ethnicity

Interest in a brain health lifestyle program was especially strong among American Indian or Alaska Native, Black, and Hispanic adults (31–39%) compared with white adults (21%). Black and Hispanic adults also placed higher importance on lifestyle behaviors for reducing the risk of Alzheimer's and related dementias. For example, 60% of Hispanic adults rated lifestyle as "very important," compared with 40% of white adults.

Family history

Adults with a family history of Alzheimer's expressed substantially higher worry about developing the disease (80% vs. 57%) than those without a family history and were slightly more likely to have discussed brain health and dementia risk reduction with a health care provider. Despite these differences, their interest in brain health lifestyle programs was no greater than that of those without a family history.

Education

Adults with a high school education or less were more likely to be very worried that they will develop Alzheimer's disease than those with a bachelor's degree or higher (23% vs. 18%).

Education was also linked to healthier lifestyle patterns. Adults with at least a bachelor's degree were more likely to rate lifestyle behaviors as very important for maintaining brain health. They were also more likely than those with less education to report regular:

- Physical exercise (41 vs. 28%).
- Mentally stimulating activities (50% vs. 35%).
- Healthy diet (48 vs. 29%).

Higher education was further associated with greater interest in participating in a brain health program (31% very interested among those with a bachelor's degree vs. 23% some college and 19% high school or less).

Household income

Adults with lower household incomes expressed the greatest worry about developing Alzheimer's disease or another dementia. Among adults 40 and older with annual incomes below $30,000, a substantially higher share reported being very worried compared with those with higher household incomes (28% vs. 17%).

Income was also reflected in differing barriers to participating in brain health programs. Adults with lower household incomes were more likely to consider cost and cite physical or health limitations, technology challenges and transportation as barriers, whereas adults with higher incomes were more likely to cite time constraints as the primary barrier.

Building a Coordinated Framework to Advance Brain Health Across the Lifespan

This year's Special Report reveals that Americans value brain health, feel motivated to protect it and want guidance they can trust but face gaps in knowledge, access and system-level frameworks to do so. These insights reinforce the need for coordinated, research-backed programming that meets individuals where they are and helps them take meaningful action to support brain health across the lifespan. Together, these findings show that adults want accessible, trustworthy information about maintaining brain health, ideally delivered through both health care settings and self-directed formats.

The Alzheimer's Association is working with stakeholders across multiple sectors to create a future that emphasizes brain health across the lifespan to ensure individuals, communities, workplaces and health care systems receive consistent, evidence-based guidance. While supporting individuals with Alzheimer's disease and their families remains a priority, the Alzheimer's Association is significantly increasing its focus on reaching and helping people earlier, sometimes long before symptoms begin, to promote behavior changes that support lifelong brain health. Programs and initiatives informed by the U.S. POINTER study are offered at a variety of touchpoints. This approach moves beyond individual decision-making to shape the environments where people live, work and receive care.

Brain Health for Individuals

Most brain health–focused tools and programming available today are self-guided, a format that aligns closely with survey findings showing that adults prefer autonomy, flexibility and resources they can integrate into their daily routines. The Alzheimer's Association is spearheading efforts to make brain health information accessible to more Americans. This includes nationwide education and tools such as the *10 Healthy Habits for Your Brain* campaign, ALZ Talks webinars covering topics ranging from brain health to dementia to caregiving, and the Brain Health Habit Builder. The Brain Health Habit Builder is a free, web-based tool that offers a quick, interactive experience for people to assess their brain health habits and develop a tailored action plan with research-backed guidance, including learnings from the U.S. POINTER study.

These tools help address the gaps between confidence and knowledge that the survey revealed by translating scientific evidence into simple, actionable steps. They also reflect adults' desire for personalized guidance: the Brain Health Habit Builder provides tailored action plans encouraging small, meaningful changes in areas like physical activity, diet, sleep and cognitive engagement.

Brain Health in Communities

The survey revealed that adults view a healthy brain as essential to independence and well-being as they age, yet many lack an understanding of evidence-based strategies that can help them achieve it. Many respondents also expressed strong motivation to take action on their own, particularly adults in midlife and underrepresented racial and ethnic groups, but reported uncertainty about where to start. These findings point to a clear opportunity: community-based programs can meet people where they live, work and learn to give practical, trustworthy information. This serves to normalize conversations and increase visibility of brain health programs that reinforce personal agency and provide concrete steps toward brain-healthy habits.

The Alzheimer's Association's Building Brain-Healthy Habits program is a free, volunteer-led program that teaches science-backed strategies for incorporating brain-healthy habits into daily life. During presentations, participants are guided in creating a personalized six-step action plan that includes goal-setting and strategies for anticipating and overcoming potential barriers to lifestyle change. The program is designed for use across a wide range of community and workplace settings, with a flexible format that allows it to be delivered in libraries, community centers, gyms, coworking spaces, corporate wellness programs, universities, adult learning centers, faith-based settings and other local gathering places as well as online.

Brain Health in the Workplace

The workplace is one of the most powerful settings to support lifelong brain health, especially for reaching people in midlife. This year's Special Report survey found that many employed adults are open to receiving practical tools, coaching and referrals about brain health through their workplaces, presenting an opportunity to reach working-age adults, including those who may be caring for someone living with dementia or be at elevated risk of developing cognitive issues themselves.

From the employer perspective, brain health is one component of the growing concept of "brain capital," which contributes to workforce capacity, economic growth and national competitiveness. Brain capital includes brain health and brain skills.[1047] Brain skills encompass the cognitive, interpersonal, self-management and technological abilities that draw on higher-order thinking, emotional regulation and adaptive capacity. Promoting brain health can help foster these skills as individuals age.[1047]

The Alzheimer's Association is leading a national movement to make brain health a workplace priority. The recently launched Brain Health At Work initiative is a no-cost program designed to help employers create brain-healthy workplaces, reduce employees' risk of cognitive decline and support working caregivers. Through Brain Health At Work, employers receive immediate access to evidence-informed tools that support brain-healthy habits — such as staying active, eating well, challenging the mind and managing chronic conditions — as well as resources to support working dementia caregivers. Through the initiative's Workplace Recognition Program, companies can also view dashboard results, compare their progress with peer organizations and earn recognition through digital badges and certificates that signal their commitment to employee well-being and caregiver support.

By pairing programming that supports cognitive functioning with employer-driven efforts to strengthen brain skills, organizations can reinforce how essential brain health is for individual quality of life and a thriving, adaptable workforce.

Brain Health in Health Care Settings

Survey findings reveal a disconnect between what adults age 40 and older want regarding brain health during a doctor's visit and what actually occurs. They overwhelmingly trust their health care providers for brain health information, yet few have ever discussed it. Together, these findings point to a gap between patient expectations and current clinical practice around brain health and lifestyle guidance.

Developing clinical practice guidelines for brain health

There is an increasing need for clear, actionable recommendations to support brain health. Although nearly all adults 40 and older view brain health as as important as physical health and identify health care providers as a trusted source of information, relatively few report receiving counseling or having discussions about brain health during routine clinical visits. To help address this gap, the Alzheimer's Association is collaborating with multidisciplinary experts, health systems and professional societies to develop consensus-driven clinical practice guidelines for brain health across the lifespan. These efforts build on the Association's longstanding commitment to evidence-based guidance and are intended to support earlier, more consistent and more equitable integration of brain health into routine care.

Building clinical expertise in brain health and dementia care

The Alzheimer's Association is positioned to help close the current clinical gap through new interprofessional continuing education offerings, including live conferences, virtual programs, online training and quality-improvement–focused education. With recently earned Joint Accreditation status, the Association can train entire care teams through a single, unified national credential.[1048] This training is designed for physicians, nurses, social workers, pharmacists and others. These offerings will help health systems, health plans and community partners build workforce capacity in brain health for people of all ages, as well as aid in early detection, diagnosis, care coordination and treatment navigation for individuals at risk of or diagnosed with dementia.

The Association also supports health care professional development in dementia care through the Alzheimer's and Dementia Care ECHO Program. This program follows the Project ECHO® telementoring model, connecting primary care teams with dementia specialists to build skills in risk reduction, diagnosis and care management. The latest ECHO Series, Alzheimer's and Dementia Care for Brain Health, is designed to support primary care teams in promoting brain health across the lifespan. The series focuses on practical, evidence-based approaches that can be integrated into routine primary care workflows. Through regular case-based learning, ECHO programs help clinicians gain confidence, improve care quality and expand access to expertise in communities where specialty care is limited.

Integrating healthy brain principles into routine care

Training provides the foundation, but clinicians also need practical methods to integrate brain health into everyday workflows. The Alzheimer's Association is developing resources to help clinicians initiate conversations and incorporate brain health into practice.

Meaningful behavior change often requires more than passive discussion. Evidence from U.S. POINTER indicates that individuals who receive greater structure and support for lifestyle modification experience greater cognitive benefits. Care teams could take a more active approach by:

- Sharing essential knowledge, such as evidence-backed recommendations to help individuals form or sustain brain-healthy habits.
- Explaining the importance of a structured lifestyle "prescription" to reach brain health goals.
- Referring patients to community and institutional resources that can provide ongoing assistance.

The recent evidence from U.S. POINTER strengthens the case for including brain health as part of regular health care visits. Clinicians could begin by:

- Initiating brief brain health discussions during cardiovascular and metabolic visits.
- Assessing a patient's readiness to make changes and helping them establish accountability for adopting or continuing healthy behaviors.
- Connecting patients to community programs, wellness coaches, dietitians, exercise specialists, faith-based groups or even family and friends who can help promote brain-healthy behaviors.

Establishing a comprehensive resource hub for health care professionals

ALZPro® is the Alzheimer's Association's central hub for professional resources on brain health and dementia. It brings together care resources, research, data platforms, clinical guidance and education in one place to support real-world use. Designed for a wide range of professionals, including clinicians, researchers, health systems and public health leaders, ALZPro helps advance early detection, improve care and expand equitable access. Users can access evidence-informed resources, tools, and insights to support decision making, stay current with emerging science and apply best practices in their work.

Brain Health Across Populations

In addition to the individual- and setting-specific efforts described in earlier sections, the Alzheimer's Association is contributing to the public health dialogue needed to advance brain health at the population level.

Many lifestyle behaviors highlighted previously do not happen in isolation. Community environments can either facilitate or hinder healthy behaviors, making public health strategies essential for supporting brain health across the lifespan. These strategies often focus on improving the social and environmental conditions that shape people's daily lives. For example, communities can promote healthier eating by introducing farmers markets to underserved neighborhoods, establishing strong nutrition standards in childcare settings and schools, and supporting community gardens and urban agriculture.

Economic stability, another key driver of health, can be strengthened through improved access to affordable health care, summer job programs and workforce training for youth, financial literacy initiatives and incentives that help small businesses grow in economically underserved areas. In addition, investments in healthier physical environments — such as planting more trees, expanding green spaces and walkable neighborhoods, promoting renewable energy and improving public transportation and bike path networks — can help foster active lifestyles, reduce pollution and support long-term brain health.

To help communities put these strategies into practice, the Alzheimer's Association Public Health Center of Excellence on Dementia Risk Reduction, funded by the Centers for Disease Control and Prevention (CDC), translates the latest science on dementia risk reduction into actionable tools, materials and messaging. The resources enable public health agencies to promote brain health and reduce dementia risk among all populations, including those in diverse, underserved and higher-risk communities.

Another example of activating public health strategies in local communities is the Healthy Brain Initiative (HBI) Road Map. For nearly 20 years, the HBI Road Map — a joint project of the CDC and the Alzheimer's Association — has provided public health professionals a framework to promote brain health across the lifespan and support dementia caregivers. In 2019, the Healthy Brain Initiative Road Map for American Indian and Alaska Native Peoples became the first guide tailored to the needs of these communities; it was updated in 2024. Since 2022, the Alzheimer's Association Healthy Brain Initiative has funded 67 local and tribal health organizations to put the HBI Road Map into practice, elevating brain health, dementia and caregiving as public priorities in these communities.

In light of the positive results of the U.S. POINTER clinical trial, there is a desire to see such programs established in communities across the country. The Alzheimer's Association is funding efforts on implementation science — the public health discipline focused on translating successful clinical trials to real-world practice in communities. In addition, a new initiative from the federal government, Make America Healthy Again: Enhancing Lifestyle and Evaluating Value-based Approaches Through Evidence (MAHA ELEVATE), will be providing funds to test innovative programs, such as U.S. POINTER, that promote health and prevention of chronic diseases among Medicare beneficiaries. The federal government could take a more aggressive approach at catalyzing community implementation of U.S. POINTER by specifically funding U.S. POINTER implementation studies through the CDC and the National Institutes of Health.

Together, these efforts position the public health community to improve brain health at the population level through coordinated, community-driven action.

This year's Special Report highlights a critical moment to move beyond viewing brain health as an issue of older age and instead establish it as a lifelong priority and a shared responsibility across society. While individual behaviors matter, lasting progress depends on coordinated actions across workplaces, communities, health care systems and public health institutions to optimize the conditions that support cognitive function and well-being. By connecting strategies at the individual, community and population levels, the nation can build a more equitable and accessible framework for brain health—one that empowers people of all ages and backgrounds to protect cognitive function and reduce dementia risk throughout their lives.

Appendices

End Notes

A1. Racial and ethnic identifiers: *Facts and Figures* keeps the racial and ethnic terms used in source documents when describing study findings. When not referring to data from specific studies, adjectives such as "Black," "Hispanic" and "White" may be used (for example, Black populations and Hispanic communities).

A2. Estimated prevalence (number and proportion) of Americans age 65 and older with clinical Alzheimer's dementia for 2026: The estimated 7.4 million individuals ages 65 years and older with clinical Alzheimer's dementia and the estimated numbers of individuals with clinical Alzheimer's dementia in each age group are from a study that used data from the Chicago Health and Aging Project (CHAP) in combination with population projections from the U.S. Census.[276] The number 7.4 million for 2026 comes from a linear extrapolation of the reported projections for 2025 (7.16) and 2030 (8.53) in the CHAP study. The percentage of people with clinical Alzheimer's dementia (among people age 65 and older and by age group) is calculated using the numbers from the CHAP study as the numerators and the U.S. Census population projections for the specific age groups of interest as the denominators.

A3. Differences between CHAP and HRS-HCAP estimates for Alzheimer's dementia prevalence: The number of people estimated to have any form of dementia in the U.S. in 2016 from the Health and Retirement Study's (HRS) Harmonized Cognitive Assessment Protocol (HCAP; 4.92 million) is lower than the CHAP estimate of how many people were living with clinical Alzheimer's dementia only (6.07 million).[175] This is because of differences in dementia ascertainment between the two studies: both studies used scores on batteries of cognitive tests, but the HRS-HCAP study additionally required an informant report of functional impairment (i.e. disability). Because the more stringent threshold for dementia in HRS-HCAP may miss people with mild Alzheimer's dementia, the Association believes that the larger CHAP estimates may be a more relevant estimate of the burden of clinical Alzheimer's dementia in the United States.

A4. Criteria for identifying people with Alzheimer's or other dementias in the Framingham Heart Study: From 1975 to 2009, 7,901 people from the Framingham Study who had survived free of dementia to at least age 45, and 5,937 who had survived free of dementia until at least age 65 were followed for incidence of dementia.[329] Diagnosis of dementia was made according to the Diagnostic and Statistical Manual of Mental Disorders, 4th Edition (DSM-IV) criteria and required that the participant survive for at least 6 months after onset of symptoms. Standard diagnostic criteria (the NINCDS-ADRDA criteria from 1984) were used to diagnose clinical Alzheimer's dementia. The definition of Alzheimer's and other dementias used in the Framingham Study was very strict; if a definition that included milder disease and disease of less than six months' duration were used, lifetime risks of Alzheimer's and other dementias would be higher than those estimated by this study.

A5. Projected number of people with Alzheimer's dementia, 2020-2060: This figure comes from the CHAP study.[276] Other projections are somewhat lower (see, for example, Brookmeyer et al.[1049]) because they relied on more conservative methods for counting people who currently have clinical Alzheimer's dementia.[A3] Nonetheless, these estimates are statistically consistent with each other, and all projections suggest substantial growth in the number of people with clinical Alzheimer's dementia over the coming decades.

A6. Annual mortality rate due to Alzheimer's disease by state: Unadjusted death rates are presented rather than age-adjusted death rates in order to provide a clearer depiction of the burden of mortality for each state. States such as Florida with larger populations of older people will have a larger burden of mortality due to Alzheimer's — a burden that appears smaller relative to other states when the rates are adjusted for age.

A7. Number of family and other unpaid caregivers of people with Alzheimer's or other dementias: To calculate this number, the Alzheimer's Association started with data from the Behavioral Risk Factor Surveillance System (BRFSS) survey. Since 2016, all states and the District of Columbia utilized the BRFSS caregiver module. This module identified respondents age 18 and over who had provided any regular care or assistance during the past month to a family member or friend who had a health problem, long-term illness or disability. The module asks a series of follow-up questions, including asking the caregiver to identify what the main health problem, long-term illness, or disability that the person they care for has. One of the reported condition categories is "Alzheimer's disease, dementia, or other cognitive impairment." In the BRFSS surveys conducted in 2019 and after, an additional follow-up question was included, asking if the caregiving recipient also had dementia in addition to their main condition. Prior to 2019, the survey did not include caregivers of recipients for whom dementia was not their main condition, so these numbers were imputed using data collected in 2019 by the National Alliance for Caregiving (NAC)/AARP survey. The NAC/AARP survey asked respondents age 18 and over whether they were providing unpaid care for a relative or friend age 18 or older or had provided such care during the past 12 months. Respondents who answered affirmatively were then asked about the health problems of the person for whom they provided care: 11% of respondents reported dementia as the main condition of their care recipient, while 26% of all respondents reported the presence of dementia. Using this ratio in combination with BRFSS data, the Alzheimer's Association was able to determine the percentage of adults in all states and the District of Columbia who are caregivers for individuals living with Alzheimer's or another dementia. These percentages were applied to the estimated number of people age 18 and older in each state in July 2025, using U.S. Census Bureau data available at: https://www.census. gov/programs-surveys/popest/data/tables.html. This resulted in a total of 12.734 million Alzheimer's and dementia caregivers across all 50 states and the District of Columbia.

A8. Number of hours of unpaid care: The BRFSS survey asks caregivers to identify, within five time frames, the number of hours they provide care in an average week. Using the method developed by Rabarison and colleagues,[503] the Alzheimer's Association assumed the midpoint of each time frame was the average number of hours for each caregiver within that time frame and then calculated the overall average number of hours of weekly care provided by dementia caregivers in each state. This number was then converted to a yearly average and multiplied by the number of caregivers in each state[A7] to determine the total number of hours of care provided. When added together, across all 50 states and the District of Columbia, the total number of hours provided by Alzheimer's and dementia caregivers is 19.608 billion hours.

A9. Value of unpaid caregiving: For each state, the hourly value of care was determined as the average of the state minimum hourly wage[1050] and the most recently available state median hourly cost of a home health aide. (For Nevada, the minimum wage used was the average of the minimum wage for those who are not provided health insurance and the minimum wage for those who are provided health insurance.)[961] The average for each state was then multiplied by the total number of hours of unpaid care in that state[A8] to derive the total value of unpaid care. Adding the totals from all states and the District of Columbia resulted in an economic value of $446.312 billion for dementia caregiving in the United States in 2025.

A10. The 2014 Alzheimer's Association Women and Alzheimer's Poll: This poll questioned a nationally representative sample of 3,102 American adults about their attitudes, knowledge and experiences related to Alzheimer's and dementia from Jan. 9, 2014, to Jan. 29, 2014. An additional 512 respondents who provided unpaid help to a relative or friend with Alzheimer's or a related dementia were asked questions about their care provision. Random selections of telephone numbers from landline and cell phone exchanges throughout the United States were conducted. One individual per household was selected from the landline sample, and cell phone respondents were selected if they were 18 years old or older. Interviews were administered in English and Spanish. The poll "oversampled" Hispanics/Latinos, selected from U.S. Census tracts with higher than an 8% concentration of this group. A list sample of Asian Americans was also utilized to oversample this group. A general population weight was used to adjust for number of adults in the household and telephone usage; the second stage of this weight balanced the sample to estimated U.S. population characteristics. A weight for the caregiver sample accounted for the increased likelihood of female and White respondents in the caregiver sample. Sampling weights were also created to account for the use of two supplemental list samples. The resulting interviews comprise a probability-based, nationally representative sample of U.S. adults. A caregiver was defined as an adult over age 18 who, in the past 12 months, provided unpaid care to a relative or friend age 50 or older with Alzheimer's or another dementia. Questionnaire design and interviewing were conducted by Abt SRBI of New York.

A11. Lewin Model on Alzheimer's and dementia costs: These numbers come from a model created for the Alzheimer's Association by the Lewin Group. The model estimates total payments for health care, long-term care and hospice for people with Alzheimer's and other dementias. The model was updated by the Lewin Group in January 2015 (updating previous model) and June 2015 (addition of state-by-state Medicaid estimates). Because the model inputs use data prior to the approval of Alzheimer's disease-modifying therapies (lecanemab and donanemab), those drug costs are not included in the initial model outputs. To address this, spending on the drugs was estimated separately based on use and cost data through the first quarter of 2025, as reported by the Centers for Medicare & Medicaid Services. (Available at https://data.cms.gov/summary-statistics-on-use-and-payments/medicare-medicaid-spending-by-drug/medicare-quarterly-part-b-spending-by-drug. Accessed on January 14, 2026.) Estimates were made for each payment source and then added to the Lewin model's output of estimated 2026 spending. The 2050 projected cost estimates do not include an estimate of drug spending. The Lewin Model's state-specific Medicaid costs for 2025 are based on an earlier estimate of state prevalence than reported here (Weuve J, Hebert LE, Scherr PA, Evans DA. Prevalence of Alzheimer disease in U.S. states. Epidemiology 2015;26(1):E4-6) and are inflated to 2025 dollars.

A12. All cost estimates were inflated to year 2025 dollars using the Consumer Price Index (CPI): All cost estimates were inflated using the seasonally adjusted average prices for medical care services from all urban consumers. The relevant item within medical care services was used for each cost element. For example, the medical care item within the CPI was used to inflate total health care payments; the hospital services item within the CPI was used to inflate hospital payments; and the nursing home and adult day services item within the CPI was used to inflate nursing home payments.

A13. Average annual per-person payments for health care and long-term care services for Medicare beneficiaries age 65 and older with and without Alzheimer's or other dementias: Payments are unadjusted, and therefore, do not account for differences in patient characteristics, such as age or sex. Additionally, payments are based on health care utilization and payments in 2018 for the Medicare Current Beneficiary Survey and 2019 for Medicare claims data, prior to the COVID-19 pandemic, and do not reflect any post-pandemic-related changes in utilization.

A14. Enrollment in traditional Medicare versus Medicare Advantage (Medicare Part C): Individuals eligible for Medicare can enroll in traditional Medicare, also referred to as fee-for-service Medicare and original Medicare, or Medicare Advantage, also referred to as Medicare Part C.[1051] With traditional Medicare, beneficiaries can receive care from any doctor or hospital in the United States that accepts Medicare. Generally, beneficiaries can seek care from a specialist without a referral. Traditional Medicare has fixed cost sharing, which includes coinsurance of 20% of the Medicare-approved amount for services covered by Part B after the deductible is met. Individuals enrolled in traditional Medicare can also enroll in Medicare Supplemental Insurance (also referred to as Medigap) to help cover the out-of-pocket costs. Traditional Medicare does not have an annual limit on the amount beneficiaries pay out-of-pocket. Benefits are the same for all individuals enrolled in traditional Medicare. Individuals enrolled in traditional Medicare can also enroll in a Medicare Part D plan to cover some of the costs of prescription drugs. Medicare Part D enrollment has a separate premium. With Medicare Advantage, individuals must enroll in a specific private plan. Premiums, benefits and out-of-pocket costs may vary across plans. Medicare Advantage plans have an annual limit on the amount individuals pay out-of-pocket. Individuals enrolled in a Medicare Advantage plan are not allowed to enroll in Medigap. Medicare Advantage plans are also allowed to offer additional benefits not included in traditional Medicare, such as vision, hearing and dental services as well as some non-health care benefits, such as transportation costs and gym memberships. Many Medicare Advantage plans include prescription drug coverage (Medicare Part D). Individuals enrolled in a Medicare Advantage plan have a specific network of doctors and hospitals that enrollees need to use for services to be paid by the Medicare Advantage plan. Additionally, individuals enrolled in a Medicare Advantage plan may need a referral to see a specialist. Enrollment in Medicare Advantage has increased dramatically over the past decade, with 51% of all Medicare beneficiaries enrolled in a Medicare Advantage plan in 2025 compared with 29% in 2013.[940]

A15. Medicare Current Beneficiary Survey Report: These data come from an analysis of findings from the 2018 Medicare Current Beneficiary Survey (MCBS). The analysis was conducted for the Alzheimer's Association by Health Care Cost Institute.[907] The MCBS, a continuous survey of a nationally representative sample of about 15,000 Medicare beneficiaries, is linked to Medicare claims. The survey is supported by the U.S. Centers for Medicare & Medicaid Services (CMS). For community-dwelling survey participants, MCBS interviews are conducted in person three times a year with the Medicare beneficiary or a proxy respondent if the beneficiary is not able to respond. For survey participants who are living in a nursing home or another residential care setting, such as an assisted living residence, retirement home or a long-term care unit in a hospital or mental health facility, MCBS interviews are conducted with a staff member designated by the facility administrator as the most appropriate to answer the questions. Data from the MCBS analysis that are included in *2025 Alzheimer's Disease Facts and Figures* pertain only to Medicare beneficiaries age 65 and older.

For this MCBS analysis, people with dementia are defined as:

- Community-dwelling survey participants who answered yes to the MCBS question, "Has a doctor ever told you that you had Alzheimer's disease or dementia?" Proxy responses to this question were accepted.
- Survey participants who were living in a nursing home or other residential care setting and had a diagnosis of Alzheimer's disease or dementia in their medical record.
- Survey participants who had at least one Medicare claim with a diagnostic code for Alzheimer's or other dementias in 2018. The claim could be for any Medicare service, including hospital, skilled nursing facility, outpatient medical care, home health care, hospice or physician, or other health care provider visit. The diagnostic codes used to identify survey participants with Alzheimer's or other dementias are G30.0, G30.1, G30.8, G30.9, G31.01, G31.09, G31.83, F.01.50, F01.51, F02.80, F02.81, F03.90, F03.91 and F10.27.

Costs from the MCBS analysis are based on responses from 2018 and reported in 2025 dollars.

A16. Differences in estimated costs reported by Hurd and colleagues: Hurd and colleagues[906] estimated per-person costs using data from participants in ADAMS, a cohort in which all individuals underwent diagnostic assessments for dementia. One reason that the per-person costs estimated by Hurd and colleagues are lower than those reported in *Facts and Figures* is that ADAMS, with its diagnostic evaluations of everyone in the study, is more likely than MCBS to have identified individuals with less severe or undiagnosed Alzheimer's. By contrast, the individuals with Alzheimer's registered by MCBS are likely to be those with more severe, and therefore more costly, illness. A second reason is that the Hurd et al. estimated costs reflect an effort to isolate the incremental costs associated with Alzheimer's and other dementias (those costs attributed only to dementia), while the per-person costs in *2026 Alzheimer's Disease Facts and Figures* incorporate all costs of caring for people with the disease (regardless of whether the expenditure was related to dementia or a coexisting condition).

Appendices

References

1. Jack CR, Andrews JS, Beach TG, et al. Revised criteria for diagnosis and staging of Alzheimer's disease: Alzheimer's Association Workgroup. Alzheimer's Dement 2024;20: 5143-5169.
2. Vermunt L, Sikkes SAM, van den Hout A, et al. Duration of preclinical, prodromal, and dementia stages of Alzheimer's disease in relation to age, sex, and APOE genotype. Alzheimers Dement 2019;15:888-898.
3. Tom SE, Hubbard RA, Crane PK, et al. Characterization of dementia and Alzheimer's disease in an older population: Updated incidence and life expectancy with and without dementia. Am J Public Health 2015;105(2):408-413.
4. Ganguli M, Dodge HH, Shen C, Pandav RS, DeKosky ST. Alzheimer disease and mortality: A 15-year epidemiological study. Arch Neurol 2005;62(5):779-784.
5. Waring SC, Doody RS, Pavlik VN, Massman PJ, Chan W. Survival among patients with dementia from a large multi-ethnic population. Alzheimer Dis Assoc Disord 2005;19(4):178-183.
6. Brookmeyer R, Corrada MM, Curriero FC, Kawas C. Survival following a diagnosis of Alzheimer disease. Arch Neurol 2002;59(11):1764-1767.
7. Larson EB, Shadlen MF, Wang L, et al. Survival after initial diagnosis of Alzheimer disease. Ann Intern Med 2004;140(7):501-509.
8. Helzner EP, Scarmeas N, Cosentino S, Tang MX, Schupf N, Stern Y. Survival in Alzheimer disease: A multiethnic, population-based study of incident cases. Neurology 2008;71(19):1489-1495.
9. Xie J, Brayne C, Matthews FE. Survival times in people with dementia: Analysis from a population based cohort study with 14-year follow-up. BMJ 2008;336(7638):258-262.
10. Brodaty H, Seeher K, Gibson L. Dementia time to death: A systematic literature review on survival time and years of life lost in people with dementia. Int Psychogeriatr 2012;24(7):1034-1045.
11. Todd S, Barr S, Roberts M, Passmore AP. Survival in dementia and predictors of mortality: A review. Int J Geriatr Psychiatry 2013;28(11):1109-1124.
12. Smith AD, Smith SM, de Jager, CA, et al. Homocysteine-lowering by B vitamins slows the rate of accelerated brain atrophy in mild cognitive impairment: A randomized controlled trial. Plos One 2010;5(9):e12244.
13. Gordon BA, Blazey TM, Su Y, et al. Spatial patterns of neuroimaging biomarker change in individuals from families with autosomal dominant Alzheimer's disease: A longitudinal study. Lancet Neurol 2018;17(3):241-250.
14. Quiroz YT, Zetterberg H, Reiman EM, et al. Plasma neurofilament light chain in the presenilin 1 E280A autosomal dominant Alzheimer's disease kindred: A cross-sectional and longitudinal cohort study. Lancet Neuro 2020;19(6):513-521.
15. Barthelemy N, Joseph-Mathurin N, Gordon BA, et al. A soluble phosphorylated tau signature links tau, amyloid and the evolution of stages of dominantly inherited Alzheimer's disease. Nat Med 2020;26:398-407.
16. U.S. Food & Drug Administration. FDA clears first blood test used in diagnosing Alzheimer's disease. Available at https://www.fda.gov/news-events/press-announcements/fda-clears-first-blood-test-used-diagnosing-alzheimers-disease. Accessed August 27, 2025.
17. Roche Diagnostics. Roche's Elecsys® pTau181 becomes the only FDA-cleared blood test for use in primary care to rule out Alzheimer's-related amyloid pathology. Available at: https://diagnostics.roche.com/us/en/news-listing/2025/fda-cleared-ptau181-alzheimers-blood-test.html. Accessed October 14, 2025.
18. Kapasi A, DeCarli C, Schneider JA. Impact of multiple pathologies on the threshold for clinically overt dementia. Acta Neuropathol 2017;134(2):171-186.
19. Kawas CH, Kim RC, Sonnen JA, Bullain SS, Trieu T, Corrada MM. Multiple pathologies are common and related to dementia in the oldest-old: The 90+ Study. Neurology 2015;85(6):535-542.
20. Viswanathan A, Rocca WA, Tzourio C. Vascular risk factors and dementia: How to move forward? Neurology 2009;72:368-374.
21. Schneider JA, Arvanitakis Z, Bang W, Bennett DA. Mixed brain pathologies account for most dementia cases in community-dwelling older persons. Neurology 2007;69:2197-2204.
22. Schneider JA, Arvanitakis Z, Leurgans SE, Bennett DA. The neuropathology of probable Alzheimer disease and mild cognitive impairment. Ann Neurol 2009;66(2):200-208.
23. Jellinger KA, Attems J. Neuropathological evaluation of mixed dementia. J Neurol Sci 2007;257(1-2):80-87.
24. Jellinger KA. The enigma of mixed dementia. Alzheimers Dement 2007;3(1):40-53.
25. Brenowitz WD, Hubbard RA, Keene CD, et al. Mixed neuropathologies and estimated rates of clinical progression in a large autopsy sample. Alzheimers Dement 2017;13(6):654-662.
26. Boyle PA, Lei Y, Wilson RS, Leurgans SE, Schneider JA, Bennett DA. Person-specific contribution of neuropathologies to cognitive loss in old age. Ann Neurol 2018;83(1):74-83.
27. Boyle PA, Yu L, Leurgans SE, et al. Attributable risk of Alzheimer's dementia attributed to age-related neuropathologies. Ann Neurol 2019;85(1):114-124.
28. Jellinger KA, Attems J. Prevalence of dementia disorders in the oldest-old: an autopsy study. Acta Neuropathol 2010;119:421-433.
29. De Reuck J, Maurage CA, Deramecourt V, et al. Aging and cerebrovascular lesions in pure and in mixed neurodegenerative and vascular dementia brains: A neuropathological study. Folia Neuropathol 2018;56(2):81-87.
30. James BD, Bennett DA, Boyle PA, Leurgans S, Schneider JA. Dementia from Alzheimer disease and mixed pathologies in the oldest old. JAMA 2012;307(17):1798-1800.
31. National Institute on Aging. What are frontotemporal disorders? Available at: https://www.nia.nih.gov/health/what-are-frontotemporal-disorders. Accessed January 19, 2026.
32. Hogan DB, Jette N, Fiest KM, et al. The prevalence and incidence of frontotemporal dementia: A systematic review. Can J Neurol Sci 2016;43(suppl):S96-109.
33. Amador-Ortiz C, Ahmed Z, Zehr C, Dickson DW. Hippocampal sclerosis dementia differs from hippocampal sclerosis in frontal lobe degeneration. Acta Neuropathol 2007;113(3):245-252.
34. Kane JPM, Surendranathan A, Bentley A, Thomas AJ, et al. Clinical prevalence of Lewy body dementia. Alzheimers Res Ther 2018;10(1):19.
35. National Institute on Aging. What Is Limbic-Predominant Age-Related TDP-43 Encephalopathy (LATE)? Available at: https://www.nia.nih.gov/health/alzheimers-and-dementia/what-limbic-predominant-age-related-tdp-43-encephalopathy-late. Accessed January 19, 2026.
36. Stojkovska I, Krainc D, Mazzulli JR. Molecular mechanisms of α-synuclein and GBA1 in Parkinson's disease. Cell Tissue Res 2018;373(1):51-60.
37. Aarsland D, Zaccai J, Brayne C. A systematic review of prevalence studies of dementia in Parkinson's disease. Mov Disord 2005;20(10):1255.
38. Plassman BL, Langa KM, Fisher GG, et al. Prevalence of dementia in the United States: The Aging, Demographics, and Memory Study. Neuroepidemiology 2007;29(1-2):125-132.
39. U.S. Department of Health and Human Services. Food and Drug Administration. Early Alzheimer's Disease: Developing Drugs for Treatment. Draft guidance. March 2024. Available at: https://www.fda.gov/regulatory-information/search-fda-guidance-documents/early-alzheimers-disease-developing-drugs-treatment. Accessed December 11, 2025.

40. Karlawish J, Peterson A, Kleid M, et al. Caregiver accounts of lucid episodes in persons with advanced dementia. Gerontologist 2024;64(6):gnad170.
41. Gilmore-Bykovskyi A, Block L, Benson C, et al. "It's You": Caregiver and Clinician Perspectives on Lucidity in People Living With Dementia. Gerontologist 2023;63(1):13-27.
42. Batthyány A, Greyson B. Spontaneous remission of dementia before death: Results from a study on paradoxical lucidity. Psychol Conscious: Theory, Research, and Practice 2021;8(1):1–8.
43. Brown C, Vaishnavi S. Practical recommendations for monitoring response to amyloid-targeting treatments for early Alzheimer disease. Practical Neurol (US) 2025;24(5): 28-29,36-37.
44. La Joie R, Cummings JL, Dage JL, et al. Treatment-related amyloid clearance (TRAC): A framework to characterize patients in the era of anti-amyloid therapies. Alzheimer's Dement 2025. Published online November 26, 2025. Available at: https://doi.org/10.1002/alz.70997. Accessed December 15, 2025.
45. Rogers MB for Alzforum. Signs of lasting benefit from amyloid Immunotherapy? Available at: https://www.alzforum.org/news/conference-coverage/signs-lasting-benefit-amyloid-immunotherapy. Accessed October 21, 2025.
46. Eisai Global. Early Alzheimer's patients continue to benefit from four years of Leqembi® (lecanemab-irmb) therapy. Available at: https://www.eisai.com/news/2025/news202554.html. Accessed November 11, 2025.
47. Eli Lilly and Company. Lilly's Kisunla (donanemab-azbt) showed growing benefit over three years in early symptomatic Alzheimer's disease. Available at: https://investor.lilly.com/news-releases/news-release-details/lillys-kisunla-donanemab-azbt-showed-growing-benefit-over-three. Accessed November 11, 2025.
48. Hartz SM, Schindler SE, Streitz ML, et al. Assessing the clinical meaningfulness of slowing CDR-SB progression with disease-modifying therapies for Alzheimer's disease. Alzheimer's Dement. First published February 13, 2025. Available at: https://alz-journals.onlinelibrary.wiley.com/doi/10.1002/trc2.70033. Accessed November 29, 2025.
49. Eisai Global. Eisai Presents New Data on the Continued and Expanding Benefit of Leqembi® (lecanemab-irmb) Maintenance Treatment in Early Alzheimer's Disease at CTAD 2025. Available at: https://www.eisai.com/news/2025/news202585.html. Accessed December 17, 2025.
50. Jeong SY, Suh CH, Lim J-S et al. Incidence of Amyloid-related imaging abnormalities in Phase III clinical trials of anti-amyloid-β immunotherapy: An updated meta-analysis. Neurology 2025;104(8): e213483.
51. Cummings J, Apostolova L, Rabinovici GD, et al. Lecanemab: Appropriate use recommendations. J Prev Alzheimers Dis 2023;10(3):362-377.
52. Rabinovici GD, Selkoe DJ, Schindler SE, et al. Donanemab: Appropriate use recommendations. J Prev Alzheimers Dis 2025;12(5):100150.
53. Rentz DM, Aisen PS, Atri A, Hitchcock J, Irizarry M, Landen J, et al. Benefits and risks of FDA-approved amyloid-targeting antibodies for treatment of early Alzheimer's disease: Navigating clinician-patient engagement. Alzheimer's Dement 2024. DOI: 10.1002/alz.14199. Accessed January 19, 2026.
54. Cummings J, Aisen P, Apostolova LG, Atri A, Salloway S, Weiner M. Aducanumab: Appropriate use recommendations. J Prev Alz Dis 2021;4(8):398-410.
55. Cummings J, Rabinovici GD, Atri A. et al. Aducanumab: Appropriate Use Recommendations Update. J Prev Alzheimers Dis 2022;9:221-230.
56. Cummings J, Zhou Y, Lee G, et al. Alzheimer's disease drug development pipeline: 2025. Alzheimer's Dement 2025;11:e70098.
57. Van der Mussele S, Le Bastard N, et al. Agitation-associated behavioral symptoms in mild cognitive impairment and Alzheimer's dementia. Aging Ment Health 2015;19(3):247-257.
58. Ralph SJ, Espinet AJ. Increased all-cause mortality by antipsychotic drugs: Updated review and meta-analysis in dementia and general mental health care. J Alzheimers Dis Rep 2018;2:1-26.
59. Maust DT, Kim HM, Seyfried LS, et al. Antipsychotics, other psychotropics, and the risk of death in patients with dementia: number needed to harm. JAMA Psychiatry 2015;72:438-445.
60. Rogowska M, Thornton M, Creese B, Velayudhan L, Aarsland D, Ballard C, et al. Implications of adverse outcomes associated with antipsychotics in older patients with dementia: A 2011-2022 update. Drugs Aging 2023;40(1):21-32.
61. Watt JA, Goodarzi Z, Veroniki AA, et al. Comparative efficacy of interventions for aggressive and agitated behaviors in dementia. Ann Internal Med 2019;171(9):633-642.
62. Abraha I, Rimland JM, Trotta FM, et al. Systematic review of systematic reviews of non-pharmacological interventions to treat behavioural disturbances in older patients with dementia. The SENATOR-OnTop series. BMJ Open 2017;7(3):e012759.
63. Koch J, Amos JG, Beattie E, et al. Non-pharmacological interventions for neuropsychiatric symptoms of dementia in residential aged care settings: An umbrella review. Int J Nurs Stud 2022;128:104187. doi: 10.1016/j.ijnurstu.2022.104187.
64. Meyer C, O'Keefe F. Non-pharmacological interventions for people with dementia: A review of reviews. Dementia (London) 2020 Aug;19(6):1927-1954.
65. Livingston G, Huntley J, Liu KY, et al. Dementia prevention, intervention, and care: 2024 report of the Lancet standing Commission. Lancet 2024; 404(10452):P572-628.
66. Hebert LE, Bienias JL, Aggarwal NT, et al. Change in risk of Alzheimer disease over time. Neurology 2010;75:786-791.
67. National Institute on Aging. Available at: https://www.nia.nih.gov/health/what-causes-alzheimersdisease. Accessed January 19, 2026.
68. Saunders AM, Strittmatter WJ, Schmechel D, et al. Association of apolipoprotein E allele epsilon 4 with late-onset familial and sporadic Alzheimer's disease. Neurology. 1993;43:1467-1472.
69. Farrer LA, Cupples LA, Haines JL, et al. Effects of age, sex, and ethnicity on the association between apolipoprotein E genotype and Alzheimer disease: A meta-analysis. JAMA. 1997;278:1349-1356.
70. Green RC, Cupples LA, Go R, et al. Risk of dementia among white and African American relatives of patients with Alzheimer disease. JAMA 2002;287(3):329-336.
71. Fratiglioni L, Ahlbom A, Viitanen M, Winblad B. Risk factors for late-onset Alzheimer's disease: A population-based, case-control study. Ann Neurol. 1993;33(3):258-266.
72. Mayeux R, Sano M, Chen J, Tatemichi T, Stern Y. Risk of dementia in first-degree relatives of patients with Alzheimer's disease and related disorders. Arch Neurol. 1991;48(3): 269-273.
73. Lautenschlager NT, Cupples LA, Rao VS, et al. Risk of dementia among relatives of Alzheimer's disease patients in the MIRAGE Study: What is in store for the oldest old? Neurology. 1996;46(3):641-650.
74. Hebert LE, Weuve J, Scherr PA, Evans DA. Alzheimer disease in the United States (2010-2050) estimated using the 2010 Census. Neurology 2013;80(19):1778-1783.
75. Nelson PT, Head E, Schmitt FA, et al. Alzheimer's disease is not "brain aging": Neuropathological, genetic, and epidemiological human studies. Acta Neuropathol 2011;121:571-587.
76. Bellenguez C, Kucukali F, Jansen IE, et al. New insights into the genetic etiology of Alzheimer's disease and related dementias. Nat Genet 2022;54:412-436.
77. Loy CT, Schofield PR, Turner AM, Kwok JBJ. Genetics of dementia. Lancet 2014;383:828-840.
78. Qian J, Wolters FJ, Beiser A, et al. APOE-related risk of mild cognitive impairment and dementia for prevention trials: An analysis of four cohorts. PLoS Med 2017;14(3):e1002254.
79. Spinney L. Alzheimer's disease: The forgetting gene. Nature 2014;510(7503):26-28.

80. Ward A, Crean S, Mercaldi CJ, et al. Prevalence of apolipoprotein e4 genotype and homozygotes (APOE e4/4) among patients diagnosed with Alzheimer's disease: A systematic review and meta-analysis. Neuroepidemiology 2012;38:1-17.
81. Mayeux R, Saunders AM, Shea S, et al. Utility of the apolipoprotein E genotype in the diagnosis of Alzheimer's disease. N Engl J Med. 1998;338:506-511.
82. Evans DA, Bennett DA, Wilson RS, et al. Incidence of Alzheimer disease in a biracial urban community: Relation to apolipoprotein E allele status. Arch Neurol 2003;60(2): 185-189.
83. Tang M, Stern Y, Marder K, et al. The APOE-e4 allele and the risk of Alzheimer disease among African Americans, whites, and Hispanics. JAMA. 1998;279:751-755.
84. Weuve J, Barnes LL, Mendes de Leon CF, et al. Cognitive aging in black and white Americans: Cognition, cognitive decline, and incidence of Alzheimer disease dementia. Epidemiology 2018;29(1):151-159.
85. Hendrie HC, Murrell J, Baiyewu O, et al. APOE ε4 and the risk for Alzheimer disease and cognitive decline in African Americans and Yoruba. Int Psychogeriatr 2014;26(6):977-985.
86. Reitz C, Jun G, Naj A, et al. Variants in the ATP-binding cassette transporter (ABCA7), apolipoprotein E epsilon 4, and the risk of late-onset Alzheimer disease in African Americans. JAMA 2013;309(14):1483-1492.
87. Gottesman RF, Albert MS, Alonso A, et al. Associations between midlife vascular risk factors and 25-year incident dementia in the Atherosclerosis Risk in Communities (ARIC) cohort. JAMA Neurol 2017;74(10):1246-1254.
88. Bakulski KM, Vadari HS, Faul JD, et al. Cumulative genetic risk and APOE   4 are independently associated with dementia status in a multiethnic, population-based cohort. Neurol Genet 2021;7:e576.
89. Rajan KB, Barnes LL, Wilson RS, et al. Racial differences in the association between apolipoprotein E risk alleles and overall and total cardiovascular mortality over 18 years. JAGS 2017;65:2425-2430.
90. Kataoka S, Robbins DC, Cowan LD, et al. Apolipoprotein E polymorphism in American Indians and its relation to plasma lipoproteins and diabetes. The Strong Heart Study. Arterioscler Thromb Vasc Biol. 1996;16:918-925.
91. Xiao C, Pappas I, Aksman LM, et al. Comparison of genetic and health risk factors for mild cognitive impairment and Alzheimer's disease between Hispanic and non-Hispanic white participants. Alzheimers Dement 2023 Nov;19:5086-5094.
92. Belloy ME, Andrews SJ, Le Guen Y, et al. APOE Genotype and Alzheimer Disease Risk Across Age, Sex, and Population Ancestry. JAMA Neurol 2023;80(12):1284–1294.
93. Le Guen Y, Raulin AC, Logue MW, et al. Association of African ancestry-specific APOE missense variant R145C with risk of Alzheimer disease. JAMA 2023;329(7):551-560.
94. Granot-Hershkovitz E, Tarraf W, Kurniansyah N, et al. APOE alleles' association with cognitive function differs across Hispanic/Latino groups and genetic ancestry in the study of Latinos investigation of neurocognitive aging (HCHS/SOL). Alzheimer's Dement 2021;17:466-474.
95. Sirkis DW, Bonham LW, Johnson TP, et al. Dissecting the clinical heterogeneity of early-onset Alzheimer's disease. Mol Psychiatry 2022;27:2674-2688.
96. Bekris LM, Yu CE, Bird TD, Tsuang DW. Genetics of Alzheimer disease. J Geriatr Psychiatry Neurol 2010;23(4):213-227.
97. Goldman JS, Hahn SE, Bird T. Genetic counseling and testing for Alzheimer disease: Joint practice guidelines of the American College of Medical Genetics and the National Society of Genetic Counselors. Genet Med 2011;13:597-605.
98. Lopera F, Marino C, Chandrahas AS, et al. Resilience to autosomal dominant Alzheimer's disease in a Reelin-COLBOS heterozygous man. Nat Med 2023;29(5):1243-1252.
99. Arboleda-Velasquez JF, Lopera F, O'Hare M, et al. Resistance to autosomal dominant Alzheimer's disease in anAPOE3 Christchurch homozygote: a case report. Nat Med 2019;25(11):1680-1683.
100. Lott IT, Dierssen M. Cognitive deficits and associated neurological complications in individuals with Down's syndrome. Lancet Neurol 2010;9(6):623-633.
101. Rubenstein E, Tewolde S, Michals A, et al. Alzheimer dementia among individuals with Down syndrome. JAMA Netw Open 2024;7(9):e2435018.
102. Tsou AY, Bulova P, Capone G, et al. Medical care of adults with Down syndrome: A clinical guideline. JAMA 2020;324(5):1543-1556.
103. Hithersay R, Startin CM, Hamburg S, et al. Association of dementia with mortality among adults with Down syndrome older than 35 years. JAMA Neurol 2019;76(2):152-160.
104. Wolters FJ, van der Lee SJ, Koudstaal PJ, et al. Parental family history of dementia in relation to subclinical brain disease and dementia risk. Neurology 2017;88:1642-1649.
105. Nianogo RA, Rosenwohl-Mack A, Yaffe K, Carrasco A, Hoffmann CM, Barnes DE. Risk factors associated with Alzheimer disease and related dementias by sex and race and ethnicity in the US. JAMA Neurol 2022;79(6):584-591.
106. Park SY, Setiawan VW, Crimmins EM, et al. Racial and ethnic differences in the population-attributable fractions of Alzheimer disease and related dementias. Neurology 2024;102(3):e208116.
107. Ronnemaa E, Zethelius B, Lannfelt L, Kilander L. Vascular risk factors and dementia: 40-year follow-up of a population-based cohort. Dement Geriatr Cogn Disord 2011;31(6): 460-466.
108. Kivimaki M, Luukkonen R, Batty GD, et al. Body mass index and risk of dementia: Analysis of individual-level data from 1.3 million individuals. Alzheimers Dement 2018;14:601-609.
109. Gottesman RF, Schneider AL, Zhou Y, et al. Association between midlife vascular risk factors and estimated brain amyloid deposition. JAMA 2017;17(14):1443-1450.
110. Abell JG, Kivimaki M, Dugravot A, et al. Association between systolic blood pressure and dementia in the Whitehall II cohort study: Role of age, duration, and threshold used to define hypertension. Eur Heart J 2018;39(33):3119-3125.
111. Debette S, Seshadri S, Beiser A, et al. Midlife vascular risk factor exposure accelerates structural brain aging and cognitive decline. Neurology 2011;77:461-468.
112. Anstey KJ, Ashby-Mitchell K, Peters R. Updating the evidence on the association between serum cholesterol and risk of late-life dementia: Review and meta-analysis. J Alzheimers Dis 2017;56(1):215-228.
113. Marden JR, Tchetgen EJ, Kawachi I, Glymour MM. Contribution of Socioeconomic Status at 3 Life-Course Periods to Late-Life Memory Function and Decline: Early and Late Predictors of Dementia Risk. Am J Epidemiol 2017;186(7):805-814.
114. Caunca MR, Odden MC, Glymour MM, et al. Association of Racial Residential Segregation Throughout Young Adulthood and Cognitive Performance in Middle-aged Participants in the CARDIA Study. JAMA Neurol 2020;77(8):1000-1007.
115. Chen R, Williams DR, Nishimi K, Slopen N, Kubzansky LD, Weuve J. A life course approach to understanding stress exposures and cognitive function among middle-aged and older adults. Soc Sci Med 2022;314:115448.
116. George KM, Lutsey PL, Kucharska-Newton A, Palta P, Heiss G, Osypuk T, Folsom AR. Life-Course Individual and Neighborhood Socioeconomic Status and Risk of Dementia in the Atherosclerosis Risk in Communities Neurocognitive Study. Am J Epidemiol 2020;189(10):1134-4112.
117. George KM, Gilsanz P, Peterson RL, et al. Impact of Cardiovascular Risk Factors in Adolescence, Young Adulthood, and Midlife on Late-Life Cognition: Study of Healthy Aging in African Americans. J Gerontol A Biol Sci Med Sci 2021;76(9):1692-1698.
118. Huh J, Arpawong TE, Gruenewald TL, Fisher GG, Prescott CA, Manly JJ, et al. General cognitive ability in high school, attained education, occupational complexity, and dementia risk. Alzheimer's Dement 2024(4):2662-69.

119. Mergenthaler P, Lindauer U, GA Dienel, Meisel A. Sugar for the brain: The role of glucose in physiological and pathological brain function. Trends Neurosci 2013;36(10):587-597.
120. Kuźma E, Lourida I, Moore SF, Levine DA, Ukoumunne OC, Llewellyn DJ. Stroke and dementia risk: A systematic review and meta-analysis. Alzheimers Dement 2018;14(11): 1416-1426.
121. Samieri C, Perier MC, Gaye B, et al. Association of cardiovascular health level in older age with cognitive decline and incident dementia. JAMA 2018;320(7):657-664.
122. Matthew J, Lennon MJ, Lipnicki DM, et al. Blood pressure, antihypertensive use, and late-life Alzheimer and non-Alzheimer dementia risk. Neurology, 2024;103(5). DOI: 10.1212/WNL.0000000000209715.
123. Rajan KB, Barnes LL, Wilson RS, et al. Blood pressure and risk of incident Alzheimer's disease dementia by antihypertensive medications and APOE ε4 allele. Ann Neurol 2018;83(5): 935-944.
124. He J, Zhao C, Zhong S, et al. Blood pressure reduction and all-cause dementia in people with uncontrolled hypertension: An open-label, blinded-endpoint, cluster-randomized trial. Nat Med 2025;31(6):2054-2061.
125. Johnson AL, Nystrom NC, Piper ME, et al. Cigarette smoking status, cigarette exposure, and duration of abstinence predicting incident dementia and death: A multistate model approach. J Alzheimers Dis 2021;80(3):1013-1023.
126. Peters R, Poulter R, Warner J, Beckett N, Burch L, Bulpitt C. Smoking, dementia and cognitive decline in the elderly, a systematic review. BMC Geriatr 2008;8:36.
127. Gudala K, Bansal D, Schifano F, Bhansali A. Diabetes mellitus and risk of dementia: A meta-analysis of prospective observational studies. Diabetes Investig 2013;4(6):640-650.
128. Vagelatos NT, Eslick GD. Type 2 diabetes as a risk factor for Alzheimer's disease: The confounders, interactions, and neuropathology associated with this relationship. Epidemiol Rev 2013;35(1):152-160.
129. Reitz C, Brayne C, Mayeux R. Epidemiology of Alzheimer disease. Nat Rev Neurol 2011;7(3):137-152.
130. Xue M, Xu W, Ou YN, et al. Diabetes mellitus and risks of cognitive impairment and dementia: A systematic review and meta-analysis of 144 prospective studies. Ageing Res Rev 2019;55:100944.
131. Clocchiatti-Tuozzo S, Rivier CA, Renedo D, et al. Life's essential 8 and poor brain health outcomes in middle-aged adults. Neurology 2024;103(10). Available at: https://doi.org/10.1212/WNL.0000000000209990. Accessed January 19, 2026.
132. Stephen R, Hongistro K, Solomon A, Lonnroos E. Physical activity and Alzheimer's disease: A systematic review. J Gerontol A Biol Sci Med Sci 2017;72(6):733-739.
133. Tan ZS, Spartano NL, Beiser AS, et al. Physical activity, brain volume, and dementia risk: The Framingham Study. J Gerontol A Biol Sci Med Sci 2017;72:789-795.
134. Buchman AS, Yu L, Wilson RS, et al. Physical activity, common brain pathologies, and cognition in community-dwelling older adults. Neurology 2019;92(8):e811-e822.
135. Najar J, Ostling S, Gudmundsson P, et al. Cognitive and physical activity and dementia: A 44-year longitudinal population study of women. Neurology 2019;92(12):e1322-e1330.
136. Ogino E, Manly JJ, Schupf N, Mayeux R, Gu Y. Current and past leisure time physical activity in relation to risk of Alzheimer's disease in older adults. Alzheimers Dement 2019;15(12):1603-1611.
137. Guure CB, Ibrahim NA, Adam MB, Said SM. Impact of physical activity on cognitive decline, dementia, and its subtypes: Meta-analysis of prospective studies. Biomed Res Int 2017;2017:9016924.
138. Casaletto K, Ramos-Miguel A, VandeBunte A, et al. Late-life physical activity relates to brain tissue synaptic integrity markers in older adults. Alzheimers Dement 2022;18(11):2023-2035.
139. Wu W, Ding D, Zhao Q, et al. Dose-response relationship between late-life physical activity and incident dementia: A pooled analysis of 10 cohort studies of memory in an international consortium. Alzheimers Dement 2024;19(1):107-122.
140. Marino FR, Lyu C, Li Y, et al. Physical activity over the adult life course and risk of dementia in the Framingham Heart Study. JAMA Netw Open 2025;8(11):e2544439.
141. Hardman RJ, Kennedy G, Macpherson H, Scholey AB, Pipingas A. Adherence to a Mediterranean-style diet and effects on cognition in adults: A qualitative evaluation and systematic review of longitudinal and prospective trials. Front Nutr 2016;3:22.
142. Lourida I, Soni M, Thompson-Coon J, et al. Mediterranean diet, cognitive function, and dementia: A systematic review. Epidemiology 2013;24:479-489.
143. Morris MC, Tangney CC, Wang Y, et al. MIND diet slows cognitive decline with aging. Alzheimers Dement 2015;11(9):1015-1022.
144. Morris MC, Tangney CC, Wang Y, Sacks FM, Bennett DA, Aggarwal NT. MIND diet associated with reduced incidence of Alzheimer's disease. Alzheimers Dement 2015;11:1007-1014.
145. Van den Brink AC, Brouwer-Broisma EM, Berendsen AAM van de Rest O. The Mediterranean, Dietary Approaches to Stop Hypertension (DASH), and Mediterranean-DASH Intervention for Neurodegenerative Delay (MIND) Diets are associated with less cognitive decline and a lower risk of Alzheimer's disease: A review. Adv Nutr 2019;10:1040-1065.
146. Ballarini T, Melo van Lent D, Brunner J, et al. Mediterranean diet, Alzheimer disease biomarkers and brain atrophy in old age. Neurology 2021;96(24):e2920-e2932.
147. Agarwal P, Leurgans SE, Agrawal S, et al. Association of Mediterranean-DASH Intervention for Neurodegenerative Delay and Mediterranean Diets With Alzheimer Disease Pathology. Neurology 2023;100(22):e2259-e2268.
148. Barnes LL, Dhana K, Liu X, et al. Trial of the MIND Diet for prevention of cognitive decline in older persons. N Engl J Med 2023;389(7):602-611.
149. Park SY, Setiawan VW, Crimmins EM, et al. Dietary patterns and risk of Alzheimer's disease and related dementias across 5 racial and ethnic groups in the Multiethnic Cohort Study. Am J Clin Nutr 2025;122(4):923-931.
150. Martinez-Gonzalez MA, Gea A, Ruiz-Canela M. The Mediterranean diet and cardiovascular health: A critical review. Circulation Res 2019;124:779-798.
151. Sanches Machado d'Almeida K, Spillere SR, Zuchinali P, Souza GC. Mediterranean diet and other dietary patterns in primary prevention of heart failure and changes in cardiac function markers: A systematic review. Nutrients 2018;10:58.
152. Walker ME, O'Donnell AA, Himali JJ, et al. Associations of the Mediterranean-Dietary Approaches to Stop Hypertension Intervention for Neurodegenerative Delay diet with cardiac remodelling in the community: The Framingham Heart Study. Br J Nutr 2021;126(12):1888-1896.
153. Sawyer RP, Blair, J, Shatz R, et al. Association of adherence to a MIND-style diet with the risk of cognitive impairment and decline in the REGARDS cohort. Neurology 2024;103(8):e209817.
154. Butler M, Nelson VA, Davila H, et al. Over-the-counter supplement interventions to prevent cognitive decline, mild cognitive impairment, and clinical Alzheimer-type dementia. Ann Intern Med 2018;168:52-62.
155. Staff RT, Hogan MJ, Williams DS, Whalley LJ. Intellectual engagement and cognitive ability in later life (the "use it or lose it" conjecture): Longitudinal, prospective study. BMJ 2018;363:k4925.
156. Karp A, Paillard-Borg S, Wang H-X, Silverstein M, Winblad B, Fratiglioni L. Mental, physical and social components in leisure activities equally contribute to decrease dementia risk. Dement Geriatr Cogn Disord 2005;21(2):65-73.

157. Di Marco LY, Marzo A, Munoz-Ruiz M, et al. Modifiable lifestyle factors in dementia: A systematic review of longitudinal observational cohort studies. J Alzheimers Dis 2014;42(1):119-135.
158. James BD, Wilson RS, Barnes LL, Bennett DA. Late-life social activity and cognitive decline in old age. J Int Neuropsychol Soc 2011;17(6):998-1005.
159. Yates LA, Ziser S, Spector A, Orrell M. Cognitive leisure activities and future risk of cognitive impairment and dementia: Systematic review and meta-analysis. Int Psychogeriatr 2016;9:1-16.
160. Hall CB, Lipton RB, Sliwinski M, Katz MJ, Derby CA, Verghese J. Cognitive activities delay onset of memory decline in persons who develop dementia. Neurology 2009;73:356-361.
161. Sanjeev G, Weuve J, Jackson JW, et al. Late-life cognitive activity and dementia. Epidemiology 2016;27(5):732-742.
162. Wang Z, Marseglia A, Shang Y, Dintica C, Patrone C, Xu W. Leisure activity and social integration mitigate the risk of dementia related to cardiometabolic diseases: A population-based longitudinal study. Alzheimer's Dement 2020;16: 316-335.
163. Sommerlad A, Sabia S, Singh-Manoux A, Lewis G, Livingston G. Association of social contact with dementia and cognition: 28-year follow-up of the Whitehall II cohort study. PLoS Med 2019;16(8):e1002862.
164. Mahalingam G, Samtani S, Lam BPC, et al. Social connections and risk of incident mild cognitive impairment, dementia, and mortality in 13 longitudinal cohort studies of ageing. Dement 2023;19:5114-128.
165. Chen Y, Grodstein F, Capuano AW, et al. Late-life social activity and subsequent risk of dementia and mild cognitive impairment. Alzheimer's Dement 2024;20:.
166. Chen Y, Grodstein F, Capuano AW, Wang T, Bennett DA, James BD. Late-life social activity and subsequent risk of dementia and mild cognitive impairment. Alzheimers Dement 2025;21(1):e14316.
167. Edwin TH, Håberg AK, Zotcheva E, et al. Trajectories of occupational cognitive demands and risk of mild cognitive impairment and dementia in later life: The HUNT4 70+ Study. Neurology 2024;102 (9):e209353. doi.org/10.1212/WNL.0000000000209353.
168. Pool LR, Weuve J, Wilson RS, Bultmann U, Evans DA, Mendes de Leon CF. Occupational cognitive requirements and late-life cognitive aging. Neurology 2016;86(15):1386-1392.
169. Kivimaki M, Walker KA, Pentti J, et al. Cognitive stimulation in the workplace, plasma proteins, and risk of dementia: three analyses of population cohort studies. BMJ 2021; 374 :n1804. doi:10.1136/bmj.n1804.
170. Fitzpatrick AL, Kuller LH, Ives DG, et al. Incidence and prevalence of dementia in the Cardiovascular Health Study. J Am Geriatr Soc 2004;52(2):195-204.
171. Kukull WA, Higdon R, Bowen JD, et al. Dementia and Alzheimer disease incidence: A prospective cohort study. Arch Neurol 2002;59(11):1737-1746.
172. Stern Y. Cognitive reserve in ageing and Alzheimer's disease. Lancet Neurol 2012;11(11):1006-1012.
173. Sando SB, Melquist S, Cannon A, et al. Risk-reducing effect of education in Alzheimer's disease. Int J Geriatr Psychiatry 2008;23(11):1156-1162.
174. Hendrie HC, Smith-Gamble V, Lane KA, Purnell C, Clark DO, Gao S. The Association of early life factors and declining incidence rates of dementia in an elderly population of African Americans. J Gerontol B Psychol Sci Soc Sci 2018;16(73, suppl 1):S82-S89.
175. Manly JJ, Jones RN, Langa KM, et al. Estimating the Prevalence of Dementia and Mild Cognitive Impairment in the US: The 2016 Health and Retirement Study Harmonized Cognitive Assessment Protocol Project. JAMA Neurol 2022;79(12):1242-1249.
176. Rawlings AM, Sharrett AR, Mosley TH, Wong DF, Knopman DS, Gottesman RF. Cognitive reserve in midlife is not associated with amyloid-β deposition in late-life. J Alzheimers Dis 2019:517-521.
177. Wilson RS, Yu L, Lamar M, Schneider JA, Boyle PA, Bennett DA. Education and cognitive reserve in old age. Neurology 2019;92(10):e1041-e1050.
178. Hönig M, Altomare D, Caprioglio C, et al. Association between years of education and amyloid burden in patients with subjective cognitive decline, MCI, and Alzheimer disease. Neurology 2024;102(6):e208053.
179. Stern Y. What is cognitive reserve? Theory and research application of the reserve concept. J Int Neuropsychol Soc 2002;8:448-460.
180. Stern Y, Arenaza-Urquijo EM, Bartres-Faz D, et al. Whitepaper: Defining and investigating cognitive reserve, brain reserve, and brain maintenance. Alzheimers Dement 2020;16(9):1305-1311.
181. Ngandu T, Lehtisalo J, Solomon A, et al. Occupational complexity and cognition in the FINGER multidomain intervention trial. Alzheimer's Dement 2022;18:2438-47.
182. Coleman ME, Roessler MEH, Peng S, et al. Social enrichment on the job: Complex work with people improves episodic memory, promotes brain reserve, and reduces the risk of dementia. Alzheimers Dement 2023;19(6):2655-2665.
183. Soh Y, Eng CW, Mayeda ER, et al. Association of primary lifetime occupational cognitive complexity and cognitive decline in a diverse cohort: Results from the KHANDLE study. Alzheimers Dement 2023;19(9):3926-3935.
184. Soh Y, Whitmer RA, Mayeda ER, et al. State-level indicators of childhood educational quality and incident dementia in older Black and White adults. JAMA Neurol 2023;80(4):352-359.
185. Liu C, Murchland AR, VanderWeele TJ, Blacker D. Eliminating racial disparities in dementia risk by equalizing education quality: A sensitivity analysis. Soc Sci Med 2022;312:115347.
186. Sisco S, Gross AL, Shih RA, et al. The role of early-life educational quality and literacy in explaining racial disparities in cognition in late life. J Gerontol B Psychol Sci Soc Sci 2015;70(4):557-567.
187. Crowe M, Clay OJ, Martin RC, et al. Indicators of childhood quality of education in relation to cognitive function in older adulthood. J Gerontol A Biol Sci Med Sci 2013;68(2):198-204.
188. Shi L, Chen S, Ma M, et al. Sleep disturbances increase the risk of dementia: A systematic review and meta-analysis. Sleep Med Rev 2018;40:4-16.
189. Sabia S, Fayosse A, Dumurgier J, van Hees VT, Paquet C, Sommerlad A. Association of sleep duration in middle and old age with incidence of dementia. Nat Commun 2021;12(1):2289.
190. Winer JR, Keters KD, Kennedy G, et al. Association of short and long sleep duration with amyloid-β burden and cognition in aging. JAMA Neurol 2021;78(10):1187-1196.
191. Makin S. Deep sleep gives your brain a deep clean: Slow-wave activity during dreamless slumber helps wash out neural detritus Scientific American Nov 1, 2019. Available at: https://www.scientificamerican.com/article/deep-sleep-gives-your-brain-a-deep-clean1/. Accessed January 19, 2026.
192. Insel PS, Mohlenhoff BS, Neylan TC, Krystal AD, Mackin RS. Association of sleep and β-amyloid pathology among older cognitively unimpaired adults. JAMA Netw Open 2021;4(7):e2117573.
193. Bubu OM, Andrade AG, Umasabor-Bubu OQ, et al. Obstructive sleep apnea, cognition and Alzheimer's disease: A systematic review integrating three decades of multidisciplinary research. Sleep Med Rev 2020:50:101250.
194. Andrade A, Bubu OM, Varga AW, Osorio RS. The relationship between obstructive sleep apnea and Alzheimer's disease. J Alzheimers Dis 2018; 64(Suppl 1):S255-S270.
195. Wang C, Holtzman DM. Bidirectional relationship between sleep and Alzheimer's disease: Role of amyloid, tau, and other factors. Neuropsychopharmacol 2020;45:104-120.
196. Ju YE, Lucey BP, Holtzman DM. Sleep and Alzheimer disease pathology—a bidirectional relationship. Nat Rev Neurol 2014;10(2):115-159.
197. Lucey BP. It's complicated: The relationship between sleep and Alzheimer's disease in humans. Neurobiol Dis 2020:144:105031.

198. Ju Y-ES, McLeland JS, Toedebusch CD, et al. Sleep quality and preclinical Alzheimer disease. JAMA Neurol 2013;70(5):587-593.
199. Lim MM, Gerstner JR, Holtzman DM. The sleep-wake cycle and Alzheimer's disease: What do we know? Neurodegener Dis Manag 2014;4(5):351-362.
200. Lao XQ, Liu X, Deng HB, et al. Sleep quality, Sleep duration, and the risk of coronary heart disease: A prospective cohort study with 60,586 adults. J Clin Sleep Med 2018;14(1): 109-117.
201. Lad M, Sedley W, Griffiths TD. Sensory loss and risk of dementia. Neuroscientist 2024;30(2):247-59.
202. Reed NS, Oh ES. New Insights Into Sensory Impairment and Dementia Risk. JAMA Netw Open 2022;5(5):e2210740.
203. Kotecha AM, Corrêa ADC, Fisher KM, Rushworth JV. Olfactory dysfunction as a global biomarker for sniffing out Alzheimer's disease: A meta-analysis. Biosensors (Basel) 2018;8(2):41.
204. McLaren AMR, Kawaja MD. Olfactory dysfunction and Alzheimer's disease: A review. J Alzheimers Dis 2024;99:811-27.
205. Silva MME, Mercer PBS, Witt MCZ, Pessoa RR. Olfactory dysfunction in Alzheimer's disease Systematic review and meta-analysis. Dement Neuropsychol 2018;12:123-32.
206. Son G, Jahanshahi A, Yoo SJ, Boonstra JT, Hopkins DA, Steinbusch HWM, Moon C. Olfactory neuropathology in Alzheimer's disease: a sign of ongoing neurodegeneration. BMB Rep 2021;54(6):295-304.
207. Bouhaben J, Delgado-Lima AH, Delgado-Losada ML. The role of olfactory dysfunction in mild cognitive impairment and Alzheimer's disease: A meta-analysis. Arch Gerontol Geriatr 2024 Aug;123:105425.
208. Fatuzzo I, Niccolini GF, Zoccali F, Cavalcanti L, Bellizzi MG, Riccardi G, et al. Neurons, nose, and neurodegenerative diseases: Olfactory function and cognitive impairment. Int J Mol Sci 2023;24(3):2117.
209. Dintica CS, Marseglia A, Rizzuto D, Wang R, Seubert J, Arfanakis K, et al. Impaired olfaction is associated with cognitive decline and neurodegeneration in the brain. Neurology 2019;92:e700-e709.
210. Ge S, McConnell ES, Wu B, Pan W, Dong X, Plassman BL. Longitudinal association between hearing loss, vision loss, dual sensory loss, and cognitive decline. J Am Geriatr Soc 2021;69:644-50.
211. Loughrey DG, Kelly ME, Kelley GA, Brennan S, Lawlor BA. Association of age-related hearing loss with cognitive function, cognitive impairment, and dementia: A systematic review and meta-analysis. JAMA Otolaryngol Head Neck Surg 2018;144(2):115-126.
212. Thomson RS, Auduong P, Miller AT, Gurgel RK. Hearing loss as a risk factor for dementia: A systematic review. Laryngoscope Investig Otolaryngol 2017 Mar 16;2:69-79.
213. Ford AH, Hankey GJ, Yeap BB, Golledge J, Flicker L, Almeida OP. Hearing loss and the risk of dementia in later life. Maturitas 2018;1121-11. DOI 10.1016/j.maturitas.2018.03.004.
214. Ishak E, Burg EA, Pike JR, et al. Population attributable fraction of incident dementia associated with hearing loss. JAMA Otolaryngol Head Neck Surg 2025;151(6):568–575.
215. Huang AR, Roth DL, Cidav T, et al. Social isolation and 9-year dementia risk in community-dwelling Medicare beneficiaries in the United States. J Am Geriatr Soc 2023;7:765-773.
216. Shen C, Rolls ET, Cheng W, et al. Associations of social isolation and loneliness with later dementia. Neurology 2022;99(2):e164-e175.
217. Lin FR, Pike JR, Albert MS, et al. Hearing intervention versus health education control to reduce cognitive decline in older adults with hearing loss in the USA (ACHIEVE): A multicentre, randomised controlled trial. Lancet 2023;402:786-797.
218. Ma LZ, Zhang YR, Li YZ, et al. Cataract, cataract surgery, and risk of incident dementia: A prospective cohort study of 300,823 participants. Biol Psychiatry. 2023;93(9):810-819. .
219. Lee CS, Gibbons LE, Lee AY, et al. Association between cataract extraction and development of dementia. JAMA Intern Med 2022;182(2):134–141.
220. Yeo BSY, Ong RYX, Ganasekar P, et al. Cataract surgery and cognitive benefits in the older person: A systematic review and meta-analysis. Ophthalmology 2024;131(8):975-984.
221. U.S. Environmental Protection Agency. 2019. Integrated science assessment (ISA) for particulate matter (final report, 2019). EPA/600/R-19/188.Washington, DC.
222. Weuve J, Bennett EE, Ranker L, et al. Exposure to air pollution in relation to risk of dementia and related outcomes: An updated systematic review of the epidemiologic literature. Environ Health Perspect 2021;129(9):96001.
223. Peters R, Ee N, Peters J, Booth A, Mudway I, Anstey KJ. Air Pollution and Dementia: A Systematic Review. J Alzheimers Dis 2019;70(s1):S145-S163.
224. Kim B, Blam K, Elser H, et al. Ambient air pollution and the severity of Alzheimer disease neuropathology. JAMA Neurol. Published online September 08, 2025. doi:10.1001/jamaneurol.2025.3316.
225. Zhang B, Weuve J, Langa KM, et al. Comparison of particulate air pollution from different emission sources and incident dementia in the U.S. JAMA Intern Med 2023;183(10): 1080-1089.
226. Abolhasani E, Hachinski V, Ghazaleh N, Azarpazhooh MR, Mokhber N, Martin J. Air pollution and Incidence of dementia: A systematic review and meta-analysis. Neurology 2023;100(2):e242-e254.
227. Elser H, Frankland TB, Chen C, et al. Wildfire smoke exposure and incident dementia. JAMA Neurol 2024 Nov 25:e244058. doi: 10.1001/jamaneurol.2024.4058.
228. Oudin A, Segersson D, Adolfsson R, Forsberg B. Association between air pollution from residential wood burning and dementia incidence in a longitudinal study in Northern Sweden. PLoS One 2018;13(6):e0198283.
229. Sprung J, Knopman DS, Petersen RC, et al. Association of hospitalization with long-term cognitive trajectories in older adults. J Am Geriatr Soc 2021;69(3):660-668.
230. James BD, Wilson RS, Capuano AW, et al. Cognitive decline after elective and nonelective hospitalizations in older adults. Neurology 2019;92(7):e690-e699.
231. Brown CH, Sharrett AR, Coresh J, et al. Association of hospitalization with long-term cognitive and brain MRI changes in the ARIC cohort. Neurology 2015;84:1443-1453.
232. Pandharipande PP, Girard TD, Jackson JC, et al. Long-term cognitive impairment after critical illness. N Engl J Med 2013;369(14):1306-1336.
233. Ehlenbach WJ, Hough CL, Crane PK, et al. Association between acute care and critical illness hospitalization and cognitive function in older adults. JAMA 2010;303(8): 763-770.
234. Mart MF, Pun BT, Pandharipande P, Jackson JC, Ely EW. ICU survivorship - The Relationship of delirium, sedation, dementia, and Acquired weakness. Crit Care Med 2021;49(8):1227-1240.
235. James BD, Wilson RS, Capuano AW, et al. Hospitalization, Alzheimer's disease and related neuropathologies, and cognitive decline. Ann Neurol 2019;86(6):844-852.
236. Fong TG, Inouye SK. The inter-relationship between delirium and dementia: The importance of delirium prevention. Nat Rev Neurol 2022;18(10):579-596.
237. Centers for Disease Control and Prevention. Surveillance Report: Traumatic Brain Injury-Related Deaths by Age Group, Sex, and Mechanism of Injury. Available at: https://stacks.cdc.gov/view/cdc/122988. Accessed December 19, 2025.
238. Fann JR, Ribe AR, Pedersen HS, et al. Long-term risk of dementia among people with traumatic brain injury in Denmark: A population-based observational cohort study. Lancet Psychiatry 2018;5(5):424-431.
239. LoBue C, Munro C, Schaffert J, et al. Traumatic brain injury and risk of long-term brain changes, accumulation of pathological markers, and developing dementia: A review. J Alzheimers Dis 2019;70(3):629-654.

240. Schneider ALC, Selvin E, Latour L, et al. Head injury and 25-year risk of dementia. Alzheimer's Dement 2021;17: 1432-1441.
241. Centers for Disease Control and Prevention. TBI Data. Available at: https://www.cdc. gov/traumaticbraininjury/data/index.html. Accessed January 19, 2026.
242. Centers for Disease Control and Prevention. Traumatic Brain Injury & Concussion. Potential Effects. Available at: https://www.cdc.gov/traumaticbraininjury/outcomes.html. Accessed January 19, 2026.
243. Shively S, Scher AI, Perl DP, Diaz-Arrastia R. Dementia resulting from traumatic brain injury: what is the pathology? Arch Neurol 2012;69(10):1245-1251.
244. LoBue C, Wadsworth H, Wilmoth K, Clem M, Hart J Jr, Womack KB. Traumatic brain injury history is associated with earlier age of onset of Alzheimer disease. Clin Neuropsychol 2017;31(1):85-98.
245. Schaffert J, LoBue C, White CL, et al. Traumatic brain injury history is associated with an earlier age of dementia onset in autopsy-confirmed Alzheimer's disease. Neuropsychology 2018;32(4):410-416.
246. Nowinski CJ, Bureau SC, Buckland ME, et al. Applying the Bradford Hill Criteria for Causation to Repetitive Head Impacts and Chronic Traumatic Encephalopathy. Front Neurol 2022 Jul 22;13:938163.
247. National Institutes of Health. Focus on Traumatic Brain Injury Research. Available at: https://www.ninds.nih.gov/current-research/focus-disorders/focus-traumatic-brain-injury-research. Accessed January 19, 2026.
248. Turk KW, Geada A, Alvarez VE, et al. A comparison between tau and amyloid- cerebrospinal fluid biomarkers in chronic traumatic encephalopathy and Alzheimer disease. Alz Res Therapy 2022;14:28.
249. Stein TD, Montenigro PH, Alvarez VE, et al. Beta-amyloid deposition in chronic traumatic encephalopathy. Acta Neuropathol 2015;130(1):21-34.
250. Besser LM, Edwards K, Lobban NS, Tolea MI, Galvin JE. Social determinants of health, risk and resilience against Alzheimer's disease and related dementias: The Healthy Brain Initiative. J Alzheimers Dis Rep 2024;8(1):637-646.
251. Majoka MA, Schimming C. Effect of social determinants of health on cognition and risk of Alzheimer disease and related dementias. Clin Ther 2021 Jun;43(6):922-29.
252. Li JM, Boustani MA, French DD. Social determinants of health in community-dwelling dementia patients aged 65 and over: Analysis of the 2019 National Health Interview Survey. Gerontol Geriatr Med 2023;9:23337214231190244.
253. World Health Organization. Social Determinants of Health. Available at who.int/health-topics/social-determinants-of-health#tab=tab_1. Accessed January 19, 2026.
254. Bernard SM, McGeehin MA. Prevalence of blood lead levels >or= 5 micro g/dL among US children 1 to 5 years of age and socioeconomic and demographic factors associated with blood of lead levels 5 to 10 micro g/dL, Third National Health and Nutrition Examination Survey, 1988-1994. Pediatrics 2003;112(6 Pt 1):1308-1313.
255. Griffith M, Tajik M, Wing S. Patterns of agricultural pesticide use in relation to socioeconomic characteristics of the population in the rural U.S. South. Int J Health Serv 2007;37(2):259-277.
256. Harris CD, Watson KB, Carlson SA, Fulton JE, Dorn JM, Elam-Evans L. Adult participation in aerobic and muscle-strengthening physical activities — United States, 2011. Morb Mortal Wkly Rep 2013;62(17):326-330.
257. Menke A, Casagrande S, Geiss L, Cowie CC. Prevalence of and trends in diabetes among adults in the United States, 1988-2012. JAMA 2015;314(10):1021-1029.
258. Sims M, Diez Roux AV, Boykin S, et al. The socioeconomic gradient of diabetes prevalence, awareness, treatment, and control among African Americans in the Jackson Heart Study. Ann Epidemiol 2011;21(12):892-898.
259. Lee TC, Glynn RJ, Pena JM, et al. Socioeconomic status and incident type 2 diabetes mellitus: Data from the Women's Health Study. PLoS One 2011;6(12):E27670.
260. Gillespie CD, Hurvitz KA. Prevalence of hypertension and controlled hypertension — United States, 2007–2010. MMWR 2013;62(3):144-148.
261. Centers for Disease Control and Prevention. Current Cigarette Smoking Among Adults in the United States. Available at: https://www.cdc.gov/tobacco/data_ statistics/fact_sheets/adult_data/cig_smoking/index.htm. Accessed January 19, 2026.
262. Kweon H, Aydogan G, Dagher A, et al. Human brain anatomy reflects separable genetic and environmental components of socioeconomic status. Sci Adv 2022;8(20):eabm2923.
263. Maroko AR, Doan TM, Arno PS, et al. Integrating Social Determinants of Health With Treatment and Prevention: A New Tool to Assess Local Area Deprivation. Available at https://www.cdc.gov/pcd/issues/2016/16_0221.htm. Accessed September 7, 2025.
264. Kind AJH, Buckingham WR. Making neighborhood-disadvantage metrics accessible - The Neighborhood Atlas. N Engl J Med 2018;378(26):2456-2458.
265. Coogan PF, Delp L, Hicks JN, et al. Neighborhood disadvantage and the incidence of dementia in US Black women. Alzheimers Dement 2025;21(4):e70125.
266. Wang Y, Zang EX, Davis-Plourde K, et al. Incidence of frailty, dementia, and disability among community-living older Americans according to county-level disadvantage. J Am Geriatr Soc 2025;73(6):1847-1856.
267. Mobley TM, Shaw C, Hayes-Larson E, et al. Neighborhood disadvantage and dementia incidence in a cohort of Asian American and non-Latino white older adults in northern California. Alzheimers Dement 2023;19(1):296-306.
268. Baker LD, Espeland MA, Whitmer RA, et al. Structured vs self-guided multidomain lifestyle interventions for global cognitive function: The US POINTER randomized clinical trial. JAMA 2025;334(8):681-691.
269. O'Bryant SO, Petersen M, Hall J, et al. Medical comorbidities and ethnicity impact plasma Alzheimer's disease biomarkers: Important considerations for clinical trials and practice. Alzheimer's Dement 2023;19(1):36-43.
270. Syrjanen JA, Campbell MR, Algeciras-Schimnich A, et al. Associations of amyloid and neurodegeneration plasma biomarkers with comorbidities. Alzheimer's Dement 2022;18(6):1128-1140.
271. Ramanan VK, Graff-Radford J, Syrjanen J, et al. Association of plasma biomarkers of Alzheimer disease with cognition and medical comorbidities in a biracial cohort. Neurology 2023;101(14):e1402-11. doi: 10.1212/WNL.0000000000207675.
272. Barnes LL. Alzheimer disease in African American individuals: increased incidence or not enough data? Nat Rev Neurol 2022;18(1):56-62.
273. Gilmore-Bykovskyi A, Croff R, Glover CM, et al. Traversing the aging research and health equity divide: Toward intersectional frameworks of research justice and participation. Gerontologist 2022;62(5):711-720.
274. U.S. Census Bureau. 2023 National Population Projections. Table 2. Projected Population by Age Group and Sex: Downloadable Files. Available at: https://www.census.gov/data/tables/2023/demo/popproj/2023-summary-tables.html. Accessed December 19, 2025.
275. Hudomiet P, Hurd MD, Rohwedder S. Trends in inequalities in the prevalence of dementia in the United States. Proc Natl Acad Sci USA 2022;119(46):e2212205119.
276. Rajan KB, Weuve J, Barnes LL, McAninch EA, Wilson RS, Evans DA. Population estimate of people with clinical AD and mild cognitive impairment in the United States (2020-2060). Alzheimers Dement 2021;17(12):1966-1975.
277. Hendriks S, Peetoom K, Bakker C, et al. Global prevalence of young-onset dementia: A systematic review and meta-analysis. JAMA Neurol 2021;78(9):1080-1090.

278. Aarsland D, Sunde AL, Tovar-Rios DA, et al. Prevalence of Alzheimer's disease pathology in the community. Nature 2025. doi: 10.1038/s41586-025-09841-y. Online ahead of print.
279. James BD, Wilson RS, Boyle PA, Trojanowski JQ, Bennett DA, Schneider JA. TDP-43 stage, mixed pathologies, and clinical Alzheimer's-type dementia. Brain 2016;139(11):2983-2993.
280. Serrano-Pozo A, Qian J, Monsell SE, et al. Mild to moderate Alzheimer dementia with insufficient neuropathological changes. Ann Neurol 2014;75:597-601.
281. Barnes LL, Leurgans S, Aggarwal NT, et al. Mixed pathology is more likely in black than white decedents with Alzheimer dementia. Neurology 2015;85:528-534.
282. Petersen RC, Lopez O, Armstrong MJ, et al. Practice guideline update summary: Mild cognitive impairment: Report of the Guideline Development, Dissemination, and Implementation Subcommittee of the American Academy of Neurology. Neurology 2018;90(3):126-135.
283. Jack CR, Therneau TM, Weigand SD, et al. Prevalence of biologically vs clinically defined Alzheimer spectrum entities using the National Institute on Aging-Alzheimer's Association Research Framework. JAMA Neurol 2019;76(10):1174-1783.
284. Gustavsson A, Norton N, Fast T, Frolich L, Georges J, Holzapfel D. Global estimates on the number of persons across the Alzheimer's disease continuum. Alzheimers Dement 2023;19(2):658-670.
285. Brookmeyer R, Abdalla N, Kawas CH, Corrada MM. Forecasting the prevalence of preclinical and clinical Alzheimer's disease in the United States. Alzheimers Dement 2018;14(2):121-129.
286. U.S. Centers for Disease Control. Subjective Cognitive Decline — A Public Health Issue. Available at: https://www.cdc.gov/healthy-aging-data/media/pdfs/subjective-cognitive-decline-508.pdf?utm_source=chatgpt.com. Accessed December 14, 2025.
287. Jansen WJ, Janssen O, Tijms BM. Prevalence estimates of amyloid abnormality across the Alzheimer disease clinical spectrum. JAMA Neurol 2022;79(3):228-243.
288. Parnetti L, Chipi E, Salvadori N. Prevalence and risk of progression of preclinical Alzheimer's disease stages: A systematic review and meta-analysis. Alzheimers Res Ther 2019;11(1):7.
289. Kotagal V, Langa KM, Plassman BL, et al. Factors associated with cognitive evaluations in the United States. Neurology 2015;84(1):64-71.
290. Taylor DH, Jr., Ostbye T, Langa KM, Weir D, Plassman BL. The accuracy of Medicare claims as an epidemiological tool: The case of dementia revisited. J Alzheimers Dis 2009;17(4):807-815.
291. Gianattasio KZ, Prather C, Glymour MM, Ciarleglio A, Power MC. Racial disparities and temporal trends in dementia misdiagnosis risk in the United States. Alzheimers Dement 2019;5:891-898.
292. Lang L, Clifford A, Wei L, et al. Prevalence and determinants of undetected dementia in the community: A systematic literature review and a meta-analysis. BMJ Open 2017;7(2):e011146.
293. Lin PJ, Daly AT, Olchanski N, et al. Dementia diagnosis disparities by race and ethnicity. Med Care 2021;59(8): 679-686.
294. Amjad H, Roth DL, Sheehan OC, Lyketsos CG, Wolff JL, Samus QM. Underdiagnosis of dementia: An observational study of patterns in diagnosis and awareness in US older adults. J Gen Intern Med 2018;33(7):1131-1138.
295. Nguyen HQ, Borson S, Khang P, et al. Dementia diagnosis and utilization patterns in a racially diverse population within an integrated health care delivery system. Alzheimers Dement (N Y) 2022;8(1):e12279.
296. Grodstein F, Chang C-H, Capuano AW, Power MC, Marquez DX, Barnes LL. Identification of Dementia in Recent Medicare Claims Data, Compared With Rigorous Clinical Assessments. J Gerontol A Biol SciMed Sci 2022;77(6):1272-1278.
297. Grodstein F, James BD, Chen Y, et al. Identification of Dementia in Medicare Claims Compared to Rigorous Clinical Assessments in African Americans. J Gerontol A Biol Sci Med Sci 2024;79(1):glad235.
298. Chen Y, Tysinger B, Crimmins E, Zissimopoulos JM. Analysis of dementia in the US population using Medicare claims: Insights from linked survey and administrative claims data. Alzheimers Dement (N Y) 2019;5:197-207.
299. Healthy People 2030. Available at: https://health.gov/healthypeople/objectives-and-data/browseobjectives/dementias/increase-proportion-older-adults-dementia-or-their-caregivers-who-know-they-have-it-dia-01. Accessed January 19, 2026.
300. Barrett AM, Orange W, Keller M, Damgaard P, Swerdlow RH. Short-term effect of dementia disclosure: How patients and families describe the diagnosis. J Am Geriatr Soc 2006;54(12):1968-1970.
301. Zaleta AK, Carpenter BD, Porensky EK, Xiong C, Morris JC. Agreement on diagnosis among patients, companions, and professionals after a dementia evaluation. Alzheimer Dis Assoc Disord 2012;26(3):232-237.
302. Amjad H, Roth DL, Samus QM, Yasar S, Wolff JL. Potentially unsafe activities and living conditions of older adults with dementia. J Am Geriatr Soc 2016;64(6):1223-1232.
303. Alzheimer's Association. 2015 Alzheimer's Disease Facts and Figures. Special report: Disclosing a diagnosis of Alzheimer's disease. Accessed December 15, 2023. Available at: https://www.alzheimersanddementia.com/article/S1552-5260(15)00058-8/fulltext.
304. Alzheimer's Association. 2019 Alzheimer's Disease Facts and Figures. Special report: Alzheimer's detection in the primary care setting — connecting patients with physicians. Available at: https://www.alzheimersanddementia.com/article/S1552-5260(19)30031-7/fulltext. Accessed January 19, 2026.
305. Qian Y, Chen X, Tang D, Kelley AS, Li J. Prevalence of memory-related diagnoses among U.S. older adults with early symptoms of cognitive impairment. J Gerontol A 76(10):1846-1853.
306. Chen Y, Power MC, Grodstein F. Correlates of missed or late versus timely diagnosis of dementia in healthcare settings. Alzheimers Dement 2024;20(8):5551-5560.
307. Tsoy E, Kiekhofer RE, Guterman EL, et al. Assessment of racial/ethnic disparities in timeliness and comprehensiveness of dementia diagnosis in California. JAMA Neurol 2021;6: 657-665.
308. Lee SA, Kim D, Lee H. Examine Race/Ethnicity Disparities in Perception, Intention, and Screening of Dementia in a Community Setting: Scoping Review. Int J Environ Res Pub Health 2022;19(14): 8865.
309. Davis MA, Lee KA, Harris M, et al. Time to dementia diagnosis by race: A retrospective cohort study. JAGS 2022;70(11):3250-3259.
310. Power MC, Willens V, Prather C, et al. Risks and benefits of clinical diagnosis around the time of dementia onset. Gerontol Geriatr Med 2023;9:23337214231213185.
311. Spargo D, Zur R, Lin PJ, Synnott P, Klein E, Hartry A. Estimating prevalence of early symptomatic Alzheimer's disease in the United States. Alzheimers Dement (Amst) 2023;15(4):e12497.
312. Liu Y, Jun H, Becker A, Wallick C, Mattke S. Detection rates of mild cognitive impairment in primary care for the United States Medicare population. J Prev Alzheimers Dis 2024;11(1):7-12.
313. Erickson CM, Clark LR, Ketchum FB, Chin NA, Gleason CE Largent EA. Implications of preclinical Alzheimer's disease biomarker disclosure for US policy and society. Alzheimers Dement (Amst) 2022;14(1):e12339.
314. Arias JJ, Tyler AM, Oster BJ. The Proactive Patient: Long-term care insurance discrimination risks of Alzheimer's disease biomarkers. J Law Med Ethics 2018;46(2):485-498.

315. Roberts JS, Dunn LB, Rabinovici GD. Amyloid imaging, risk disclosure and Alzheimer's disease: Ethical and practical issues. Neurodegener Dis Manag 2013;3(3):219-229.
316. Fernandez-Blazquez MA, Avila-Villanueva M, Maestu F, Medina M. Specific features of subjective cognitive decline predict faster conversion to mild cognitive impairment. J Alzheimers Dis 2016;52(1):271-281.
317. Reisberg B, Shulman MB, Torossian C, Leng L, Zhu W. Outcome over seven years of healthy adults with and without subjective cognitive impairment. Alzheimers Dement 2010;6(1):11-24.
318. Kaup AR, Nettiksimmons J, LeBlanc ES, Yaffe K. Memory complaints and risk of cognitive impairment after nearly 2 decades among older women. Neurology 2015;85(21): 1852-1858.
319. Gifford KA, Liu D, Lu Z, et al. The source of cognitive complaints predicts diagnostic conversion differentially among nondemented older adults. Alzheimers Dement 2014;10(3):319-327.
320. Buckley RF, Maruff P, Ames D, et al. Subjective memory decline predicts greater rates of clinical progression in preclinical Alzheimer's disease. Alzheimers Dement 2016;12(7):796-804.
321. Jessen F, Amariglio RE, van Boxtel M, et al. A conceptual framework for research on subjective cognitive decline in preclinical Alzheimer's disease. Alzheimers Dement 2014;10(6):844-852.
322. Jessen F, Wolfsgruber S, Wiese B, et al. AD dementia risk in late MCI, in early MCI, and in subjective memory impairment. Alzheimers Dement 2014;10(1):76-83.
323. Reisberg B, Gauthier S. Current evidence for subjective cognitive impairment (SCI) as the pre-mild cognitive impairment (MCI) stage of subsequently manifest Alzheimer's disease. Int Psychogeriatr 2008;20(1):1-16.
324. Jessen F, Amariglio RE, Buckley RF, et al. The characterisation of subjective cognitive decline. Lancet Neurol 2020;19(3): 271-278.
325. Dhana K, Beck T, Desai P, Wilson RS, Evans DA, Rajan KB. Prevalence of Alzheimer's disease dementia in the 50 US states and 3142 counties: A population estimate using the 2020 bridged-race postcensal from the National Center for Health Statistics. Alz Dement 2023;19(10):4388-4395.
326. Howard G, Howard VJ. Twenty Years of Progress Toward Understanding the Stroke Belt. Stroke 2020;51(3):742-750.
327. Rajan KB, Weuve J, Barnes LL, Wilson RS, Evans DA. Prevalence and incidence of clinically diagnosed Alzheimer's disease dementia from 1994 to 2012 in a population study. Alzheimers Dement 2019;15(1):1-7.
328. Hebert LE, Beckett LA, Scherr PA, Evans DA. Annual incidence of Alzheimer disease in the United States projected to the years 2000 through 2050. Alzheimer Dis Assoc Disord 2001;15(4):169-173.
329. Chene G, Beiser A, Au R, et al. Gender and incidence of dementia in the Framingham Heart Study from mid-adult life. Alzheimers Dement 2015;11(3):310-320.
330. Seshadri S, Wolf PA, Beiser A, et al. Lifetime risk of dementia and Alzheimer's disease. The impact of mortality on risk estimates in the Framingham Study. Neurology. 1997;49(6):1498-1504.
331. Hebert LE, Scherr PA, McCann JJ, Beckett LA, Evans DA. Is the risk of developing Alzheimer's disease greater for women than formen? Am J Epidemiol 2001;153(2):132-136.
332. Gong J, Harris K, Lipnicki DM, et al. Sex differences in dementia risk and risk factors: Individual-participant data analysis using 21 cohorts across six continents from the COSMIC consortium. Alzheimers Dement 2023;19(8): 3365-3378.
333. Kawas C, Gray S, Brookmeyer R, Fozard J, Zonderman A. Age-specific incidence rates of Alzheimer's disease: The Baltimore Longitudinal Study of Aging. Neurology 2000;54(11):2072-2077.
334. Zahodne LB, Schofield PW, Farrell MT, Stern Y, Manly JJ. Bilingualism does not alter cognitive decline or dementia risk among Spanish-speaking immigrants. Neuropsychology 2014;28(2):238-246.
335. Fratiglioni L, Viitanen M, von Strauss E, Tontodonati V, Herlitz A, Winblad B. Very old women at highest risk of dementia and Alzheimer's disease: Incidence data from the Kungsholmen Project, Stockholm. Neurology. 1997;48:132-138.
336. Letenneur L, Gilleron V, Commenges D, Helmer C, Orgogozo JM, Dartigues JF. Are sex and educational level independent predictors of dementia and Alzheimer's disease? Incidence data from the PAQUID project. J Neurol Neurosurg Psychiatry. 1999;66:177-183.
337. Matthews FE, Stephan BC, Robinson L, et al. A two decade dementia incidence comparison from the Cognitive Function and Ageing Studies I and II. Nat Commun 2016;7:11398.
338. Mielke MM, Ferretti MT, Iulita MF, Hayden K, Khachaturian AS. Sex and gender in Alzheimer's disease — Does it matter? Alzheimers Dement 2018;14(9):1101-1103.
339. Rocca WA. Time, Sex, gender, history, and dementia. Alzheimer Dis Assoc Disord 2017;31(1):76-79.
340. GBD 2021 Demographics Collaborators. Global age-sex-specific mortality, life expectancy, and population estimates in 204 countries and territories and 811 subnational locations, 1950-2021, and the impact of the COVID-19 pandemic: a comprehensive demographic analysis for the Global Burden of Disease Study 2021. Lancet. 2024 May 18;403(10440):1989-2056.
341. Shaw C, Hayes-Larson E, Glymour MM, Dufouil C, Hohman TJ, Whitmer RA. Evaluation of selective survival and sex/gender differences in dementia incidence using a simulation model. JAMA Netw Open 2021;4(3):e211001.
342. Beam CR, Kaneshiro C, Jang JY, et al. Differences between women and men in incidence rates of dementia and Alzheimer's disease. J Alzheimers Dis 2018; 64(4): 1077–1083.
343. Gilsanz P, Lee C, Corrada MM, Kawas CH, Quesenberry CP, Jr., Whitmer RA. Reproductive period and risk of dementia in a diverse cohort of health care members. Neurology 2019;92(17):e2005-e2014.
344. Mielke MM, Vemuri P, Rocca WA. Clinical epidemiology of Alzheimer's disease: Assessing sex and gender differences. Clin Epidemiol 2014;6:37-48.
345. Mielke MM, Aggarwal NT, Vila-Castelar C, et al. Consideration of sex and gender in Alzheimer's disease and related disorders from a global perspective. Alzheimers Dement 2022;18(12):2707-2724.
346. Arenaza-Urquijo EM, Boyle R, Casaletto K, et al. Sex and gender differences in cognitive resilience to aging and Alzheimer's disease. Alzheimers Dement 2024; 20(8): 5695–5719.
347. Rocca WA, Mielke MM, Vemuri P, Miller VM. Sex and gender differences in the causes of dementia: A narrative review. Maturitas 2014;79(2):196-201.
348. Langa KM, Larson EB, Crimmins EM, et al. A comparison of the prevalence of dementia in the United States in 2000 and 2012. JAMA Intern Med 2017;177(1):51-58.
349. Launer LJ, Andersen K, Dewey ME, et al. Rates and risk factors for dementia and Alzheimer's disease: Results from EURODEM pooled analyses. EURODEM Incidence Research Group and Work Groups. European Studies of Dementia. Neurology. 1999;52(1):78-84.
350. Russ TC, Stamatakis E, Hamer M, Starr JM, Kivimaki M, Batty GD. Socioeconomic status as a risk factor for dementia death: individual participant meta-analysis of 86 508 men and women from the UK. Br J Psychiatry 2013;203(1):10-17.
351. Lam JO, Whitmer RA, Corrada MM, et al. Gender differences in the association between education and late-life cognitive function in the LifeAfter90 Study: A multiethnic cohort of the oldest-old. Alzheimers Dement 2024;20(11):7547-7555.
352. Mayeda RM, Mobley TM, Weiss RE, Murchland AR, Berkman LF, Sabbath EL. Association of work-family experience with mid-and late-life memory decline in US women. Neurology 2020; e3072-33080.

353. Mielke MM, James BD. Women who participated in the paid labor force have lower rates of memory decline: Working to remember. Neurology 2020;95(23):1027-1028.
354. Population Reference Bureau. Women, Work, and the COVID Pandemic: Myths and Realities. Available at: https://www.prb.org/articles/blog-u-s-women-work-andthe-covid-pandemic-myths-and-realities. Accessed January 19, 2026.
355. Zamarro G, Prados MJ. "Gender Differences in Couples' Division of Childcare, Work, and Mental Health During COVID-19." Rev Econ Househ 2021;19(1):11-40.
356. Center for American Progress. Calculating the Hidden Cost of Interrupting a Career for Child Care. Available at: https://www.americanprogress.org/article/calculating-the-hidden-cost-of-interrupting-a-career-for-childcare/. Accessed January 19, 2026.
357. Avila-Rieger JF, Adkins-Jackson PB, Hill-Jarrett TG, et al. Early life exposure to structural sexism and late-life memory trajectories among black and white women and men in the United States. Alzheimers Dement 2025;21(2):e14410.
358. Carter CL, Resnick EM, Mallampalli M, Kalbarczyk A. Sex and gender differences in Alzheimer's disease: Recommendations for future research. J Womens Health 2012;21(10):1018-1023.
359. Altmann A, Tian L, Henderson VW, Greicius MD, Alzheimer's Disease Neuroimaging Initiative Investigators. Sex modifies the APOE-related risk of developing Alzheimer disease. Ann Neurol 2014;75(4):563-573.
360. Ungar L, Altmann A, Greicius MD. Apolipoprotein E, gender, and Alzheimer's disease: An overlooked, but potent and promising interaction. Brain Imaging Behav 2014;8(2):262-273.
361. Hohman TJ, Dumitrescu L, Barnes LL, et al. Sex-specific association of apolipoprotein E with cerebrospinal fluid levels of tau. JAMA Neurol 2018;75(8):989-998.
362. Neu SC, Pa J, Kukull W, et al. Apolipoprotein E genotype and sex risk factors for Alzheimer disease: A meta-analysis. JAMA Neurol 2017;74(10):1178-1189.
363. Yaffe K, Haan M, Byers A, Tangen C, Kuller L. Estrogen use, APOE, and cognitive decline: Evidence of gene-environment interaction. Neurology 2000;54(10):1949-1954.
364. Kang JH, Grodstein F. Postmenopausal hormone therapy, timing of initiation, APOE and cognitive decline. Neurobiol Aging 2012;33(7):1129-1137.
365. Dilworth-Anderson P, Hendrie HC, Manly JJ, Khachaturian AS, Fazio S. Diagnosis and assessment of Alzheimer's disease in diverse populations. Alzheimers Dement 2008;4(4):305-309.
366. Manly JJ, Mayeux R. Ethnic differences in dementia and Alzheimer's disease. In: Anderson N, Bulatao R, Cohen B, eds. Critical perspectives on racial and ethnic differentials in health in late life. Washington, D.C.: National Academies Press; 2004: p. 95-141.
367. Demirovic J, Prineas R, Loewenstein D, et al. Prevalence of dementia in three ethnic groups: The South Florida Program on Aging and Health. Ann Epidemiol 2003;13(6):472-478.
368. Harwood DG, Ownby RL. Ethnicity and dementia. Curr Psych Report 2000;2(1):40-45.
369. Perkins P, Annegers JF, Doody RS, Cooke N, Aday L, Vernon SW. Incidence and prevalence of dementia in a multiethnic cohort of municipal retirees. Neurology. 1997;49(1):44-50.
370. Steenland K, Goldstein FC, Levey A, Wharton W. A meta-analysis of Alzheimer's disease incidence and prevalence comparing African-Americans and Caucasians. J Alzheimers Dis 2015;50(1):71-76.
371. Power MC, Bennett EE, Turner RW, et al. Trends in relative incidence and prevalence of dementia across non-Hispanic black and white individuals in the United States, 2000-2016. JAMA Neurology 2021;78(3):275-284.
372. Potter GG, Plassman BL, Burke JR, et al. Cognitive performance and informant reports in the diagnosis of cognitive impairment and dementia in African Americans and whites. Alzheimers Dement 2009;5(6):445-453.
373. Gurland BJ, Wilder DE, Lantigua R, et al. Rates of dementia in three ethnoracial groups. Int J Geriatr Psychiatry. 1999;14(6):481-493.
374. Haan MN, Mungas DM, Gonzalez HM, Ortiz TA, Acharya A, Jagust WJ. Prevalence of dementia in older Latinos: The influence of type 2 diabetes mellitus, stroke and genetic factors. J Am Geriatr Soc 2003;51:169-177.
375. Samper-Ternent R, KuoYF, Ray LA, Ottenbacher KJ, Markides KS, Al Snih S. Prevalence of health conditions and predictors of mortality in oldest old Mexican Americans and non-Hispanic whites. J Am Med Dir Assn 2012;13(3):254-259.
376. Mehta KM, Yeo GW. Systematic review of dementia prevalence and incidence in United States race/ethnic populations. Alzheimers Dement 2017;13(1):72-83.
377. Gonzalez HM, Tarraf W, Schneiderman N, et al. Prevalence and correlates of mild cognitive impairment among diverse Hispanics/Latinos: Study of Latinos-Investigation of Neurocognitive Aging results. Alzheimers Dement 2019;15(12):1507-1515.
378. Yaffe K, Falvey C, Harris TB, et al. Effect of socioeconomic disparities on incidence of dementia among biracial older adults: Prospective study. BMJ 2013;347:f7051.
379. Kornblith E, Bahorik A; Boscardin WJ; Xia F, Barnes DE, Yaffe K. Association of Race and Ethnicity With Incidence of Dementia Among Older Adults. JAMA 2022;327(15): 1488-1495.
380. Chin AL, Negash S, Hamilton R. Diversity and disparity in dementia: The impact of ethnoracial differences in Alzheimer disease. Alzheimer Dis Assoc Disord 2011;25(3):187-195.
381. Froehlich TE, Bogardus Jr. ST, Inouye SK. Dementia and race: Are there differences between African Americans and Caucasians? J Am Geriatr Soc 2001;49(4):477-484.
382. Glymour MM, Manly JJ. Lifecourse social conditions and racial and ethnic patterns of cognitive aging. Neuropsychol Rev 2008;18(3):223-254.
383. Bailey ZD, Feldman JM, Bassett MT. How Structural Racism Works - Racist Policies as a Root Cause of U.S. Racial Health Inequities. N Engl J Med 2021;384(8):768-773.
384. Bailey ZD, Krieger N, Agenor M, Graves J, Linos N, Bassett MT. Structural racism and health inequities in the USA: Evidence and interventions. Lancet 2017;389(10077): 1453-1463.
385. Lamar M, Lerner AJ, James BD, et al. Relationship of early-life residence and educational experience to level and change in cognitive functioning: Results of the Minority Aging Research Study. J Gerontol B Psychol Sci Soc Sci 2020;75(7):e81-e92.
386. Peterson RL, George KM, Barnes LL, et al. Timing of School Desegregation and Late-Life Cognition in the Study of Healthy Aging in African Americans (STAR). JAMA Netw Open 2021;4(10): e2129052.
387. Bancks MP, Byrd GS, Caban-Holt A, et al. Self-reported experiences of discrimination and incident dementia. Alzheimers Dement 2023;19(7):3119-3128.
388. Walsemann KM, Hair NL, Farina MP, et al. State-level desegregation in the U.S. South and mid-life cognitive function among Black and White adults. Soc Sci Med 2023;338:116319.
389. Gutierrez S, Whitmer RA, Soh Y, et al. School-based racial segregation, social support, and late-life cognitive function in the Study of Healthy Aging in African Americans (STAR). Alzheimers Dement 2024;20(9):6257-6267.
390. Pohl DJ, Seblova D, Avila JF, et al. Relationship between Residential Segregation, Later-Life Cognition, and Incident Dementia across Race/Ethnicity. Int J Environ Res Public Health 2021;18(21):11233.
391. Reddy KP, Eberly LA, Julien HM, et al. Association between racial residential segregation and Black-White disparities in cardiovascular disease mortality. Am Heart J 2023 Oct:264:143-152.
392. Mentias A, Mujahid MS, Sumarsono A, et al. Historical Redlining, Socioeconomic Distress, and Risk of Heart Failure Among Medicare Beneficiaries. Circulation 2023 Jul 18;148(3):210-219.

393. Mujahid MS, Gao X, Tabb LP, et al. Historical redlining and cardiovascular health: The Multi-Ethnic Study of Atherosclerosis. Proc Natl Acad Sci U S A 2021;118(51):e2110986118.
394. Reddy NM, Mayne SL, Pool LR, et al. Exposure to neighborhood-level racial residential segregation in young adulthood to midlife and incident subclinical atherosclerosis in Black adults: The Coronary Artery Risk Development in Young Adults Study. Circ Cardiovasc Qual Outcomes 2022;15(2): e007986.
395. Egede LE, Walker RJ, Campbell JA, et al. Historic redlining and impact of structural racism on diabetes prevalence in a nationally representative sample of U.S. adults. Diabetes Care 2024;47(6):964-969.
396. Linde S, Walker RJ, Campbell JA, et al. Historic residential redlining and present-day diabetes mortality and years of life lost: The persistence of structural racism. Diabetes Care 2022;45(8):1772-1778.
397. Lines LM, Sherif NA, Wiener JM. Racial and ethnic disparities among individuals with Alzheimer's disease in the United States: A literature review. Research Triangle Park, NC: RTI Press; 2014.
398. Zhang Z, Hayward MD, Yu YL. Life course pathways to racial disparities in cognitive impairment among older Americans. J Health Soc Behav 2016;57(2):184-199.
399. Matthews KA, Xu W, Gaglioti AH, et al. Racial and ethnic estimates of Alzheimer's disease and related dementias in the United States (2015-2060) in adults aged ≥ 65 years. Alzheimers Dement 2019;15(1):17-24.
400. Mayeda ER, Glymour MM, Quesenberry CP, Whitmer RA. Inequalities in dementia incidence between six racial and ethnic groups over 14 years. Alzheimers Dement 2016;12(3):216-224.
401. Mayeda ER, Glymour MM, Quesenberry CP, Jr., Whitmer RA. Heterogeneity in 14-year dementia incidence between Asian American subgroups. Alzheimer Dis Assoc Disord 2017;31(3):181-186.
402. Zhu Y, Park S, Kolady R, et al. A systematic review/meta-analysis of prevalence and incidence rates illustrates systemic underrepresentation of individuals racialized as Asian and/or Asian-American in ADRD research. Alzheimers Dement 2024;20(6):4315–4330.
403. Hayes-Larson E, Zhou Y, Wu Y, et al. Estimating dementia incidence in insured older Asian Americans and Pacific Islanders in California: An application of inverse odds of selection weights. Am J Epidemiol 2024:kwae182. doi: 10.1093/aje/kwae182. Epub ahead of print.
404. Suchy-Dicey AM, Domoto-Reilly K, Nelson L, et al. Epidemiology and prevalence of dementia and Alzheimer's disease in American Indians: Data from the Strong Heart Study. Alzheimers Dement 2024 May 15;20(6):4174–4184.
405. Ajrouch KJ, Zahodne LB, Antonucci TC. Arab American cognitive aging: Opportunities for advancing research on Alzheimer's disease disparities. Innov Aging 2017;1(3):igx034.
406. Abner EL, Jicha GA, Christian WJ, Schreurs BG. Rural-urban differences in Alzheimer's disease and related disorders diagnostic prevalence in Kentucky and West Virginia. J Rural Health 2016;32(3):314-320.
407. Wing JJ, Levine DA, Ramamurthy A, Reider C. Alzheimer's disease and related disorders prevalence differs by Appalachian residence in Ohio. J Alzheimers Dis 2020;76(4):1309-1316.
408. Flatt JD, Cicero EC, Lambrou NH, Wharton W, Anderson JG, Bouldin ED, McGuire LC, Taylor CA. Subjective cognitive decline higher among sexual and gender minorities in the United States, 2015-2018. Alzheimers dement 2021;7(1):e12197.
409. Liu H, Hsieh N, Zhang Z, Zhang Y, Langa KM. Same-sex couples and cognitive impairment: Evidence from the health and retirement study. J Gerontol B 2021;76(7):1388-1399.
410. Hsieh N, Liu H, Lai WH. Elevated risk of cognitive impairment among older sexual minorities: Do health conditions, health behaviors, and social connections matter? Gerontologist 2021;61(3):352-362.
411. Perales-Puchalt J, Gauthreaux K, Flatt J, Teylan MA, Resendez J, Kukull WA, Chan KCG, Burns J, Vidoni ED. Risk of dementia and mild cognitive impairment among older adults in same-sex relationships. Int J Geriatr Psychiatry 2019;34(6):828-835.
412. Dragon CN, Guerino P, Ewald E, Laffan AM. Transgender Medicare beneficiaries and chronic conditions: exploring fee-for-service claims data. LGBT Health 2017;4(6):404-411.
413. Hughto JM, Varma H, Babbs G, et al. Disparities in health condition diagnoses among aging transgender and cisgender Medicare beneficiaries, 2008-2017. Front Endocrinol (Lausanne) 2023;14:1102348.
414. Guo Y, Li Q, Yang X, Jaffee MS, Wu Y, Wang F, Bian J. Prevalence of Alzheimer's and Related Dementia Diseases and Risk Factors Among Transgender Adults, Florida, 20122020. Am J Public Health 2022;112(5):754-757.
415. Romanelli RJ, Rosenblatt AS, Marcum ZA, Flatt JD. Cognitive Impairment in Sexual and Gender Minority Groups: A Scoping Review of the Literature. LGBT Health 2024;11(3):178-192.
416. Meyer IH. Prejudice, social stress, and mental health in lesbian, gay, and bisexual populations: conceptual issues and research evidence. Psychol Bull 2003;129(5):674-697.
417. Flatt JD, Johnson JK, Karpiak SE, Seidel L, Larson B, Brennan-Ing M. Correlates of Subjective Cognitive Decline in Lesbian, Gay, Bisexual, and Transgender Older Adults. J Alzheimers Dis 2018;64(1):91-102.
418. Brady B, Zheng L, Kootar S, Anstey KJ. Sex and gender differences in risk scores for dementia and Alzheimer's disease among cisgender, transgender, and non-binary adults. Alzheimers Dement 2024;20(1), 5-15.
419. Brennan-Ing M, Seidel L, Larson B, Karpiak SE. Social care networks and older LGBT adults: challenges for the future. J Homosex 2014;61(1):21-52.
420. Cohen RA, Seider TR, Navia B: HIV effects on age-associated neurocognitive dysfunction: premature cognitive aging or neurodegenerative disease? Alzheimers Res Ther 2015;7:37.
421. Lam JO, Hou CE, Hojilla JC, et al. Comparison of dementia risk after age 50 between individuals with and without HIV infection. AIDS 2021;35(5):821-828.
422. Cicero EC, Lett E, Flatt JD, Benson GP, Epps F. Transgender Adults From Minoritized Ethnoracial Groups in the U.S. Report Greater Subjective Cognitive Decline. J Gerontol B Psychol Sci Soc Sci 2023;78(6):1051-1059.
423. Hill Collins P. Intersectionality as Critical Social Theory. Duke University Press; 2019.
424. Correro AN, Nielson KA. A review of minority stress as a risk factor for cognitive decline in lesbian, gay, bisexual, and transgender (LGBT) elders. J Gay Lesbian Ment Health 2020;24(1):2-19.
425. Flatt JD, Cicero EC, Kittle KR, Brennan-Ing M. Recommendations for advancing research with sexual and gender minority older adults. J Gerontol B 2022;77(1):1-9.
426. Fitten LJ, Ortiz F, Ponton M. Frequency of Alzheimer's disease and other dementias in a community outreach sample of Hispanics. J Am Geriatr Soc 2001;49(10):1301-1308.
427. Wolters FJ, Chibnik LB, Waziry R, et al. Twenty-seven-year time trends in dementia incidence in Europe and the United States. The Alzheimer Cohorts Consortium. Neurology 2020;95(5):e519-e531.
428. Rocca WA, Petersen RC, Knopman DS, et al. Trends in the incidence and prevalence of Alzheimer's disease, dementia, and cognitive impairment in the United States. Alzheimers Dement 2011;7(1):80-93.
429. Wu YT, Beiser AS, Breteler MMB, et al. The changing prevalence and incidence of dementia over time: Current evidence. Nat Rev Neurol 2017;13(6):327-339.
430. Schrijvers EM, Verhaaren BF, Koudstaal PJ, Hofman A, Ikram MA, Breteler MM. Is dementia incidence declining? Trends in dementia incidence since 1990 in the Rotterdam Study. Neurology 2012;78(19):1456-1463.
431. Qiu C, von Strauss E, Backman L, Winblad B, Fratiglioni L. Twenty-year changes in dementia occurrence suggest decreasing incidence in central Stockholm, Sweden. Neurology 2013;80(20):1888-1894.

432. Satizabal CL, Beiser AS, Chouraki V, Chene G, Dufouil C, Seshadri S. Incidence of dementia over three decades in the Framingham Heart Study. N Engl J Med 2016;374:523-532.
433. Cerasuolo JO, Cipriano LE, Sposato LA, et al. Population-based stroke and dementia incidence trends: Age and sex variations. Alzheimers Dement 2017;13(10):1081-1088.
434. Derby CA, Katz MJ, Lipton RB, Hall CB. Trends in dementia incidence in a birth cohort analysis of the Einstein Aging Study. JAMA Neurol 2017;74(11):1345-1351.
435. Ahmadi-Abhari S, Guzman-Castillo M, Bandosz P, et al. Temporal trend in dementia incidence since 2002 and projections for prevalence in England and Wales to 2040: Modelling study. BMJ 2017;358:j2856.
436. Sullivan KJ, Dodge HH, Hughes TF, et al. Declining incident dementia rates across four population-based birth cohorts. J Gerontol A Biol Sci Med Sci 2019;74(9):1439-1445.
437. Matthews FE, Arthur A, Barnes LE, et al. A two-decade comparison of prevalence of dementia in individuals aged 65 years and older from three geographical areas of England: Results of the Cognitive Function and Ageing Study I and II. Lancet 2013;382(9902):1405-1412.
438. Wiberg P, Waern M, Billstedt E, Ostling S, Skoog I. Secular trends in the prevalence of dementia and depression in Swedish septuagenarians 1976–2006. Psychol Med 2013;43:2627-2634.
439. Wimo A, Sjolund BM, Skoldunger A, et al. Cohort effects in the prevalence and survival of people with dementia in a rural area in Northern Sweden. J Alzheimers Dis 2016;50:387-396.
440. Hall KS, Gao S, Baiyewu O, et al. Prevalence rates for dementia and Alzheimer's disease in African Americans: 1992 versus 2000. Alzheimers Dement 2009;5(3):227-233.
441. Farina MP, Zhang YS, Kim JK, Hayward MD, Crimmins EM. Trends in dementia prevalence, incidence, and mortality in the United States (2000-2016). J Aging Health 2022;34(1):100-108.
442. van den Kommer TN, Deeg DJH, van der Flier WM, Comijs HC. Time trend in persistent cognitive decline: Results from the longitudinal aging study Amsterdam. J Gerontol B Psychol Sci Soc Sci 2018;73(Suppl 1)S57-S64.
443. Sekita A, Ninomiya T, Tanizaki Y, et al. Trends in prevalence of Alzheimer's disease and vascular dementia in a Japanese community: The Hisayama Study. Acta Psychiatr Scand 2010;122(4):319-325.
444. Gao S, Burney HN, Callahan CM, Purnell CE, Hendrie HC. Incidence of Dementia and Alzheimer Disease Over Time: A Meta-Analysis. J Am Geriatr Soc 2019;67(7):1361-1369.
445. Crimmins EM, Saito Y, Kim JK, Zhang Y, Sasson I, Hayward MD. Educational differences in the prevalence of dementia and life expectancy with dementia in the United States: Changes from 2000 to 2010. J Gerontol B Psychol Sci Soc Sci 2018;73(Suppl 1):S20-S28.
446. Choi H, Schoeni RF, Martin LG, Langa K M. Trends in the prevalence and disparity in cognitive limitations of Americans 55-69 years old. J Gerontol B Psychol Sci Soc Sci 2018;73 (Suppl 1):S29-S37.
447. Zheng H. A New Look at Cohort Trend and Underlying Mechanisms in Cognitive Functioning. J Gerontol B Psychol Sci Soc Sci 2021;76(8):1652-1663.
448. Freedman VA, Kasper JD, Spillman BC, Plassman BL. Short-term changes in the prevalence of probable dementia: An analysis of the 2011–2015 National Health and Aging Trends Study. J Gerontol B Psychol Sci Soc Sci 2018;73(Suppl 1)S48-S56.
449. Langa KM. Is the risk of Alzheimer's disease and dementia declining? Alzheimers Res Ther 2015;7(1):34.
450. Larson EB, Yaffe K, Langa KM. New insights into the dementia epidemic. N Engl J Med 2013;369(24):2275-2277.
451. Sheffield KM, Peek MK. Changes in the prevalence of cognitive impairment among older Americans, 1993-2004: Overall trends and differences by race/ethnicity. Am J Epidemiol 2011;174(3):274-283.
452. Weuve J, Rajan KB, Barnes LL, Wilson RS, Evans DA. Secular trends in cognitive performance in older black and white U.S. adults, 1993-2012: Findings from the Chicago Health and Aging Project. J Gerontol B Psychol Sci Soc Sci 2018;73 (Suppl 1):S73-S81.
453. Prince MJ, Wimo A, Guerchet M, Ali G-C, Wu Y-T, Prina M. World Alzheimer Report 2015: The Global Impact of Dementia: An Analysis of Prevalence, Incidence, Cost and Trends; 2015.
454. de Erausquin GA, Snyder H, Carrillo M, Hosseini AA, Brugha TS, Seshadri S. The chronic neuropsychiatric sequelae of COVID-19: The need for a prospective study of viral impact on brain functioning. Alzheimers Dement 2021;17(6):1056-1065.
455. Arias E, Tejada-Vera B, Kochanek KD, Ahmad FB. Provisional Life Expectancy Estimates for 2021. National Vital Statistics System, Report No. 23, 2022. Available at: https://www.cdc.gov/nchs/data/vsrr/vsrr023.pdf. Accessed December 15, 2025.
456. The World Bank. Fertility, total (births per woman)—US. Available at: https://data.worldbank.org/indicator/SP.DYN.TFRT.IN?locations=US. Accessed January 19, 2026.
457. U.S. Census Bureau. 2017 National Population Projections Tables. Available at: https://www.census. gov/data/tables/2017/demo/popproj/2017-summary-tables.html. Accessed January 19, 2026.
458. Administration for Community Living. 2023 Profile of Older Americans. May 2024 Available at: https://acl.gov/sites/default/files/Profile%20of%20OA/ACL_ProfileOlderAmericans2023_508.pdf. Accessed December 19, 2025.
459. Bauman K. Shift Toward Greater Educational Attainment for Women Began 20 Years Ago. U.S. Census Bureau. Available at: https://www.census.gov/newsroom/blogs/random-samplings/2016/03/shift-toward-greater-educational-attainment-for-women-began-20-years-ago.html. Accessed January 19, 2026.
460. Population Reference Bureau. Why is the U.S. Birth Rate Declining? 2021. Available at: https://www.prb. org/resources/why-is-the-u-s-birth-rate-declining/. Accessed January 19, 2026.
461. Horowitz JM, Igielnik R, Kochhar R. Trends in income and wealth inequality. Pew Research Center. Available at: https://www.pewresearch.org/social-trends/2020/01/09/trends-in-income-and-wealth-inequality/. Accessed January 19, 2026.
462. Cottrill A, Cubanski J, Neuman T, Smith K. Income and Assets of Medicare Beneficiaries in 2023. KFF. 2024. Available at: https://www.kff.org/medicare/issue-brief/income-and-assets-of-medicare-beneficiaries-in-2023/. Accessed January 19, 2026.
463. Tom SE, Phadke M, Hubbard RA, Crane PK, Stern Y, Larson EB. Association of Demographic and Early-Life Socioeconomic Factors by Birth Cohort with Dementia Incidence Among US Adults Born Between 1893 and 1949. JAMA Netw Open 2020;3(7):e2011094.
464. Skoog I. Dementia incidence: The times, they are a-changing. Nature Rev Neurol 2016;12:316-368.
465. Centers for Disease Control and Prevention, National Center for Health Statistics. National Vital Statistics System, Mortality 2018-2024 on CDC WONDER Online Database, released in 2026. Data are from the Multiple Cause of Death Files, 2018-2024, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Accessed at http://wonder.cdc.gov/ucd-icd10-expanded.html on Mar 9, 2026.
466. Mokdad AH, Ballestros K, Echko M, Glenn S, Olsen HE, Mullany E. The State of US Health, 1990-2016: Burden of Diseases, Injuries, and Risk Factors Among US States. JAMA 2018;319(14):1444-1472.
467. Centers for Disease Control and Prevention. National Center for Health Statistics. Excess Deaths Associated with COVID-19. Available at: https://www.cdc.gov/nchs/nvss/vsrr/covid19/excess_deaths.htm. Accessed December 19, 2025.

468. World Health Organization. International Statistical Classification of Diseases and Related Health Problems. 10th revision. 2nd edition. WHO Press: Geneva, Switzerland; 2004.
469. Brunnstrom HR, Englund EM. Cause of death in patients with dementia disorders. Eur J Neurol 2009;16(4):488-492.
470. Ives DG, Samuel P, Psaty BM, Kuller LH. Agreement between nosologist and Cardiovascular Health Study review of deaths: Implications of coding differences. J Am Geriatr Soc 2009;57(1):133-139.
471. Romero JP, Benito-Leon J, Louis ED, Bermejo-Pareja F. Under reporting of dementia deaths on death certificates: A systematic review of population-based cohort studies. J Alzheimers Dis 2014;41(1):213-221.
472. Ganguli M, Rodriguez EG. Reporting of dementia on death certificates: A community study. J Am Geriatr Soc. 1999;47(7):842-849.
473. James BD, Leurgans SE, Hebert LE, Scherr PA, Yaffe K, Bennett DA. Contribution of Alzheimer disease to mortality in the United States. Neurology 2014;82(12):1045-50.
474. Stokes AC, Weiss J, Lundberg DJ, et al. Estimates of the association of dementia with US mortality levels using linked survey and mortality records. JAMA Neurol 2020;77(12):1543-1550.
475. Unpublished tabulations based on data from the 100% National Sample Medicare Fee-for-Service Beneficiaries for 2019. Prepared under contract by Health Care Cost Institute, November 2021.
476. Weuve J, Hebert LE, Scherr PA, Evans DA. Deaths in the United States among persons with Alzheimer's disease (2010-2050). Alzheimers Dement 2014;10(2):E40-E46.
477. Hudomiet P, Hurd MD, Rohwedder S. Inequalities in the duration and lifetime risk of dementia in the U.S. Demography 2025;62(4):1389–1412.
478. Arrighi HM, Neumann PJ, Lieberburg IM, Townsend RJ. Lethality of Alzheimer disease and its impact on nursing home placement. Alzheimer Dis Assoc Disord 2010;24(1):90-95.
479. Tejada-Vera B. Mortality from Alzheimer's disease in the United States: Data for 2000 and 2010. National Center for Health Statistics Data Brief, No. 116. National Center for Health Statistics, Hyattsville, MD; 2013.
480. Taylor C, Greenlund S, McGuire L, Lu H, Croft J. Deaths from Alzheimer's Disease — United States, 1999-2014. MMWR Morb Mortal Wkly Rep 2017;66:521-526.
481. Mitchell SL, Teno JM, Miller SC, Mor V. A national study of the location of death for older persons with dementia. J Am Geriatr Soc 2005;53(2):299-305.
482. GBD 2021 US Burden of Disease Collaborators. GBD 2024. The burden of diseases, injuries, and risk factors by state in the USA, 1990-2021: a systematic analysis for the Global Burden of Disease Study 2021. Lancet 2024;404(10469):2314-2340.
483. Ney JP, Steinmetz JD, Anderson-Benge E. US Burden of disorders affecting the nervous system. JAMA Neurol 2025;Nov 24:e254470.
484. U.S. Burden of Disease Collaborators, Mokdad AH, Ballestros K, et al. The state of U.S. health, 1990-2016: Burden of diseases, injuries, and risk factors among U.S. states. JAMA. 2018;319(14):1444-1472.
485. Barker C, Green A. Opening the debate on DALYs (disability-adjusted life years). Health Policy Plan. 1996;11(2):179-183.
486. Tough H, Siegrist J, Fekete C. Social relationships, mental health and wellbeing in physical disability: a systematic review. BMC Public Health 2017 May 8;17(1):414.
487. Krahn GL, Walker DK, Correa-De-Araujo R. Persons with disabilities as an unrecognized health disparity population. Am J Public Health 2015 Apr;105 Suppl 2(Suppl 2):S198-206.
488. Gaugler JE, Kane RL, Kane RA. Family care for older adults with disabilities: Toward more targeted and interpretable research. Int J Aging Hum Dev 2002;54(3):205-231.
489. Schulz R, Quittner AL. Caregiving through the life-span: Overview and future directions. Health Psychol. 1998;17:107-111.
490. Happ MB, Moss KO, Dabbs AD, Narby E, Song M-K. Defining informal caregiving and caregivers for persons living with dementia. J Gerontol Nurs 2024;50(12):41-45.
491. Friedman EM, Shih RA, Langa KM, Hurd MD. U.S. prevalence and predictors of informal caregiving for dementia. Health Aff 2015;34(10):1637-1641.
492. Friedman EM, Patterson SE, Freedman VA. Nearly 4 in 10 extended families of older adults in the United States include an older relative with dementia. Alzheimers Dement 2025;21(7):e70451.
493. Greenwood N, Smith R. Motivations for being informal carers of people living with dementia: A systematic review of qualitative literature. BMC Geriatr 2019;19(1):169.
494. Ingraham BC, Barthold D, Fishman P, Coe NB. Caregiving for dementia: trends pre-post onset and predictive factors of family caregiving (2002-2018). Health Aff Sch 2024;2(3):qxae020.
495. Kasper JD, Freedman VA, Spillman BC, Wolff JL. The disproportionate impact of dementia on family and unpaid caregiving to older adults. Health Aff 2015;34(10):1642-1649.
496. Burgdorf JG, Wolff JL, Barrón Y, Amjad H. Dementia severity associated with unmet caregiving needs during skilled home health care. J Appl Gerontol 2025:7334648251332232.
497. Alzheimer's Association. Issues Brief: LGBT and Dementia. Available at https://www.alz.org/media/Documents/lgbt-dementia-issues-brief.pdf. Accessed January 19, 2026.
498. Fredriksen-Goldsen KI, Jen S, Bryan AEB, Goldsen J. Cognitive impairment, Alzheimer's disease, and other dementias in the lives of lesbian, gay, bisexual and transgender (LGBT) older adults and their caregivers: Needs and competencies. J Appl Gerontol 2018;37(5):545-569.
499. Candrian C, Burke ES, Kline D, Torke AM. Experiences of caregiving with Alzheimer's disease in the LGBT community. BMC Geriatr 2023;23(1):293.
500. Anderson JG, Flatt JD, Jabson Tree JM, Gross AL, Rose KM. Characteristics of Sexual and Gender Minority Caregivers of People With Dementia. J Aging Health 2021;33(10):838-851.
501. Lampe NM, Akré ERL, Barbee H, McKay T. LGBTQ+ identity social support and care access among LGBTQ+ caregivers of individuals living with mild cognitive impairment, Alzheimer's disease, and related dementias. Alzheimers Dement 2025;21(5):e70188.
502. Kasper JD, Freedman VA, Spillman BC. Disability and care needs of older Americans by dementia status: An analysis of the 2011 National Health and Aging Trends Study. U.S. Department of Health and Human Services; 2014. Available at: http://aspe.hhs.gov/report/disability-and-care-needsolder-americans-dementia-status-analysis-2011-national-healthand-aging-trends-study. Accessed December 15, 2025.
503. Rabarison KM, Bouldin ED, Bish CL, McGuire LC, Taylor CA, Greenlund KJ. The economic value of informal caregiving for persons with dementia: Results from 38 states, the District of Columbia, and Puerto Rico, 2015 and 2016 BRFSS. Am J Public Health 2018;108(10):1370-1377.
504. National Alliance for Caregiving in Partnership with the Alzheimer's Association. Dementia Caregiving in the U.S. Bethesda, MD. Available at: https://www.caregiving.org/wp-content/uploads/2020/05/Dementia-Caregiving-in-the-US_February-2017.pdf. Accessed January 19, 2026.
505. Unpublished data from the 2015, 2016 and 2017 Behavioral Risk Factor Surveillance System survey, analyzed by and provided to the Alzheimer's Association by the Alzheimer's Disease and Healthy Aging Program (AD+HP), Centers for Disease Control and Prevention (CDC).
506. Fisher GG, Franks MM, Plassman BL, et al. Caring for individuals with dementia and cognitive impairment, not dementia: Findings from The Aging, Demographics, and Memory Study. J Am Geriatr Soc 2011;59(3):488-494.
507. Riffin C, Van Ness PH, Wolff JL, Fried T. Family and other unpaid caregivers and older adults with and without dementia and disability. J Am Geriatr Soc 2017;65(8):1821-1828.

508. National Poll on Healthy Aging. Dementia Caregivers: Juggling, Delaying and Looking Forward. Available at: http://www.healthyagingpoll.org/sites/default/files/2017-10/NPHA_Caregivers-Report-PROOF_101817_v2.pdf. Accessed January 19, 2026.
509. Caregiving in the U.S.: 2020 Report. Available at: https://www.aarp.org/content/dam/aarp/ppi/2020/05/full-report-caregiving-in-the-united-states.doi.10.26419-2Fppi.00103.001.pdf. Accessed January 19, 2026.
510. AARP and National Alliance for Caregiving. Caregiving in the US 2025. Washington, DC: AARP. July 24, 2025. Available at: https://doi.org/10.26419/ppi.00373.001. Accessed December 19, 2025.
511. Ohno S, Chen Y, Sakamaki H, Matsumaru N, Yoshino M, Tsukamoto K. Burden of caring for Alzheimer's disease or dementia patients in Japan, the US, and EU: results from the National Health and Wellness Survey: a cross-sectional survey. J Med Econ 2021;24(1):266-278.
512. National Alliance for Caregiving and AARP. Caregiving in the U.S.: Unpublished data analyzed under contract for the Alzheimer's Association; 2009.
513. Alzheimer's Association. 2014 Alzheimer's Disease Facts and Figures. Special Report: Women and Alzheimer's Disease. Available at: https://www.alzheimersanddementia.com/article/S1552-5260(14)00062-4/fulltext. Accessed January 19, 2026.
514. Ma M, Dorstyn D, Ward L, Prentice S. Alzheimer's disease and caregiving: A meta-analytic review comparing the mental health of primary carers to controls. Aging Ment Health 2017;5:1-11.
515. Xiong C, Biscardi M, Astell A, et al. Sex and gender differences in caregiving burden experienced by family caregivers of persons with dementia: A systematic review. PLoS One 2020;15(4):e0231848.
516. Duangjina T, Jeamjitvibool T, Park C, et al. Sex and gender differences in caregiver burden among family caregivers of persons with dementia: A systematic review and meta-analysis. Arch Gerontol Geriatr 2025:138:105977.
517. Roberts HL, Bollens-Lund E, Ornstein KA, Kelley AS. Caring for aging parents in the last years of life. J Am Geriatr Soc 2023;71(9):2871-2877.
518. Feng K, Song X, Caswell H. Kinship and Care: Racial disparities in potential dementia caregiving in the United States From 2000 to 2060. J Gerontol A Biol Sci Med Sci 2024;79(Supplement_1):S32-S41.
519. Fabius CD, Wolff JL, Kasper JD. Race differences in characteristics and experiences of black and white caregivers of older Americans. Gerontologist 2020;60(7):1244-1253.
520. Moon HE, Rote SM, Sears J, Schepens Niemiec SL. Racial Differences in the Dementia Caregiving Experience during the COVID-19 Pandemic: Findings from the National Health and Aging Trends Study (NHATS). J Gerontol B Psychol Sci Soc Sci 2022;gbac098.
521. Liu R, Chi I, Wu S. Caregiving Burden Among Caregivers of People With Dementia Through the Lens of Intersectionality. Gerontologist 2022;62(5):650-661.
522. Wang D, Mangal RK, Daniel A, Gould M, Stead TS, Ganti L. Racial disparities in subjective cognitive decline and its implications among Alzheimer's caretakers. J Natl Med Assoc 2024;116(2 Pt 1):170-173.
523. Dilworth-Anderson P, Moon H, Aranda MP. Dementia caregiving research: Expanding and reframing the lens of diversity, inclusivity, and intersectionality. Gerontologist 2020;60(5):797-805.
524. Rote SM, Angel JL, Moon H, Markides K. Caregiving across diverse populations: New evidence from the National Study of Caregiving and Hispanic EPESE. Innov Aging 2019;3(2):igz033.
525. Ejem D, Atkins GC, Perkins M, Morhardt DJ, Williams IC, Cothran FA. Stressors and Acceptability of Services Among Black Caregivers of Persons With Memory Problems. J Gerontol Nurs 2022;48(6):13-18.
526. Parker LJ, Fabius CD. Racial differences in respite use among black and white caregivers for people living with dementia. J Aging Health 2020;32(10):1667-1675.
527. Chen C, Thunell J, Zissimopoulos J. Changes in physical and mental health of Black, Hispanic, and White caregivers and non-caregivers associated with onset of spousal dementia. Alzheimers Dement (N Y) 2020;6(1):e12082.
528. Cothran FA, Chang E, Beckett L, Bidwell JT, Price CA, Gallagher-Thompson D. A Landscape of Subjective and Objective Stress in African-American Dementia Family Caregivers. West J Nurs Res 2022;44(3):239-249.
529. Yoshikawa, A., Bouldin, E. D., López-Anuarbe, M., Kindratt, T. B., Sylvers, D. L., & Webster, N. J. (2024). Use of Caregiving Support Services Among Diverse Dementia Caregivers by Geographic Context. The Gerontologist, 64(2), gnad067. https://doi.org/10.1093/geront/gnad067.
530. Cantu P, Cho T-C, Wyman M. Racial and ethnic disparities in the monetary value of informal caregiving for non-institutionalized people living with dementia. J Aging Health 2024;36(9):570-582.
531. Liu C, Badana ANS, Burgdorf J, Fabius CD, Roth DL, Haley WE. Systematic review and meta-analysis of racial and ethnic differences in dementia caregivers' well-being. Gerontologist 2021;61(5):e228-e243.
532. Baik D, Centi S, McNair B. Assessing racial and ethnic differences in cardiovascular disease in U.S. family caregivers of persons with dementia: Analysis of data from the 2015-2020 Behavioral Risk Factor Surveillance System. Res Gerontol Nurs 2023;16(5):241-249.
533. Brewster GS, Bonds K, McLennon S, Moss KO, Epps F, Lopez RP. Missing the Mark: The Complexity of African American Dementia Family Caregiving. J Fam Nurs 2020;26(4):294-301.
534. Lewis JP, Manson SM, Jernigan VB, Noonan C. "Making Sense of a Disease That Makes No Sense": Understanding Alzheimer's disease and related disorders among caregivers and providers within Alaska native communities. Gerontologist 2021;61(3):363-373.
535. Parker LJ, Fabius C. Who's Helping Whom? Examination of care arrangements for racially and ethnically diverse people living with dementia in the community. J Appl Gerontol 2022;41(12):2589-2593.
536. Idorenyin Imoh U, Charity T. Cultural and Social Factors in Care Delivery Among African American Caregivers of Persons With Dementia: A Scoping Review. Gerontol Geriatr Med 2023;9:23337214231152002.
537. Ta Park VM, Ly Q, von Oppenfeld J, et al. A scoping review of dementia caregiving for Korean Americans and recommendations for future research. Clin Gerontol 2023;46(2):223-239.
538. Kaki DA, Bridi L, Mwendwa P, et al. Attitudes towards dementia among a diverse group of refugees resettled in the United States. J Geriatr Psychiatry Neurol 2025;38(2):132-142.
539. Martinez IL, Gonzalez EA, Black L. Services for Latino family dementia caregivers: Is the workforce prepared? J Appl Gerontol 2024;43(9):1251-1258.
540. Quiñones-Cordero MM, Norton S, Rivas C. Exploring the Unmet Needs of Latino Dementia Caregivers: A qualitative study. Gerontologist 2025:gnaf191. doi: 10.1093/geront/gnaf191. Online ahead of print.
541. Moraes Balbim G, Magallanes M, Marques IG, et al. Sources of caregiving burden in middle-aged and older Latino caregivers. J Geriatr Psychiatry Neurol 2020;33(4):185-194.
542. aldin MA, Balbim GM, Colin SJ, et al. The influence of Latino cultural values on the perceived caregiver role of family members with Alzheimer's disease and related dementias. Ethn Health 2023;28(4):619-633.
543. Martinez IL, Gonzalez EA, Quintero C, Vania MJ. The Experience of Alzheimer's Disease Family Caregivers in a Latino Community: Expectations and incongruences in support services. J Gerontol B Psychol Sci Soc Sci 2022;77(6):1083-1893.
544. Alexander K, Oliver S, Bennett SG, Henry J, Hepburn K, Clevenger C. "Falling between the cracks": Experiences of Black dementia caregivers navigating U.S. health systems. J Am Geriatr Soc 2022;70(2):592-600.

545. Sloan DH, Johnston D, Fabius C, Pyatt T, Antonsdottir I, Reuland M. Transcending inequities in dementia care in Black communities: Lessons from the maximizing independence at home care coordination program. Dementia (London) 2022;21(5):1653-1668.
546. Golden BP, Block L, Benson C, et al. Experiences of in-hospital care among dementia caregivers in the context of high neighborhood-level disadvantage. J Am Geriatr Soc 2023;71(11):3435–3444.
547. Grill JD, Tsoh JY, Nam B, et al. Increasing representation of Asian American, Native Hawaiian, and Pacific Islander communities in aging, dementia, and caregiving research: An update from the CARE registry. Alzheimers Dement 2025;21(4):e70144.
548. Leggins B, Hart DM, Jackson AJ. Perceptions about dementia clinical trials among underrepresented populations: a nationally representative survey of U.S. dementia caregivers. Alzheimers Res Ther 2024;16(1):224.
549. Ch'en P, Patel PB, Ramirez M. (2024). Caregivers' and Health Care Providers' Cultural Perceptions of and Experiences With Latino Patients With Dementia. Neurol Clin Pract 2024;14(4):e200307.
550. Epps F, Moore M, Chester M, et al. The Alter Program: A nurse-led, dementia-friendly program for African American faith communities and families living with dementia. Nurs Adm Q 2021;46(1):72-80.
551. Racine L, Ford H, Johnson L, Fowler-Kerry S. An integrative review of Indigenous informal caregiving in the context of dementia care. J Adv Nurs 2022;78(4):895-917.
552. Epps F, Alexander K, Brewster GS, et al. Promoting dementia awareness in African-American faith communities. Public Health Nurs 2020;37(5):715-721.
553. Liu J, Lou Y, Wu B, Mui A. "I've been always strong to conquer any suffering:" challenges and resilience of Chinese American dementia caregivers in a life course perspective. Aging Ment Health 2021;25(9):1716-1724.
554. Portacolone E, Palmer NR, Lichtenberg P, et al. Earning the Trust of African American Communities to Increase Representation in Dementia Research. Ethn Dis 2020;30(Suppl 2):719-734.
555. Park VT, Grill JD, Zhu J, et al. Asian Americans and Pacific Islanders' perspectives on participating in the CARE recruitment research registry for Alzheimer's disease and related dementias, aging, and caregiving research. Alzheimers Dement (N Y) 2021;7(1):e12195.
556. Epps F, Heidbreder V, Alexander K, Tomlinson A, Freeman V, Williams N. A dementia-friendly church: How can the African American church support families affected by dementia? Dementia (London) 2021;20(2):556-569.
557. Guest MA, Smith MP. In Our Community, Dementia Speaks: Pilot of a person-centered training targeting African-American caregivers of persons-living with dementia (innovative practice). Dementia (London) 2021;20(1):391-397.
558. Meyer OL, Sun M, Do T, et al. Community-Engaged Research with Vietnamese Americans to Pilot-Test a Dementia Caregiver Intervention. J Cross Cult Gerontol 2020;35(4):479-492.
559. Bonner GJ, Freels S, Ferrans C, et al. Advance Care Planning for African American Caregivers of Relatives With Dementias: Cluster Randomized Controlled Trial. Am J Hosp Palliat Care 2021;38(6):547-556.
560. Zanjani F, Rhodes A, O'Donnell K, et al. Community Input for Addressing Dementia Health Disparities: Richmond Brain Health Initiative. Prog Community Health Partnersh 2025;19(1):71-83.
561. Freedman VA, Patterson SE, Cornman JC, Wolff JL. A day in the life of caregivers to older adults with and without dementia: Comparisons of care time and emotional health. Alzheimers Dement 2022;18(9):1650-1661.
562. National Alliance for Caregiving and AARP. Caregiving in the U.S. (2015 Report). Available at: https://www.aarp.org/content/dam/aarp/ppi/2015/caregivingin-the-united-states-2015-report-revised.pdf. Accessed January 19, 2026.
563. Spillman B, Wolff J, Freedman VA, Kasper JD. Informal Caregiving for Older Americans: An Analysis of the 2011 National Health and Aging Trends Study. Available at: https://aspe.hhs.gov/pdf-report/informal-caregiving-olderamericans-analysis-2011-national-health-and-aging-trendsstudy. Accessed January 19, 2026.
564. Patterson SE, Freedman VA. Family structure and unmet care needs among older adults with and without dementia in the United States. Gerontologist 2025;65(5):gnaf062. doi: 10.1093/geront/gnaf062.
565. Bratches RW, Puga F, Barr PJ, et al. Size and Composition of Caregiver Networks Who Manage Medications for Persons Living With Dementia: Cross-sectional analysis of the 2011-2022 National Health and Aging Trends Study. Interact J Med Res 2025;14:e64499.
566. Spillman BC, Freedman VA, Kasper JD, Wolff JL. Change over time in caregiving networks for older adults with and without dementia. J Gerontol B Psychol Sci Soc Sci 2020;75(7): 1563-1572.
567. Fabius CD, Gallo JJ, Burgdorf JG, et al. Family CARE PARTNERS AND PAID CAREGIVERS: National estimates of role-sharing in home care. Gerontologist 2024;65(2):gnae177.
568. Port CL, Zimmerman S, Williams CS, Dobbs D, Preisser JS, Williams SW. Families filling the gap: Comparing family involvement for assisted living and nursing home residents with dementia. Gerontologist 2005;45(Special Issue 1):87-95.
569. Schulz R, Belle SH, Czaja SJ, McGinnis KA, Stevens A, Zhang S. Long-term care placement of dementia patients and caregiver health and well-being. JAMA 2004;292(8):961-967.
570. Kim Y, Kim J, Kim H, Park S, Li Y. Trend in respite use by race among caregivers for people living with dementia. J Gerontol A Biol Sci Med Sci 2024;79(supplement 1):S42-S49. doi: 10.1093/gerona/glae036.
571. Jutkowitz E, Gaugler JE, Trivedi AN, Mitchell LL, Gozalo P. Family caregiving in the community up to 8-years after onset of dementia. BMC Geriatr 2020;20(1):216.
572. Gaugler JE, Zarit SH, Pearlin LI. The onset of dementia caregiving and its longitudinal implications. Psychol Aging 2003;18(2):171-180.
573. Jutkowitz E, Gozalo P, Trivedi A, Mitchell L, Gaugler JE. The effect of physical and cognitive impairments on caregiving. Med Care 2020;58(7):601-609.
574. Lei L, Maust DT, Leggett AN. Functional decline over time and change in family and other unpaid care provided to community-dwelling older adults living with and without dementia. J Gerontol B Psychol Sci Soc Sci 2023;78(10): 1727-1734.
575. Galske J, Chera T, Hwang U, Monin JK, Venkatesh A, Lam K, Leggett AN, Gettel C. Daily care hours among caregivers of older emergency department patients with dementia and undiagnosed cognitive impairment. J Am Geriatr Soc 2024 Oct;72(10):3261-3264.
576. Walmart: 2025 Annual Report. Available at: https://corporate.walmart.com/content/dam/corporate/documents/newsroom/2025/04/24/walmart-releases-2025-annual-report-and-proxy-statement/walmart-inc-2025-annual-report.pdf. Accessed December 23, 2025.
577. McDonald's Corporation Report 2023. Available at: https://corporate.mcdonalds.com/content/dam/sites/corp/nfl/pdf/McD%20-%202024%20Annual%20Report%20to%20Shareholders.pdf. Accessed December 23, 2025.
578. Jutkowitz E, Kane RL, Gaugler JE, MacLehose RF, Dowd B, Kuntz KM. Societal and family lifetime cost of dementia: Implications for policy. J Am Geriatr Soc 2017;65(10): 2169-2175.
579. Official Data Foundation. CPI inflation calculator. Available at: http://www.in2013dollars.com/2017-dollars-in-2018?amount=139765. Accessed January 19, 2026.
580. Deb A, Thornton JD, Sambamoorthi U, Innes K. Direct and indirect cost of managing Alzheimer's disease and related dementias in the United States. Expert Rev Pharmacoecon Outcomes Res 2017;17(2):189-202.

581. Rattinger GB, Schwartz S, Mullins CD, et al. Dementia severity and the longitudinal costs of informal care in the Cache County population. Alzheimers Dement 2015;11(8):946-954.
582. Song M-K, Paul S, Happ MB, Lea J, Pirkle JL, Jr., Turberville-Trujillo L. Informal Caregiving Networks of Older Adults With Dementia Superimposed on Multimorbidity: A Social Network Analysis Study. Innov Aging 2023;7(4):igad033.
583. Feast A, Moniz-Cook E, Stoner C, Charlesworth G, Orrell M. A systematic review of the relationship between behavioral and psychological symptoms (BPSD) and caregiver well-being. Int Psychogeriatr 2016;28(11):1761-1774.
584. Ornstein K, Gaugler JE. The problem with "problem behaviors": A systematic review of the association between individual patient behavioral and psychological symptoms and caregiver depression and burden within the dementia patient-caregiver dyad. Int Psychogeriatr 2012;24(10): 1536-1552.
585. Lin X, Moxley JH, Czaja SJ. Caring for Dementia Caregivers: Psychosocial Factors Related to Engagement in Self-Care Activities. Behav Sci (Basel) 2023;13(10):851.
586. Waligora KJ, Bahouth MN, Han HR. The Self-Care Needs and Behaviors of Dementia Informal Caregivers: A Systematic Review. Gerontologist 2019;59(5):e565-e583.
587. Jones RW, Lebrec J, Kahle-Wrobleski K, et al. Disease progression in mild dementia due to Alzheimer disease in an 18-month observational study (GERAS): The impact on costs and caregiver outcomes. Dement Geriatr Cogn Dis Extra 2017;20;7(1):87-100.
588. Sorensen S, Duberstein P, Gill D, Pinquart M. Dementia care: Mental health effects, intervention strategies, and clinical implications. Lancet Neurol 2006;5(11):961-973.
589. Pinquart M, Sorensen S. Associations of stressors and uplifts of caregiving with caregiver burden and depressive mood: A meta-analysis. J Gerontol B Psychol Sci Soc Sci 2003;58(2):112-128.
590. Liu W, Gallagher-Thompson D. Impact of dementia caregiving: Risks, strains, and growth. In: Qualls SH, Zarit SH, eds. Aging families and caregiving. Hoboken, NJ: John Wiley & Sons, Inc.; 2009: p. 85-112.
591. Vitaliano PP, Zhang J, Scanlan JM. Is caregiving hazardous to one's physical health? A meta-analysis. Psychol Bull 2003;129(6):946-972.
592. Schulz R, Beach SR. Caregiving as a risk factor for mortality: The Caregiver Health Effects Study. JAMA. 1999;282: 2215-2260.
593. Leggett AN, Meyer OL, Bugajsky BC, Polenick CA. Accentuate the Positive: The association between informal and formal supports and caregiving gains. J Appl Gerontol 2021l;40(7): 763-771.
594. Cousins-Whitus E, Burke E, Spitznagel MB. Self-mastery and dementia caregiver burden: A systematic review and meta-analysis. Clin Gerontol 2025;48(5):896-915.
595. Quinn C, Toms G. Influence of positive aspects of dementia caregiving on caregivers' well-being: A systematic review. Gerontologist 2019;59(5):e584-e596.
596. Zarit SH. Positive aspects of caregiving: More than looking on the bright side. Aging Ment Health 2012;16(6):673-674.
597. Cheng ST, Mak EP, Lau RW, Ng NS, Lam LC. Voices of Alzheimer caregivers on positive aspects of caregiving. Gerontologist 2016;56(3):451-460.
598. Monin JK, Schulz R, Feeney BC. Compassionate love in individuals with Alzheimer's disease and their spousal caregivers: Associations with caregivers' psychological health. Gerontologist 2015;55(6):981-989.
599. Roth DL, Dilworth-Anderson P, Huang J, Gross AL, Gitlin LN. Positive aspects of family caregiving for dementia: Differential item functioning by race. J Gerontol B Psychol Sci Soc Sci 2015;70(6):813-819.
600. Lloyd J, Patterson T, Muers J. The positive aspects of caregiving in dementia: A critical review of the qualitative literature. Dementia (London) 2016;15(6):1534-1561.
601. Yu DSF, Cheng S-T, Wang J. Unravelling positive aspects of caregiving in dementia: An integrative review of research literature. Int J Nurs Stud 2018:79:1-26.
602. Cheng ST. Positive aspects of caregiving attenuate the relationship between behavioral bother and anxiety and depressive symptoms in dementia family caregivers. Geriatr Gerontol Int 2023;23(5):366-370.
603. Wennberg AM, Anderson LR, Cagnin A, Chen-Edinboro LP, Pini L. Howboth positive and burdensome caregiver experiences are associated with care recipient cognitive performance: Evidence from the National Health and Aging Trends Study and National Study of Caregiving. Front Public Health 2023;11:1130099.
604. van den Kieboom R, Snaphaan L, Mark R, Bongers I. The trajectory of caregiver burden and risk factors in dementia progression: A systematic review. J Alzheimers Dis 2020;77(3):1107-1115.
605. Polenick CA, Min L, Kales HC. Medical Comorbidities of dementia: Links to caregivers' emotional difficulties and gains. J Am Geriatr Soc 2020;68(3):609-613.
606. Sheehan OC, Haley WE, Howard VJ, Huang J, Rhodes JD, Roth DL. Stress, Burden, and Well-Being in Dementia and Nondementia Caregivers: Insights From the Caregiving Transitions Study. Gerontologist 2021;61(5):670-679.
607. Irani E, Wang F, Meyer K. Social activity restriction and psychological health among caregivers of older adults with and without dementia. J Aging Health 2024;36(10):678-688.
608. Sallim AB, Sayampanathan AA, Cuttilan A, Chun-Man Ho R. Prevalence of mental health disorders among caregivers of patients with Alzheimer disease. J Am Med Dir Assoc 2015;16(12):1034-1041.
609. Thunyadee C, Sitthimongkol Y, Sangon S, Chai-Aroon T, Hegadoren KM. Predictors of depressive symptoms and physical health in caregivers of individuals with schizophrenia. J Nurs Health Sci 2015;17:412-429.
610. Sanosi AA, Ayoub OA, Habadi MI, Muglan JA. Neuropsychiatric and Associated Symptoms and Their Management in Caregivers of Alzheimer's Disease Patients: A Systematic review and meta-analysis. Cureus 2025;17(7):e88795.
611. Harris ML, Titler MG, Hoffman GJ. Associations between Alzheimer's disease and related dementias and depressive symptoms of partner caregivers. J Appl Gerontol 2021;40(7):772-780.
612. Vitaliano PP, Ustundag O, Borson S. Objective and subjective cognitive problems among caregivers and matched non-caregivers. Gerontologist 2017;57(4):637-647.
613. Dassel KB, Carr DC, Vitaliano P. Does caring for a spouse with dementia accelerate cognitive decline? Findings from the Health and Retirement Study. Gerontologist 2017;57(2): 319-328.
614. Lou Y, Gong J, Zang E. Care recipients' cognitive trajectories and caregivers' depressive symptoms: The mediating role of caregiving burden. Gerontologist 2025;65(4):gnaf024.
615. Arthur PB, Gitlin LN, Kairalla JA, Mann WC. Relationship between the number of behavioral symptoms in dementia and caregiver distress: What is the tipping point? Int Psychogeriatr 2018;30(8):1099-1107.
616. Solimando L, Fasulo M, Cavallero S, Veronese N, Smith L, Vernuccio L. Suicide risk in caregivers of people with dementia: a systematic review and meta-analysis. Aging Clin Exp Res 2022;34(10):2255-2260.
617. Ivey-Stephenson AZ, Crosby AE, Hoenig JM, et al. Suicidal thoughts and behaviors among adults aged ≥18 years - United States, 2015-2019. MMWR Surveill Summ 2022;71(1):1-19.
618. Aston L, Hilton A, Moutela T, Shaw R, Maidment I. Exploring the evidence base for how people with dementia and their informal carers manage their medication in the community: A mixed studies review. BMC Geriatr 2017;17(1):242.
619. Polenick CA, Stanz SD, Leggett AN, Maust DT, Hodgson NA, Kales HC. Stressors and resources related to medication management: Associations with spousal caregivers' role overload. Gerontologist 2020;60(1):165-173.

620. Alsaeed D, Jamieson E, Gul MO, Smith FJ. Challenges to optimal medicines use in people living with dementia and their caregivers: A literature review. Int J Pharm 2016;512(2): 396-404.
621. Liu C, Fabius CD, Howard VJ, Haley WE, Roth DL. Change in Social Engagement among Incident Caregivers and Controls: Findings from the Caregiving Transitions Study. J Aging Health 2021;33(1-2):114-124.
622. Anderson JG, Jabson Tree JM, Flatt JD, Gross AL, Williams IC, Rose KM. A comparative analysis of family quality of life between heterosexual and sexual minority caregivers of people with dementia. J Appl Gerontol 2022;41(6):1576-1584.
623. Lee J, Baik S, Becker TD, Cheon JH. Themes describing social isolation in family caregivers of people living with dementia: A scoping review. Dementia (London) 2022;21(2):701-721.
624. Chen XS, Lydon EA, Mathias VF. Loneliness Among Older Caregivers: An analysis of the 2020 California Health Interview Survey. J Appl Gerontol 2025;44(7):1193-1204.
625. Qian Y, Pomeroy ML, Petchler CM. The epidemiology of social isolation and loneliness among family and unpaid caregivers of older adults: Findings from the National Study of Caregiving. J Gerontol B Psychol Sci Soc Sci 2025;80(7):gbaf101.
626. Alhasan DM, Hirsch JA, Jackson CL, Miller MC, Cai B, Lohman MC. Neighborhood Characteristics and the Mental Health of Caregivers Cohabiting with Care Recipients Diagnosed with Alzheimer's Disease. Int J Environ Res Public Health 2021;18(3):913.
627. Vetter M, Donelan K, Guzikowski S, et al. The needs of family caregivers of persons living with dementia cared for in primary care practices. J Eval Clin Pract 2023;29(8):1243-1246.
628. Burgdorf JG, Amjad H. Impact of diagnosed (vs undiagnosed) dementia on family caregiving experiences. J Am Geriatr Soc 2023;71(4):1236-1242.
629. Couch E, Belanger E, Gadbois EA, et al. "I know that my role is going to change": A mixed-methods study of the relationship between amyloid-β PET scan results and caregiver burden. Aging Clin Exp Res 2023;35(2):387-397.
630. Lee K, Chung J, Meyer KN, Dionne-Odom JN. Unmet needs and health-related quality of life of dementia family caregivers transitioning from home to long-term care: A scoping review. Geriatr Nurs 2022;43:254-264.
631. Gaugler JE, Mittelman MS, Hepburn K, Newcomer R. Clinically significant changes in burden and depression among dementia caregivers following nursing home admission. BMC Medicine 2010;8:85.
632. Peacock SC. The experience of providing end-of-life care to a relative with advanced dementia: An integrative literature review. Palliat Support Care 2013;11(2):155-168.
633. Schulz R, Mendelsohn AB, Haley WE, et al. End-of-life care and the effects of bereavement on family caregivers of persons with dementia. N Engl J Med 2003;349(20): 1936-1942.
634. Kumar V, Ankuda CK, Aldridge MD, Husain M, Ornstein KA. Family Caregiving at the End of Life and Hospice Use: A national study of Medicare beneficiaries. J Am Geriatr Soc 2020;68(10):2288-2296.
635. Fonareva I, Oken BS. Physiological and functional consequences of caregiving for relatives with dementia. Int Psychogeriatr 2014;26(5):725-747.
636. Parker LJ, Fabius C, Rivers E, Taylor JL. Is Dementia-Specific Caregiving Compared With Non-Dementia Caregiving Associated With Physical Difficulty Among Caregivers for Community-Dwelling Adults? J Appl Gerontol 2022;41(4):1074-1080.
637. Brewster GS, Wang D, McPhillips MV, Epps F, Yang I. Correlates of Sleep Disturbance Experienced by Informal Caregivers of Persons Living with Dementia: A Systematic Review. Clin Gerontol 2024;47(3):380-407.
638. Liu Y, Song Y, Johnson FU, et al. Characteristics and predictors of sleep among spousal care dyads living with chronic conditions. J Gerontol B Psychol Sci Soc Sci 2023;78(Suppl 1):S38-S47.
639. Gao C, Chapagain NY, Scullin MK. Sleep Duration and Sleep Quality in caregivers of patients with dementia: A systematic review and meta-analysis. JAMA Netw Open 2019;2(8):e199891.
640. Petrovsky DV, Geisser SR, Kolte S. Sleep quality differences among caregivers for persons living with and without dementia. Aging Ment Health 2024;28(12):1760-1766.
641. Dassel KB, Carr DC. Does dementia caregiving accelerate frailty? Findings from the Health and Retirement Study. Gerontologist 2016;56(3):444-450.
642. Allen AP, Curran EA, Duggan A, et al. A systematic review of the psychobiological burden of informal caregiving for patients with dementia: Focus on cognitive and biological markers of chronic stress. Neurosci Biobehav Rev 2017;73:123-164.
643. Mausbach BT, Roepke SK, Ziegler MG, et al. Association between chronic caregiving stress and impaired endothelial function in the elderly. J Am Coll Cardiol 2010;55(23): 2599-2606.
644. Mausbach BT, Romero-Moreno R, Bos T, et al. Engagement in pleasant leisure activities and blood pressure:A5-year longitudinal study in Alzheimer caregivers. Psychosom Med 2017;79(7):735-741.
645. Vitaliano PP, Scanlan JM, Zhang J, Savage MV, Hirsch IB, Siegler I. A path model of chronic stress, the metabolic syndrome, and coronary heart disease. Psychosom Med 2002;64:418-435.
646. von Kanel R, Mausbach BT, Dimsdale JE, et al. Effect of chronic dementia caregiving and major transitions in the caregiving situation on kidney function: A longitudinal study. Psychosom Med 2012;74(2):214-220.
647. Ng YT, Kratz A, Turkelson A, Birditt K. Daily interactions with care recipients and cardiovascular reactivity among dementia caregivers: The buffering role of friend interactions. Alzheimers Dement 2025;21(5):e70281.
648. Roth DL, Sheehan OC, Haley WE, Jenny NS, Cushman M, Walston JD. Is family caregiving associated with inflammation or compromised immunity? A meta-analysis. Gerontologist 2019;59(5):e521-e534.
649. Roth DL, Haley WE, Sheehan OC, et al. The transition to family caregiving and its effect on biomarkers of inflammation. Proc Natl Acad Sci USA 2020;117(28):16258-16263.
650. Meyer K, Gassoumis Z, Wilber K. The Differential Effects of Caregiving Intensity on Overnight Hospitalization. West J Nurs Res 2022;44(6):528-539.
651. Daddato AE, Gleason KS, Dollar BA, et al. Understanding experiences of caregivers of spouses with dementia during caregiver health care emergencies. Gerontologist 2024;64(7):gnad165.
652. Cha P-C, Rothenberg C, Chary AN. Emergency department utilization among co-residing family caregivers of persons living with dementia. J Am Geriatr Soc 2025;73(9): 2920-2922.
653. Schubert CC, Boustani M, Callahan CM, Perkins AJ, Hui S, Hendrie HC. Acute care utilization by dementia caregivers within urban primary care practices. J Gen Intern Med 2008;23(11):1736-1740.
654. Zhu CW, Scarmeas N, Ornstein K, et al. Health-care use and cost in dementia caregivers: Longitudinal results from the Predictors Caregiver Study. Alzheimers Dement 2015;11(4):444-454.
655. Leggett AN, Sonnega AJ, Lohman MC. Till death do us part: Intersecting health and spousal dementia caregiving on caregiver mortality. J Aging Health 2020;32(7-8):871-879.
656. Roth DL, Fredman L, Haley WE. Informal caregiving and its impact on health: A reappraisal from population-based studies. Gerontologist 2015;55(2):309-319.
657. Christakis NA, Allison PD. Mortality after the hospitalization of a spouse. N Engl J Med 2006;354:719-730.
658. Perkins M, Howard VJ, Wadley VG, et al. Caregiving strain and all-cause mortality: Evidence from the REGARDS Study. J Gerontol B Psychol Sci Soc Sci 2013;68(4):504-512.

659. Gaugler JE, Jutkowitz E, Peterson CM, Zmora R. Caregivers dying before care recipients with dementia. Alzheimers Dement (NY) 2018;4:688-693.
660. Stokes JE, Kindratt TB, Antonucci TC, et al. Employment dynamics among adult children at the onset of parental dementia: Variation by sociodemographic characteristics. J Aging Health 2024;36(9):546-558.
661. AARP, Family Caregiving and Out-of-Pocket Costs: 2016 Report. Available at: https://www.aarp.org/content/dam/aarp/research/surveys_statistics/ltc/2016/familycaregiving-costs-fact-sheet.doi.10.26419%252Fres.00138.002.pdf. Accessed January 19, 2026.
662. Albert SM. Are Medical Care Expenses Higher for Spouses Who Provide Dementia Care? Am J Geriatr Psychiatry 2021;29(5):476-477.
663. Chu J, Benjenk I, Chen J. Incremental Health Care Expenditures of the Spouses of Older Adults With Alzheimer's Diseases and Related Dementias (ADRD). Am J Geriatr Psychiatry 2021;29(5):462-472.
664. Alzheimer's Association. 2016 Alzheimer's Disease Facts and Figures. Alzheimer Dement. 2016;12(4):459-509.
665. Hart DM, Leggins B, Sanches C. Financial toxicity in dementia caregiving: Sociodemographic predictors in a U.S. nationally representative survey. Gerontologist 2025;65(6):gnaf092. doi: 10.1093/geront/gnaf092.
666. Kelley AS, McGarry K, Bollens-Lund E, et al. Residential setting and the cumulative financial burden of dementia in the 7 years before death. J Am Geriatr Soc 2020;68(6):1319-1324.
667. Stall NM, Kim SJ, Hardacre KA, et al. Association of informal caregiver distress with health outcomes of community-dwelling dementia care recipients: A systematic review. J Am Geriatr Soc 2019;67(3):609-617.
668. Amjad H, Mulcahy J, Kasper JD, et al. Do caregiving factors affect hospitalization risk among disabled older adults? J Am Geriatr Soc 2021;69(1):129-139.
669. Leggett, A. N., Koo, H. J., Strominger, J., & Maust, D. T. (2023). Gatekeepers: The Association of Caregiving Network Characteristics With Emergency Department Use by Persons Living With Dementia. The journals of gerontology. Series B, Psychological sciences and social sciences, 78(6), 1073–1084. https://doi.org/10.1093/geronb/gbac198.
670. Burgdorf JG, Wolff JL, Barrón Y, Amjad H. Family caregiver availability and capacity associated with home health service types for patients with dementia. J Am Med Dir Assoc 2025;26(9):105744.
671. Sullivan SS, de Rosa C, Li CS, Chang YP. Dementia caregiver burdens predict overnight hospitalization and hospice utilization. Palliat Support Care 2022;1-15.
672. Liu R, Wyk BV, Quiñones AR, Allore HG. Longitudinal Care Network Changes and Associated Healthcare Utilization Among Care Recipients. Res Aging 2024;46(5-6):327-338.
673. Jelinski D, Fernandes B, Reich K. Care for older adults living with dementia in the emergency department: a systematic review and meta-synthesis of care partner roles and perspectives. Emerg Med J 2025;42(3):154-163.
674. Cheng S-K, Li K-K, Or PPL, Losada A. Do caregiver interventions improve outcomes in relatives with dementia and mild cognitive impairment? A comprehensive systematic review and meta-analysis. Psychol Aging 2022;37(8):929-953.
675. Gaugler JE, Jutkowitz E, Shippee TP, Brasure M. Consistency of dementia caregiver intervention classification: An evidence-based synthesis. Int Psychogeriatr 2017;29(1):19-30.
676. Gitlin LN, Hodgson N. Caregivers as therapeutic agents in dementia care: The evidence-base for interventions supporting their role. In: Gaugler JE, Kane RL, eds. Family caregiving in the new normal. Philadelphia, Pa.: Elsevier, Inc.; 2015: p. 305-356.
677. Liew TM, Lee CS. Reappraising the efficacy and acceptability of multicomponent interventions for caregiver depression in dementia: The utility of network meta-analysis. Gerontologist 2019;16;59(4):e380-e392.
678. Rosalynn Carter Institute for Caregiving. Available at: https://www.rosalynncarter.org/. Accessed January 19, 2026.
679. Maslow K. Translating Innovation to Impact: Evidence-Based Interventions to Support People with Alzheimer's Disease and their Caregiver at Home and in the Community. Washington, D.C.: Administration on Aging; 2012. Accessed December 15, 2023. Available at: https://www.agingresearch.org/app/uploads/2017/12/50820Compliant20AoA-White-Paper20for20Release.pdf
680. Jutten LH, Mark RE, Wicherts JM, Sitskoorn MM. The effectiveness of psychosocial and behavioral interventions for informal dementia caregivers: Meta-analyses and meta-regressions. J Alzheimers Dis 2018;66(1):149-172.
681. Nguyen H, Terry D, Phan H, Vickers J, McInerney F. Communication training and its effects on carer and care-receiver outcomes in dementia settings: A systematic review. J Clin Nurs 2019;28(7-8):1050-1069.
682. Williams F, Moghaddam N, Ramsden S, De Boos D. Interventions for reducing levels of burden amongst informal carers of persons with dementia in the community. A systematic review and meta-analysis of randomised controlled trials. Aging Ment Health 2019;23(12):1629-1642.
683. Larson EB, Stroud C. Meeting the Challenge of Caring for Persons Living With Dementia and Their Care Partners and Caregivers: A Report From the National Academies of Sciences, Engineering, and Medicine. JAMA 2021;325(18):1831-1832.
684. Sun Y, Ji M, Leng M, et al. Comparative efficacy of 11 non-pharmacological interventions on depression, anxiety, quality of life, and caregiver burden for informal caregivers of people with dementia: A systematic review and network meta-analysis. Int J Nurs Stud 2022:129:104204.
685. Cheng S-T, Li K-K, Losada A, et al. The effectiveness of nonpharmacological interventions for informal dementia caregivers: An updated systematic review and meta-analysis. Psychol Aging 2020;35(1):55-77.
686. Walter E, Pinquart M. How Effective Are Dementia Caregiver Interventions? An Updated Comprehensive Meta-Analysis. Gerontologist 2020;60(8):609-619.
687. Gitlin LN, Jutkowitz E, Gaugler JE. Dementia caregiver intervention research now and into the future: Review and recommendations. Washington, D.C.: Commissioned paper for the National Academies of Science, Engineering and Medicine NIA Decadal Study. Available at: https://sites.nationalacademies.org/cs/groups/dbassesite/documents/webpage/dbasse_198208.pdf. Accessed January 19, 2026.
688. Lee M, Ryoo JH, Chung M, Anderson JG, Rose K, Williams IC. Effective interventions for depressive symptoms among caregivers of people with dementia: A systematic review and meta-analysis. Dementia (London) 2020;19(7):2368-2398.
689. Cheng S-T, Zhang F. A comprehensive meta-review of systematic reviews and meta-analyses on nonpharmacological interventions for informal dementia caregivers. BMC Geriatr 2020;20(1):137.
690. Baker ZG, Dellapina M, Gustavson AM, et al. Evidence Map of non-pharmacological dementia care partner interventions implemented in the US: Gaps and impact opportunities. J Appl Gerontol 2024;43(9):1259-1273.
691. Bass DM, Hornick T, Kunik M, et al. Findings from a real-world translation study of the evidence-based "Partners in Dementia Care". Innov Aging 2019;3(3):igz031.
692. Hodgson N, Gitlin LN (2021). Implementing and sustaining family care programs in real world settings: Barriers and facilitators. In J. E. Gaugler (Ed.), Bridging the Family Care Gap. Academic Press: San Diego, CA.
693. Fauth EB, Jackson MA, Walberg DK, et al. External validity of the New York University Caregiver Intervention: Key caregiver outcomes across multiple demonstration projects. J Appl Gerontol 2019;38(9):1253-1281.
694. Hodgson NA, Petrovsky DV, Finegan K, Kallmyer BA, Pike J, Fazio S. One call makes a difference: An evaluation of the Alzheimer's Association National Helpline on dementia caregiver outcomes. Patient Educ Couns 2021;104(4):896-902.

695. Reuben DB, Evertson LC, Jackson-Stoeckle R, Epstein-Lubow G, Spragens LH, Haggerty KL. Dissemination of a successful dementia care program: Lessons to facilitate spread of innovations. J Am Geriatr Soc 2022;70(9):2686-2694.
696. Gitlin LN, Roth DL, Marx K, et al. Embedding caregiver support within adult day services: Outcomes of a multi-site trial. Gerontologist 2023:gnad107.
697. Boustani M, Alder CA, Solid CA. Agile implementation: A blueprint for implementing evidence-based healthcare solutions. J Am Geriatr Soc 2018;66(7):1372-1376.
698. Saragih ID, Tonapa SI, Porta CM, Lee BO. Effects of telehealth intervention for people with dementia and their carers: A systematic review and meta-analysis of randomized controlled studies. J Nurs Schol 2022;54(6):704-719.
699. Etxeberria I, Salaberria K, Gorostiaga A. Online support for family caregivers of people with dementia: a systematic review and meta-analysis of RCTs and quasi-experimental studies. Aging Ment Health 2021;25(7):1165-1180.
700. Pleasant M, Molinari V, Dobbs C, Meng H, Hyer K. Effectiveness of online dementia caregivers training programs: A systematic review. Geriatr Nurs 2020;S0197-4572(20):30209-30213.
701. Leng M, Zhao Y, Xiao H, Li C, Wang Z. Internet-based supportive interventions for family caregivers of people with dementia: Systematic review and meta-analysis. J Med Internet Res 2020;22(9):e19468.
702. Hopwood J, Walker N, McDonagh L, et al. Internet-based interventions aimed at supporting family caregivers of people with dementia: Systematic review. J Med Internet Res 2018;20(6): e216.
703. Waller A, Dilworth S, Mansfield E, Sanson-Fisher R. Computer and telephone delivered interventions to support caregivers of people with dementia: A systematic review of research output and quality. BMC Geriatr 2017;17(1):265.
704. Gaugler JE, Zmora R, Mitchell LL, et al. Six-month effectiveness of remote activity monitoring for persons living with dementia and their family caregivers: An experimental mixed methods study. Gerontologist 2019;59(1):78-89.
705. Boots LM, de Vugt ME, van Knippenberg RJ, Kempen GI, Verhey FR. A systematic review of internet-based supportive interventions for caregivers of patients with dementia. Int J Geriatr Psych 2015;29(4):331-344.
706. Zhu L, Xing Y, Jia H, et al. Effects of telehealth interventions on the caregiver burden and mental health for caregivers of people with dementia: a systematic review and meta-analysis. Aging Ment Health 2024;28(11):1427-1439.
707. Fortinsky RH, Gitlin LN, Pizzi LT, et al. Effectiveness of the care of persons with dementia in their environments intervention when embedded in a publicly funded home-and community-based service program. Innov Aging 2020;4(6):igaa053.
708. Haggerty KL, Campetti R, Stoeckle RJ, Epstein-Lubow G, Evertson LC, Spragens L. Dissemination of a successful dementia care program: Lessons from early adopters. J Am Geriatr Soc 2022;70(9):2677-2685.
709. Heid AR, Zarit SH. Conducting assessments of community-based programs for individuals with dementia and their family caregivers. Gerontologist 2025;65(4):gnae145.
710. Maslow K, Bass DM, Rentsch JH. Update on the status of effective programs to help dementia family caregivers in the United States: Observations from the search for programs to include in Best Practice Caregiving. In Gaugler JE, ed. Bridging the Family Care Gap. Academic Press; 2021:247-302.
711. Cannon RM, Bass DM, Powers SM. Healthcare and community organizations implementing evidence-based dementia caregiving programs: Findings from best programs for caregiving. Gerontologist 2025;65(6):gnaf059.
712. Minyo MJ, Powers SM, Bass DM. Programmatic research outcomes used to establish the evidence-base of dementia caregiving support programs: An analysis of Best Programs for Caregiving. Alzheimers Dement (N Y) 2025;11(2):e70092.
713. Jennings LA, Ramirez KD, Hays RD, Wenger NS, Reuben DB. Personalized goal attainment in dementia care: Measuring what persons with dementia and their caregivers want. J Am Geriatr Soc 2018;66(11):2120-2127.
714. Gaugler JE, Reese M, Tanler R. Care to Plan: An online tool that offers tailored support to dementia caregivers. Gerontologist 2016;56(6):1161-1174.
715. Van Mierlo LD, Meiland FJ, Van Hout HP, Droes RM. Toward an evidence-based implementation model and checklist for personalized dementia care in the community. Int Psychogeriatr 2016;28(5):801-813.
716. Zarit SH, Lee JE, Barrineau MJ, Whitlatch CJ, Femia EE. Fidelity and acceptability of an adaptive intervention for caregivers: An exploratory study. Aging Ment Health 2013;17(2):197-206.
717. Kishita N, Hammond L, Dietrich CM, Mioshi E. Which interventions work for dementia family carers?: an updated systematic review of randomized controlled trials of carer interventions. Int Psychogeriatr 2018;30(11):1679-1696.
718. Demanes A, Ward KT, Wang AT, Hess M. Systematic Review of Dementia Support Programs with Multicultural and Multilingual Populations. Geriatrics (Basel) 2021;7(1):8.
719. U.S. Department of Health and Human Services. National Research Summit on Care, Services and Supports for Persons with Dementia and their Caregivers. Available at: https://aspe.hhs.gov/national-research-summit-care-servicesand-supports-persons-dementia-and-their-caregivers. Accessed January 19, 2026.
720. Luchsinger JA, Burgio L, Mittelman M, et al. Comparative effectiveness of 2 interventions for Hispanic caregivers of persons with dementia. J Am Geriatr Soc 2018;66(9): 1708-1715.
721. Napoles AM, Chadiha L, Eversley R, Moreno-John G. Reviews: Developing culturally sensitive dementia caregiver interventions: Are we there yet? Am J Alzheimers Dis Other Dement 2010;25:389-406.
722. Llanque SM, Enriquez M. Interventions for Hispanic caregivers of patients with dementia: A review of the literature. Am J Alzheimers Dis Other Demen 2012;27(1):23-32.
723. Akarsu NE, Prince MJ, Lawrence VC, Das-Munshi J. Depression in carers of people with dementia from a minority ethnic background: Systematic review and meta-analysis of randomised controlled trials of psychosocial interventions. Int J Geriatr Psychiatry 2019;34(6):790-806.
724. Meinertz NR, Lee J, Kim Y. Are family caregiving programs appropriate for minority caregivers? A systematic review of 37 caregiving programs. J Appl Gerontol 2025;44(7): 1125-1141.
725. Meyer K, Mage SM, Gonzalez A, et al. Lessons from a pilot study of a culturally tailored financial well-being intervention among Latino family caregivers. J Appl Gerontol 2025;44(6):938-948.
726. Ajrouch KJ, Barada FM, Janevic MR, Antonucci TC. Supporting Arab-American Families Living With Dementia: Testing a culturally adapted program. J Appl Gerontol 2025;44(4):515-519.
727. Neidre DB, Delgado RE, Peacock KS et al. A scoping review to contribute to knowledge about culturally adapting interventions for Latino family caregivers of persons living with dementia. J Transcult Nurs 2025;36(1):43-56.
728. Assfaw AD, Reinschmidt KM, Teasdale TA, et al. Assessing culturally tailored dementia interventions to support informal caregivers of people living with dementia (PLWD): A scoping review. J Racial Ethn Health Disparities 2025;12(3):1526-1543.
729. Jang Y, Hepburn K, Park J, et al. Changes in depressive symptoms of Korean American dementia caregivers after attending the Savvy Caregiver Program: Preliminary findings with a pilot sample. Clin Gerontol 2024;47(5):862-869.

730. Di Lorito C, Bosco A, Peel E, Hinchliff S, Dening T, Calasanti T. Are dementia services and support organisations meeting the needs of Lesbian, Gay, Bisexual and Transgender (LGBT) caregivers of LGBT people living with dementia? A scoping review of the literature. Aging Ment Health 2022;26(10): 1912-1921.
731. Kittle KR, Lee R, Pollock K, et al. Feasibility of the Savvy Caregiver Program for LGBTQ+ Caregivers of people living with Alzheimer's disease and related dementias. Int J Environ Res Pub Health 2022;19(22):15102.
732. Gaugler JE, Johnson E, Epstein-Lubow G. Building a public health infrastructure to support family caregivers of people with dementia. Gerontologist 2025:gnaf223. doi: 10.1093/geront/gnaf223. Online ahead of print.
733. McGuire LC, Holt HL. Healthy Brain Initiative (HBI) and Building our Largest Dementia Infrastructure (BOLD) initiatives: 20 Years of building a strong public health infrastructure. Gerontologist 2025:gnaf225. doi: 10.1093/geront/gnaf225. Online ahead of print.
734. Roberts SS, Lewis M, Colcombe CW. Promoting risk reduction: Increasing public health capacity to address dementia. Gerontologist 2025:gnaf227. doi: 10.1093/geront/gnaf227. Online ahead of print.
735. Chodosh J, Borson S, Nordyke A. Advancing early and equitable detection of dementia: Key learnings/challenges, recent innovations, and future directions. Gerontologist 2025:gnaf221. doi: 10.1093/geront/gnaf221. Online ahead of print.
736. Alzheimer's Association. Alzheimer's Association Dementia Care Practice Recommendations. Available at: https://www.alz.org/media/Documents/alzheimersdementia-care-practice-recommendations.pdf. Accessed January 19, 2026.
737. Hennelly N, Cooney A, Houghton C, O'Shea E. Personhood and Dementia Care: A Qualitative Evidence Synthesis of the Perspectives of People With Dementia. Gerontologist 2021;61(3):e85-e100.
738. Camp CJ. Denial of human rights: We must change the paradigm of dementia care. Clin Gerontol 2019;42(3):221-223.
739. Gaugler JE, Bain LJ, Mitchell L, et al. Reconsidering frameworks of Alzheimer's dementia when assessing psychosocial outcomes. Alzheimers Dement (NY) 2019;5: 388-397.
740. Burton A, Ogden M, Cooper C. Planning and enabling meaningful patient and public involvement in dementia research. Curr Opin Psychiatry 2019;32(6):557-562.
741. The Lewin Group. Process Evaluation of the Older Americans Act Title IIIE-National Family Caregiver Support Program: Final Report, 2016. Available at: https://acl.gov/sites/default/files/programs/2017-02/NFCSP_Final_Report-update.pdf. Accessed January 19, 2026.
742. Stone RI. Factors affecting the future of family caregiving in the United States. In: JE Gaugler, RL Kane, eds. Family Caregiving in the New Normal. San Diego, CA: Elsevier, Inc; 2015: p. 57-77.
743. Gaugler JE. Supporting family care for older adults: Building a better bridge. In J. E. Gaugler (Ed.). Bridging the Family Care Gap. Academic Press; 2021: p. 427-452.
744. Gaugler JE, Borson S, Epps F, Shih RA, Parker LJ, McGuire LC. The intersection of social determinants of health and family care of people living with Alzheimer's disease and related dementias: A public health opportunity. Alzheimers Dement 2023;19(12):5837-5846.
745. Mudrazija S, Aranda MP. Current and future replacement and opportunity costs of family caregiving for older Americans with and without dementia. Innov Aging 2025;9(6):igaf049.
746. Hepburn K, Gaugler J, Roberto K. Support for care partners and caregivers: 2023 Summit Session 5. Alzheimers Dement 2025;21(6):e70389.
747. Administration for Community Living. 2022 National Strategy to Support Family Caregivers. Available at: https://acl.gov/sites/default/files/RAISE_SGRG/NatlStrategyToSupportFamilyCaregivers.pdf. Accessed January 19, 2026.
748. Administration for Community Living. Progress Report: Federal Implementation of the 2022 National Strategy to Support Family Caregivers. Available at: https://acl.gov/sites/default/files/2024ProgressReport_StrategyToSupportCaregivers.pdf. Accessed January 19, 2026.
749. U.S. Centers for Medicare & Medicaid Services. Guiding an Improved Dementia Experience (GUIDE) Model. Available at: https://www.cms.gov/priorities/innovation/innovation-models/guide. Accessed January 19, 2026.
750. Mutoniwase E, Cheng Z, Cai X. Better state support for family caregivers linked to lower hospitalization rates among older adults living with dementia. J Appl Gerontol 2025:7334648251365673.
751. American Public Health Association. Strengthening the dementia care workforce: A public health priority. 2020. Available at: https://www.apha.org/policies-and-advocacy/public-health-policy-statements/policy-database/2021/01/13/strengthening-the-dementia-care-workforce. Accessed January 19, 2026.
752. Alzheimer's Association and Centers for Disease Control and Prevention. Healthy Brain Initiative, State and Local Public Health Partnerships to Address Dementia: The 2018–2023 Road Map. Chicago, IL: Alzheimer's Association; 2018. https://www.cdc.gov/aging/pdf/2018-2023-Road-Map-508.pdf.
753. Travers Altizer JL, Reckrey JM, Frogner BK, Grabowski DC, Spetz J. The dementia care workforce: Essential to care but large research gaps exist. Alzheimers Dement 2025;21(5):e70269.
754. Maust DT, Davis RC, Muench U, Marcus SC, Spetz J. Clinician type and care setting for treatment of Medicare beneficiaries with dementia. Alzheimers Dement 2025;21(3):e70102.
755. Palmqvist S, Whitson HE, Allen LA, et al. Alzheimer's Association Clinical Practice Guideline on the use of blood-based biomarkers in the diagnostic workup of suspected Alzheimer's disease within specialized care settings. Alzheimers Dement 2025;21(7):e70535.
756. HealthCare.gov. Primary Care Provider. Available at: https://www.healthcare.gov/glossary/primary-care-provider/. Accessed January 19, 2026.
757. Bernstein A, Rogers KM, Possin KL, et al. Dementia assessment and management in primary care settings: A survey of current provider practices in the United States. BMC Health Serv Res 2019;19: 919.
758. Liss JL, Seleri Assuncao S, Cummings J, et al. Practical recommendations for timely, accurate diagnosis of symptomatic Alzheimer's disease (MCI and dementia) in primary care: a review and synthesis. J Intern Med 2021;290(2):310-334.
759. Fowler NR, Partrick KA, Taylor J, et al. Implementing early detection of cognitive impairment in primary care to improve care for older adults. Journal of internal medicine. J Intern Med 2025;298(1):31-45.
760. Cordell CB, Borson S, Boustani M, et al. Alzheimer's Association recommendations for operationalizing the detection of cognitive impairment during the Medicare Annual Wellness Visit in a primary care setting. Alzheimers Dement 2013;9:141-150.
761. Galvin JE, Sadowsky CH. Practical guidelines for the recognition and diagnosis of dementia. J Am Board Fam Med 2012;25:367-382.
762. Mc Ardle R, Dsouza A, Hagan A, et al. Attitudes and preferences towards screening for dementia from the perspectives of healthcare professionals: an updated systematic review. Int J Geriatr Psych 2025 Feb;40(2):e70057.
763. Hinton L, Franz CE, Reddy G, Flores Y, Kravitz RL, Barker JC. Practice constraints, behavioral problems, and dementia care: Primary care physicians' perspectives. J Gen Intern Med 2007;22:1487-1492.
764. Bernstein A, Rogers KM, Possin KL, et al. Primary care provider attitudes and practices evaluating and managing patients with neurocognitive disorders. J Gen Intern Med 2019;34:1691-1692.

765. 2020 Alzheimer's disease facts and figures. Alzheimers Dement. 2020;doi:10.1002/alz.12068.
766. American Geriatrics Society. (n.d.) State of the geriatric workforce. Geriatrics workforce by the numbers. Available at: https://www.americangeriatrics.org/geriatrics-profession/about-geriatrics/geriatrics-workforce-numbers. Accessed December 19, 2025.
767. Foley KT, Luz CC. Retooling the Health Care Workforce for an Aging America: A Current Perspective. Gerontologist 2021;61(4):487-496.
768. Fried LP, Hall WJ. Editorial: Leading on behalf of an aging society. J Am Geriatr Soc 2008;56(10):1791-1795.
769. Callahan CM, Weiner M, Counsell SR. Defining the domain of geriatric medicine in an urban public health system affiliated with an academic medical center. J Am Geriatr Soc 2008;56(10):1802-1806.
770. Warshaw GA, Bragg EJ, Fried LP, Hall WJ. Which patients benefit the most from a geriatrician's care? Consensus among directors of geriatrics academic programs. J Am Geriatr Soc 2008;56(10):1796-1801.
771. U.S. Census Bureau. Older Americans Month: May 2023 [Press release]. May 2023. Available at: https://www.census.gov/newsroom/stories/older-americans-month.html. Accessed January 19, 2026.
772. American Geriatrics Society. Current number of board certified geriatricians by state. 2022. Available at: https://www.americangeriatrics.org/sites/default/files/inline-files/Current%20Number%20of%20Board%20Certified%20Geriatricians%20by%20State%20%28July%202022%29.pdf. Accessed December 19, 2025.
773. National Resident Matching Program (NRMP). Results and Data: Specialties Matching Service®, 2025 Appointment Year. Available at: https://www.nrmp.org/wp-content/uploads/2025/02/SMS_Results_and_Data_2025.pdf. Accessed December 19, 2025.
774. University of Virginia, Weldon Cooper Center for Public Service. National 50-state population projections: 2030, 2040, 2050. Available at: https://coopercenter.org/national-population-projections. Accessed January 19, 2026.
775. U.S. Department of Health and Human Services, Health Resources and Services Administration, National Center for Health Workforce Analysis. Workforce Projections Dashboard. Available at: https://data.hrsa.gov/topics/health-workforce/workforce-projections. Accessed January 19, 2026.
776. American Board of Psychiatry and Neurology. 2024 Annual Report. Available at: https://abpn.org/wp-content/uploads/2025/04/ABPN_2024_Annual_Report_WEB.pdf. Accessed December 19, 2025.
777. Moye J, Karel MJ, Stamm KE, et al. Workforce analysis of psychological practice with older adults: Growing crisis requires urgent action. Train Educ Prof Psychol 2018;13(1):46–55.
778. Auerbach DI, Buerhaus PI, Staiger DO. Implications of the rapid growth of the nurse practitioner workforce in the US: An examination of recent changes in demographic, employment, and earnings characteristics of nurse practitioners and the implications of those changes. Health Aff 2020;39(2):273-279.
779. American Association of Nurse Practitioners. Nurse Practitioners are the Providers of Choice for Millions of Americans. Available at: https://storage.aanp.org/www/documents/NP_Infographic_111122.pdf. Accessed January 19, 2026.
780. Kozikowski A, Honda T, Segal-Gidan F, Hooker RS. Physician assistants in geriatric medical care. BMC Geriatr 2020;20(1): 1-8.
781. Andrilla CHA, Patterson DG, Garberson LA, Coulthard C, Larson EH. Geographic variation in the supply of selected behavioral health providers. Am J PrevMed 2018;54(6, Suppl 3):S199-S207.
782. Douthit N, Kiv S, Dwolatzky T, Biswas S. Exposing some important barriers to health care access in the rural USA. Pub health 2015;129(6):611-620.
783. Xue Y, Poghosyan L, Lin Q. Supply and Geographic Distribution of Geriatric Physicians and Geriatric Nurse Practitioners. JAMA Netw Open 2024;7(11):e2444659.
784. U.S. Department of Health and Human Services, Health Resources and Services Administration, National Center for Health Workforce Analysis. Workforce Projections: 2022-2037. Available at: https://data.hrsa.gov/topics/health-workforce/nchwa/workforce-projections. Accessed December 19, 2025.
785. Liu JL, Baker L, Chen A, Wang J. Geographic variation in shortfalls of dementia specialists in the United States. Health Affairs Scholar, Volume 2, Issue 7, July 2024, qxae088, https://doi.org/10.1093/haschl/qxae088.
786. Majersik JJ, Ahmed A, Chen IH, et al. A Shortage of Neurologists– We Must Act Now: A Report From the AAN 2019 Transforming Leaders Program. Neurology 2021;96(24):1122-1134.
787. Warshaw GA, Bragg EJ. Preparing the health care workforce to care for adults with Alzheimer's disease and related dementias. Health Aff 2014;33(4):633-641.
788. Farrell TW, Korniyenko A, Hu G, Fulmer T. Geriatric medicine is advancing, not declining: A proposal for new metrics to assess the health of the profession. J Am Geriatr Soc 2024. doi: 10.1111/jgs.19143.
789. Alzheimer's Association. 2024 Alzheimer's Disease Facts and Figures. Special report: Mapping a Better Future for Dementia Care Navigation.
790. Heintz H, Monette P, Epstein-Lubow G, Smith L, Rowlett S, Forester BP. Emerging collaborative care models for dementia care in the primary care setting: a narrative review. Am J Geriatr Psychiatry 2020;28(3):320-330.
791. Frost R, Rait G, Aw S, et al. Implementing post diagnostic dementia care in primary care: a mixed-methods systematic review. Aging Ment Health 2021;25(8):1381-1394.
792. Murali KP, Carpenter JG, Kolanowski A, Bykovskyi AG. Comprehensive Dementia Care Models: State of the science and future directions. Research in gerontological nursing 2025;18(1):7-16.
793. French DD, LaMantia MA, Livin LR, Herceg D, Alder CA, Boustani MA. Healthy Aging Brain Center improved care coordination and produced net savings. Health Aff 2014;33(4):613-618.
794. Haggerty KL, Epstein-Lubow G, Spragens LH, et al. Recommendations to improve payment policies for comprehensive dementia care. J Am Geriatr Soc 2020;68(11):2478-2485.
795. Kern LM, Bynum JPW, Pincus HA. Care fragmentation, care continuity, and care coordination: how they differ and why it matters. JAMA Intern Med 2024;184(3):236-237.
796. Amjad H, Carmichael D, Austin AM, Chang CH, Bynum JP. Continuity of care and health care utilization in older adults with dementia in fee-for-service Medicare. JAMA Intern Med 2016; 176(9): 1371-1378.
797. Timmins L, Kern LM, O'Malley AS, Urato C, Ghosh A, Rich E. Communication gaps persist between primary care and specialist physicians. Ann Fam Med 2022;20(4):343-347.
798. Institute for Healthcare Improvement. Americans' experiences with medical errors and views on patient safety. https://www.ihi.org/sites/default/files/2023-09/IHI_NPSF_Patient_Safety_Survey_Fact_Sheets_2017.pdf.
799. Sundwall DN, Munger MA, Tak CR, Walsh M, Feehan M. Lifetime prevalence and correlates of patient-perceived medical errors experienced in the U.S. ambulatory setting: a population-based study. Health Equity 2020; 4(1): 430-437.
800. Kern LM, Riffin C, Phongtankuel V, et al. Gaps in the coordination of care for people living with dementia. J Am Geriatr Soc 2024 Oct;72(10):3119-3128.
801. Ge S, Xiao X, Huang B, Britt KC. Exploring neurologists' perspectives: Barriers and facilitators in implementing cognitive care planning. Public Policy Aging Rep 2025;35(3):70-75.

802. Jennings LA, Laffan AM, Schlissel AC, et al. Health care utilization and cost outcomes of a comprehensive dementia care program for Medicare beneficiaries. JAMA Int Med 2019;179:161-166.
803. Care Ecosystem. Care Ecosystem Toolkit. Available at: https://memory.ucsf.edu/sites/memory.ucsf.edu/files/wysiwyg/CareEcosystemToolkit.pdf. Accessed January 19, 2026.
804. Possin KL, Merrilees JJ, Dulaney S, et al. Effect of collaborative dementia care via telephone and internet on quality of life, caregiver well-being, and health care use: The Care Ecosystem Randomized Clinical Trial. JAMA Intern Med 2019;179(12):1658-1667.
805. Rosenbloom MH, Kashyap B, Diaz-Ochoa A, et al. Implementation and review of the care ecosystem in an integrated healthcare system. BMC Geriatr 2023;23(1):515.
806. Guterman EL, Kiekhofer RE, Wood AJ, Allen IE, Kahn JG, Dulaneyet S. Care ecosystem collaborative model and health care costs in Medicare beneficiaries with dementia: A secondary analysis of a randomized clinical trial. JAMA Intern Med 2023;183(11):1222-1228.
807. Scales K, Wagner LM. Direct care workers are the foundation of a dementia-capable workforce. Generations 2023;47(1):1-9.
808. Maust DT, Wagner J, Zimmerman S, et al. The National Dementia Workforce Study: Overview. J Am Geriatr Soc 2025;73(11):3318-3326.
809. PHI. Direct Care Workers in the United States: Key Facts. 2025. Available at: https://www.phinational.org/resource/direct-care-workers-in-the-united-states-key-facts-2025/. Accessed December 19, 2025.
810. Campbell S, Drake ADR, Espinoza R, Scales K. Caring for the Future: The Power and Potential of America's Direct Care Workforce. Bronx, NY: PHI; 2021. https://www.phinational.org/resource/caring-forthe-future-the-power-and-potential-of-americas-direct-care-workforce/.
811. Reckrey JM, Tsui EK, Morrison RS, et al. Beyond functional support: the range of health-related tasks performed in the home by paid caregivers in New York. Health Aff (Project Hope) 2019;38(6):927-933.
812. Lyons TL, Champion JD. Nonpharmacological interventions for management of behavioral and psychological symptoms of dementia in long-term care facilities by direct caregivers: A systematic review. J Gerontol Nurs 2022;48(7):18-23.
813. Eaton J, Cloyes KG, Paulsen B, Madden C, Ellington L. The development of knowledgeable nursing assistants as creative caregivers (KNACC). Geriatr Nurs 2023;51:95-101.
814. Kemp CL, Bender AA, Morgan JC, Burgess EO, Epps FR, Hill AM, Perkins MM. Understanding capacity and optimizing meaningful engagement among persons living with dementia. Dementia 2023;22(4):854-874.
815. Dokos M, Schultz R, Gossner JD, Fauth EB. Supporting persons with dementia: perspectives from certified nurse's assistants. Innov Aging 2023;7(5):igad049.
816. Toot S, Swinson T, Devine M, Challis D, Orrell M. Causes of nursing home placement for older people with dementia: a systematic review and meta-analysis. Int Psychogeriatr 2017;29(2):195-208.
817. Estrada LV, Watman D, Franzosa E, Reckrey J. When do paid caregivers support the health of older adults? Geriatrician perspectives. Journal of Applied Gerontology 2025;44(2): 193-198.
818. Carnahan JL, Slaven JE, Callahan CM, Tu W, Torke AM. Transitions From Skilled Nursing Facility to Home: The Relationship of Early Outpatient Care to Hospital Readmission. J Am Med Dir Assoc 2017;18(10):853-859.
819. Feltner C, Jones CD, Cene CW, et al. Transitional care interventions to prevent readmissions for persons with heart failure: a systematic review and meta-analysis. Ann Intern Med 2014;160(11):774-784.
820. Murtaugh CM, Deb P, Zhu C, et al. Reducing Readmissions among Heart Failure Patients Discharged to Home Health Care: Effectiveness of Early and Intensive Nursing Services and Early Physician Follow-Up. Health Serv Res 2017;52(4):1445-1472.
821. Guo W, Cai S, Caprio T, Schwartz L, Temkin-Greener H. End-of-Life Care transitions in assisted living: associations with state staffing and training regulations. J Am Med Dir Assoc 2023;24(6):827-832.
822. Shepherd H, Livingston G, Chan J, Sommerlad A. Hospitalisation rates and predictors in people with dementia: a systematic review and meta-analysis. BMC Med 2019;17(1):1-13.
823. LaMantia MA, Stump TE, Messina FC, Miller DK, Callahan CM. Emergency department use among older adults with dementia. Alzheimer Dis Assoc Disord 2016;30(1):35-40.
824. National Institute on Aging. Gaps in the Dementia Care Workforce: Research Update and Data Needs. Committee on Population (CPOP) Semi-Annual Meeting, May 23, 2019. Available at: https://www.nia.nih.gov/sites/default/files/2019-11/Seminar-Gaps-Dementia-Workforce-Final-508.pdf. Accessed January 19, 2026.
825. Yoon JM, Trinkoff AM, Kim M, Kim E. State-level nursing home in-service dementia training requirements and inappropriate psychotropic medication use. Geriatr Nursing 2023;51:209-214.
826. Centers for Medicare & Medicaid Services (CMS). Long-term services and supports rebalancing toolkit. Available at: https://www.medicaid.gov/medicaid/long-termservices-supports/downloads/ltss-rebalancing-toolkit.pdf. Accessed January 19, 2026.
827. Projections Managing Partnership. Projections Central: Long-Term Occupational Projections (2022-2032). Available at: https://projectionscentral.org/longterm. Accessed December 18, 2025.
828. Shih RA, Friedman EM, Chen EK, Whiting GC. Prevalence and correlates of gray market use for aging and dementia long-term care in the US. J Appl Gerontol 2022; 41(4): 1030-1034.
829. Famakinwa, J. Home Care's Industry-Wide Turnover Rate Reaches Nearly 80%, 2024. Available at: https://homehealthcarenews.com/2024/07/home-cares-industry-wide-turnover-rate-reaches-nearly-80/. Accessed December 19, 2025.
830. Gandhi A, Yu H, Grabowski DC. High nursing staff turnover in nursing homes offers important quality information. Health Aff 2021;40(3):384-391.
831. Institute of Medicine. Committee on the Future Health Care Workforce for Older Americans. Retooling for an Aging America: Building the Health Care Workforce. Washington (DC): National Academies Press (US); 2008.
832. Trinkoff AM, Han K, Storr CL, Lerner N, Johantgen M, Gartrell K. Turnover, staffing, skill mix, and resident outcomes in a national ample of US nursing homes. J Nurs Adm 2013;43(12):630-636.
833. Scales K. Transforming direct care jobs, reimagining long-term services and supports. J Am Med Dir Assoc 2022;23(2):207-213.
834. Scales K. Disrupting care: Policy threats to the immigrant direct care workforce and the future of long-term care. Public Policy and Aging Report (forthcoming).
835. Weller C, Almeida B, Cohen M, Stone R. Making Care Work Pay. Available at: https://www.ltsscenter.org/wp-content/uploads/2020/09/Making-Care-Work-Pay-Report-FINAL.pdf. Accessed January 19, 2026.
836. Reckrey JM, Perez S, Watman D, Ornstein KA, Russell D, Franzosa E. The need for stability in paid dementia care: family caregiver perspectives. J Appl Gerontol 2023;42(4):607-616.
837. Manchha AV, Walker N, Way KA, Dawson D, Tann K, Thai M. Deeply discrediting: A systematic review examining the conceptualizations and consequences of the stigma of working in aged care. Gerontologist 2021;61(4):e129-e146.
838. Khavjou O, Suarez G, Tyler D, Squillace M, Dey J, Oliveira I. Wages of direct care workers lower than other entry-level jobs in most states (Issue brief). Washington, DC: Office of the Assistant Secretary for Planning and Evaluation (ASPE), U.S. Department of Health and Human Services. Available at: https://aspe.hhs.gov/sites/default/files/documents/7a611d901c615e5611ea095b1dcf8d08/wages-dcw-lower-ib.pdf. Accessed January 19, 2026.

839. King J, Scales K, Chapman S. Training Standards for Personal Care Aides Across States: An Assessment of Current Standards and Leading Examples. University of California Healthcare Workforce Research Center on Long-Term Care and PHI. Available at: https://www.healthworkforceta.org/research-alerts/training-standards-for-personal-care-aides-across-states-an-assessment-of-current-standards-and-leading-examples/. Accessed December 19, 2025.
840. Burke G, Orlowski G. Training to serve people with dementia: is our health care system ready? Available at: https://www.justiceinaging.org/wp-content/uploads/2015/08/Training-to-serve-people-with-dementia-Alz1_Final.pdf. Accessed January 19, 2026.
841. U.S. Bureau of Labor Statistics (BLS). Occupational injuries and illnesses and fatal injuries profiles. Available at: https://www.bls.gov/iif/. Accessed January 19, 2026.
842. Paraprofessional Healthcare Institute (PHI). Workplace Injuries and the Direct Care Workforce. Available at: https://phinational.org/resource/workplace-injuriesdirect-care-workforce. Accessed January 19, 2026.
843. Quinn MM, Markkanen PK, Galligan CJ, Sama SR, Lindberg JE, Edwards MF. Healthy aging requires a healthy home care workforce: the occupational safety and health of home care aides. Curr Environ Health Rep 2021;8(3):235-244.
844. Antipas H, Tamplin J, Sousa TV, Baker FA. Understanding and mitigating occupational stress in professional dementia caregivers in residential aged care: a systematic review with framework synthesis. Journal of Psychological Health 8 2025;Jul 8:1-37.
845. Bonner A, Walsh A, Shue J, Morton G, Fulmer T. (2023). Generations: Dementia-Friendly Initiatives for Individuals Living with Dementia, Care Partners, and Communities. Available at: https://generations.asaging.org/dementiafriendly-initiatives. Accessed January 19, 2026.
846. Hebert CA, Scales K. Dementia friendly initiatives: A state of the science review. Dementia 2019;18(5):1858-1895.
847. Alzheimer's Disease International. Dementia Friendly Communities: Global Developments. 2016. Available at: https://www.alzint.org/u/dfc-developments.pdf. Accessed December 19, 2025.
848. ACT on Alzheimer's. About ACT on Alzheimer's. Available at: https://actonalz.org/about. Accessed January 19, 2026.
849. The White House. Fact sheet: The White House Conference on Aging. Available at: https://obamawhitehouse.archives.gov/the-press-office/2015/07/13/fact-sheet-white-house-conference-aging. Accessed January 19, 2026.
850. World Health Organization. National Programmes for Age-Friendly Cities and Communities: A Guide (2023). Available at: https://www.who.int/publications/i/item/9789240068698. Accessed December 19, 2025.
851. Kim K, Choi JS, Choi E, et al. Effects of community-based health worker interventions to improve chronic disease management and care among vulnerable populations: A systematic review. Am j pub health 2016;106(4):e3-28.
852. Johnson E, Lewis M, Nordyke A, et al. Community health workers: developing roles in public health dementia efforts in the United States. Front Public Health 2025;13:1616404.
853. Alam RB, Ashrafi SA, Pionke JJ, Schwingel A. Role of Community Health Workers in Addressing Dementia: A Scoping Review and Global Perspective. J Appl Gerontol 2021;40(12):1881-92.
854. U.S. Department of Health and Human Services (HHS), Administration for Community Living (ACL). ACL Announces Funding Opportunity for Dementia-Capable Community Health Worker Programs. Available at: https://acl.gov/news-and-events/announcements/acl-announces-funding-opportunity-dementia-capable-community-health. Accessed December 19, 2025.
855. Dickey TJ. "Public Libraries' Contribution to Sustainable Dementia-Friendly Communities". Williams-Cockfield, KC. and Mehra, B. (Ed.) How Public Libraries Build Sustainable Communities in the 21st Century (Advances in Librarianship, Vol. 53), Emerald Publishing Limited, Bingley, 2023. pp. 283-292.
856. van Buuren LPG, Mohammadi M. Dementia-friendly design: ASet of design criteria and design typologies supporting wayfinding. HERD 2022;15(1):150-172.
857. Devos P, Aletta F, Thomas P, et al. Designing supportive soundscapes for nursing home residents with dementia. Int J Environ Res Public Health 2019;16(24):4904.
858. Anetzberger GJ, Palmisano BR, Sanders M, Bass D, Dayton C, Eckert S, Schimer MR. A model intervention for elder abuse and dementia. Gerontologist 2000;40(4):492-497.
859. Dong XQ, Chen R, Simon MA. Elder abuse and dementia: A review of the research and health policy. Health Aff (Millwood) 2014;33(4):642-649.
860. Justice in Aging. 2015. Training to Serve People with Dementia: Is our Health Care System Ready? Paper 4: Dementia Training Standards for First Responders, Protective Services and Ombuds. Available at: https://justiceinaging.org/wp-content/uploads/2015/08/Training-to-serve-people-with-dementia-Alz4_Final.pdf#:~:text=In%20the%20nationwide%20survey%2C%20ten%20states%20(Colorado%2C,and%20how%20to%20handle%20difficult%20situations%20safely. Accessed December 19, 2025.
861. Sun F, Gao X, Brown H, Winfree LT. Police officer competence in handling Alzheimer's cases: The roles of AD knowledge, beliefs, and exposure. Dementia 2019;18(2):674-684.
862. Brown RT, Ahalt C, Rivera J, Stijacic Cenzer I, Wilhelm A, Williams BA. Good cop, bad cop: Evaluation of a geriatrics training program for police. J Am Geriatr Soc 2017;65(8):1842-1847.
863. Anderson KA, Cimbal AM, Maile JJ. Hairstylists' relationships and helping behaviors with older adult clients. J Appl Gerontol 2010;29(3):371-380.
864. Che SL, Wu J, Chuang Y-C, Van IK, Leong SM. The willingness to help people with dementia symptoms among four occupation practitioners in Macao. Am J Alzheimers Dis Other Demen 2022;37:15333175221139172.
865. Cherry DL. HCBS can keep people with dementia at home. Generations 2012;36(1) 83-90.
866. Ty D, McDermott M. Building Workforce Capacity to Improve Detection and Diagnosis of Dementia. Milken Institute; 2021. Available at: https://milkeninstitute.org/sites/default/files/2021-05/Building%20Dementia%20Workforce.pdf. Accessed January 19, 2026.
867. Office of the Governor of California. On World Alzheimer's Day, Governor Newsom signs legislation to take on dementia and help Californians thrive as they age. Available at: https://www.gov.ca.gov/2024/09/21/on-world-alzheimers-day-governor-newsom-signs-legislation-to-take-on-dementia-and-help-californians-thrive-as-they-age/. Accessed January 19, 2026.
868. Alzheimer's Impact Movement. State Legislatures Take Action: Advancing Alzheimer's Training for First Responders. Available at: https://alzimpact.org/State-Legislatures-Take-Action-Advancing-Alzheimers-Training-for-First-Responders. Accessed December 19, 2025.
869. KFSM-TV Channel 5 (Johnson, Arkansas). Alzheimer's and dementia training now required for Arkansas law enforcement officers. Available at: https://www.5newsonline.com/article/news/state/alzheimers-dementia-training-required-arkansas-law-enforcement-officers/527-86420874-5f59-4593-b648-5b302dff8d90. Accessed December 19, 2025.
870. AARP. Law Mandates Dementia Training for Virginia First Responders. Available at: https://states.aarp.org/virginia/dementia-law-mandates-training-first-responders. Accessed December 19, 2025.
871. Florida Public Radio. New Florida law requires state to develop Alzheimer's and dementia-related training. Available at: https://www.wuft.org/healthscience/2024-10-23/new-florida-law-requires-law-enforcement-to-receive-alzheimers-and-dementia-related-training. Accessed December 19, 2025.
872. AARP. Dementia Training for Texas Law Enforcement. Available at: https://states.aarp.org/texas/dementia-training-for-texas-law-enforcement. Accessed December 19, 2025.

873. AARP. Ohio Governor Signs AARP-backed Bill to Provide Dementia Training for First Responders. Available at: https://blog.aarp.org/fighting-for-you/ohio-governor-dementia-training-first-responders. Accessed December 19, 2025.
874. Novak P. The National Dementia Workforce Study: Perspective From the National Institute on Aging. J Am Geriatr Soc 2025;73(11):3354-3358.
875. Spetz J, Wagner LM, White EM, et al. The National Dementia Workforce Study: Development of Questionnaires for Home Care, Assisted Living, and Nursing Home Settings. J Am Geriatr Soc 2025;73(11):3344–3353.
876. White EM, Wagner J, Stewart K, et al. The National Dementia Workforce Study: Methods for Surveying Community Clinicians Who Provide Care to People With Dementia. J Am Geriatr Soc 2025;73(11):3327-3335.
877. Wagner J, Wagner LM, Zimmerman S, et al. The National Dementia Workforce Study: The Plan for Organization Sample Frames and Data Collection. J Am Geriatr Soc 2025 73(11):3336-3343.
878. National Dementia Workforce Study. How to Access Data. National Dementia Workforce Study website. https://www.ndws.org/surveys-and-data/how-to-access-data. Accessed September 7, 2025.
879. Warshaw GA, Bragg EJ. The essential components of quality geriatric care. Generations 2016;40(1):28-37.
880. Tullo E, Wakeling L, Pearse R, Kheng Khoo T, Teodorczuk A. Lost in translation: How can education about dementia be effectively integrated into medical school contexts? A realist synthesis. BMJ Open 2023;13(11):e077028.
881. Tuffour I, Ganga G. Dementia: A call for a paradigm shift in pre-registration nurse education. Glob Ment Health (Camb) 2023;11:e2.
882. Sideman AB, Harrison KL, Garrett SB, Paladino J, Naasan G, Ritchie CS. Dementia specialty care clinicians' perspectives on their role in the dementia diagnostic process and diagnostic disclosure. J Geriatr Psychiatry Neurol 2025;38(1):3-12.
883. Health Resources and Services Administration. Train Health Care Workers About Dementia. Available at: https://bhw.hrsa.gov/alzheimers-dementia-training. Accessed December 19, 2025.
884. Mate K, Fulmer T, Pelton L, Berman A, Bonner A, Huang W, Zhang J. Evidence for the 4Ms: Interactions and Outcomes across the Care Continuum. J Aging Health 2021;33(7-8): 469-481.
885. Goldberg GR, Solis G, John JT, Olvet DM, Kranz KA. 4Ms for Early Learners: A Skills-Based Geriatrics Curriculum for Second-Year Medical Students. MedEdPORTAL 2022;18:11264.
886. Avallone M, Perweiler E, Pacetti S. Using the 4Ms framework to teach geriatric competencies in a community clinical experience. Nurs Forum 2021;56(1):83-88.
887. Mate KS, Berman A, Laderman M, et al. Creating age-friendly health systems: A vision for better care of older adults. Healthc (Amst) 2018;6(1):4-6.
888. Alzheimer's Association. Alzheimer's Facts and Figures 2021 special report: Race, ethnicity and Alzheimer's in America. Available at: https://alz.org/media/Documents/alzheimers-facts-and-figures-special-report-2021.pdf. Accessed January 19, 2026.
889. Diaz-Santos M, Yanez J, Suarez PA. Alzheimer's disease in bilingual Latinos: clinical decisions for diagnosis and treatment planning. J Health Service Psychol 2021;47(4):171-179.
890. Chejor P, Laging B, Whitehead L, Porock D. Experiences of older immigrants living with dementia and their carers: a systematic review and meta-synthesis. BMJ open 2022;12(5):e059783.
891. Nowaskie DZ, Sewell, DD. Assessing the LGBT cultural competency of dementia care providers. Alzheimers Dement 2021;7(1): e12137.
892. Eller N, Belza B. Addressing Alzheimer's disease in Asian American and Pacific Islander older adults: An action guide for service providers. J Gerontol Nurs 2019;44(4):3-4.
893. Abramsohn EM, Paradise KM, Glover CM, et al. Community Rx: Optimizing a community resource referral intervention for minority dementia caregivers. J Appl Gerontol 2022;41(1):113-123.
894. American Geriatrics Society. GWEP coordinating center. Available at: https://www.americangeriatrics.org/programs/gwep-coordinating-center. Accessed January 19, 2026.
895. Alzheimer's Association. The Alzheimer's and Dementia Care ECHO® Program for clinicians. Available at: https://www.alz.org/professionals/health-systems-medical-professionals/echo-alzheimers-dementia-care-program. Accessed January 19, 2026.
896. Sideman AB, Hernandez de Jesus A, Alagappan C, et al. Strengthening Primary Care Workforce Capacity in Dementia Diagnosis and Care: A qualitative study of project Alzheimer's disease–ECHO. Med Care Res Rev 2024;81(5):384-394.
897. Boustani M, Alder CA, Solid CA, Reuben D. An alternative payment model to support widespread use of collaborative dementia care models. Health Aff (Millwood) 2019;38(1):54-59.
898. Pizzi LT, Jutkowitz E, Prioli KM, Lu E, Babcock Z, McAbee-Sevick H, Wakefield DB, Robison J, Molony S, Piersol CV, Gitlin LN. Cost-benefit analysis of the COPE program for persons living with dementia: Toward a payment model. Innov Aging 2022;6(1):igab042.
899. Muirhead K, Macaden L, Smyth K, Chandler C, Clarke C, Polson R, O'Malley C. Establishing the effectiveness of technology-enabled dementia education for health and social care practitioners: a systematic review. Syst Rev 2021;10(1):1-26.
900. Geddes MR, O'Connell ME, Fisk JD, Gauthier S, Camicioli R, Ismail Z. Remote cognitive and behavioral assessment: Report of the Alzheimer Society of Canada Task Force on Dementia Care Best Practices for COVID-19. Alzheimers Dement 2020;12(1):e12111.
901. Yi JS, Pittman CA, Price CL, Nieman CL, Oh ES. Telemedicine and dementia care: a systematic review of barriers and facilitators. J Am Med Dir Assoc 2021;22(7):1396-1402.
902. Pappada A, Chattat R, Chirico I, Valente M, Ottoboni G. Assistive technologies in dementia care: an updated analysis of the literature. Front Psych 2021;12:644587.
903. Ma Y, Nordberg OE, Hubbers J, et al. Bridging the gap: Advancements in technology to support dementia care - A scoping review. arXiv preprint arXiv:2404.09685. 2024.
904. Kiselica AM, Hermann GE, Scullin MK, Benge JF. Technology that CARES: Enhancing dementia care through everyday technologies. Alzheimers Dement 2024;20(12):8969-78.
905. Abadir PM, Battle A, Walston JD, Chellappa R. Enhancing Care for Older Adults and Dementia Patients With Large Language Models: Proceedings of the National Institute on Aging—Artificial Intelligence & Technology Collaboratory for Aging Research Symposium. J Gerontol A Biol Sci Med Sci 2024;79(9):glae176.
906. Hurd MD, Martorell P, Delavande A, Mullen KJ, Langa KM. Monetary costs of dementia in the United States. N Engl J Med 2013;368:1326-1334.
907. Unpublished tabulations based on data from the Medicare Current Beneficiary Survey for 2018. Prepared under contract by Health Care Cost Institute, December 2021.
908. Murman DL, Chen Q, Powell MC, Kuo SB, Bradley CJ, Colenda CC. The incremental direct costs associated with behavioral symptoms in AD. Neurology 2022;59:1721-1729.
909. Yang Z, Levey A. Gender differences: A lifetime analysis of the economic burden of Alzheimer's disease. Women Health Iss 2015;25(5):436-440.
910. White L, Fishman P, Basu A, Crane PK, Larson EB, Coe NB. Medicare expenditures attributable to dementia. Health Services Res 2019;54(4):773-781.
911. Coe NB, White L, Oney M, Basu A, Larson EB. Public spending on acute and long-term care for Alzheimer's disease and related dementias. Alzheimers Dement 2023;19(1):150-157.
912. Suehs BT, Davis CD, Alvir J, et al. The clinical and economic burden of newly diagnosed Alzheimer's disease in a Medicare Advantage population. Am J Alzheimers Dis Other Dement 2013;28(4):384-3892.

913. Lin P-J, Zhong Y, Fillit HM, Chen E, Neumann PJ. Medicare expenditures of individuals with Alzheimer's disease and related dementias or mild cognitive impairment before and after diagnosis. J Am Geriatr Soc 2016;64:1549-1557.
914. Geldmacher DS, Kirson NY, Birnbaum HG, et al. Pre-diagnosis excess acute care costs in Alzheimer's patients among a U.S. Medicaid population. Appl Health Econ Health Policy 2013;11(4):407-413.
915. Zhu CW, Cosentino S, Ornstein K, et al. Medicare utilization and expenditures around incident dementia in a multiethnic cohort. J Gerontol A Biol Sci Med Sci 2015;70(11):1448-1453.
916. Li J, AndyC, Mitchell S. Use of Medicare's new reimbursement codes for cognitive assessment and care planning, 2017-2018. JAMA Netw Open 2021;4(9):e2125725.
917. Kirson NY, Desai U, Ristovska L, et al. Assessing the economic burden of Alzheimer's disease patients first diagnosed by specialists. BMC Geriatrics 2016;16:138.
918. Oney M, White L, Coe NB. Out-of-pocket costs attributable to dementia: A longitudinal analysis. J Am Geriatr Soc 2022;70(5):1538-1545.
919. Hudomiet P, Hurd MD, Rohwedder S. The relationship between lifetime out-of-pocket medical expenditures, dementia and socioeconomic status in the U.S. J Econ Ageing 2019;14:100181.
920. Dwibedi N, Findley AP, Wiener C, Shen C, Sambamoorthi U. Alzheimer disease and related disorders and out-of-pocket health care spending and burden among elderly Medicare beneficiaries. Medical Care 2018;56:240-246.
921. Synnott PG, Zhu Y, Rodday AM, et al. Characterizing financial risk from out-of-pocket expenditures across dementia stages. Alzheimers Dement 2025;21(9):e70666.
922. Leniz J, Yi D, Yorganci E, et al. Exploring costs, cost coKelley AS, McGarry K, Gorges R, Skinner JS. The burden of health care costs for patients with dementia in the last 5 years of life. Ann Intern Med 2015;163:729-736.
923. Kelley AS, McGarry K, Gorges R, Skinner JS. The burden of health care costs for patients with dementia in the last 5 years of life. Ann Intern Med 2015;163:729-736.
924. Agency for Healthcare Research and Quality. Healthcare Cost and Utilization Project (HCUP) National (Nationwide) Inpatient Sample (NIS) for 2022.
925. Agency for Healthcare Research and Quality. Healthcare Cost and Utilization Project (HCUP) National (Nationwide) Inpatient Sample (NIS) for 2021. Available at: https://hcup-us.ahrq.gov/nisoverview.jsp. Accessed December 23, 2025.
926. U.S. Centers for Medicare & Medicaid Services. State Level Chronic Conditions Table: Prevalence, Medicare Utilization and Spending, 2007-2018.
927. Kamdar N, Syrjamaki J, Aikens JE, Mahmoudi E. Readmission Rates and Episode Costs for Alzheimer Disease and Related Dementias Across Hospitals in a Statewide Collaborative. JAMA Netw Open 2023;6(3):e232109.
928. Cairns C, Kang K. National Hospital Ambulatory Medical Care Survey: 2022 emergency department summary tables. Available at: https://ftp.cdc.gov/pub/Health_Statistics/NCHS/Dataset_Documentation/NHAMCS/doc22-ed-508.pdf. Accessed January 19, 2026.
929. Cairns C, Kang K, Santo L. National Hospital Ambulatory Medical Care Survey: 2018 emergency department summary tables. Available from: https://www.cdc.gov/nchs/data/nhamcs/ web_tables/2018_ed_web_tables-508.pdf.
930. Cairns C, Kang K. National Hospital Ambulatory Medical Care Survey: 2019 emergency department summary tables. Available at: https://dx.doi.org/10.15620/cdc:115748. Accessed January 19, 2026.
931. Cairns C, Kang K. National Hospital Ambulatory Medical Care Survey: 2020 emergency department summary tables. Available at: https://dx.doi.org/10.15620/cdc:121911. Accessed January 19, 2026.
932. Cairns C, Kang K. National Hospital Ambulatory Medical Care Survey: 2021 emergency department summary tables. Available at: https://ftp.cdc.gov/pub/Health_Statistics/NCHS/Dataset_Documentation/NHAMCS/doc21-ed-508.pdf. Accessed January 19, 2026.
933. Gerlach LB, Martindale J, Bynum JPW, Davis MA. Characteristics of emergency department visits among older adults with dementia. JAMA Neurol 2023;80(9):1002-1004.
934. Hill JD, Schmucker AM, Siman N, et al. Emergency and post-emergency care of older adults with Alzheimer's disease/Alzheimer's disease related dementias. J Am Geriatr Soc 2022;70(9):2582-2591.
935. Medicare. Skilled Nursing Facility Care. Available. at: https://www.medicare.gov/coverage/skilled-nursing-facility-care. Accessed January 19, 2026.
936. U.S. Centers for Medicare & Medicaid Services. Mapping Medicare disparities by population. Available at: https://data.cms.gov/tools/mapping-medicare-disparities-by-population. Accessed January 19, 2026.
937. Leibson CL, Hall Lon K, Ransom JE, et al. Direct medical costs and source of cost differences across the spectrum of cognitive decline: A population-based study. Alzheimers Dement 2015;11(8):917-932.
938. U.S. Centers for Medicare & Medicaid Services. Original Medicare (Part A and B) Eligibility and Enrollment. Available at: https://www.cms.gov/Medicare/Eligibility-and-Enrollment/OrigMedicarePartABEligEnrol. Accessed January 19, 2026.
939. U.S. Centers for Medicare & Medicaid Services. Understanding Medicare Advantage Plans. CMS Product No. 12026. November 2024. Available at: https://www.medicare.gov/publications/12026-understanding-medicare-advantage-plans.pdf. Accessed January 19, 2026.
940. Centers for Medicare & Medicaid Services, U.S. Department of Health and Human Services. Medicare Enrollment Dashboard. Available at: data.cms.gov/tools/medicare-enrollment-dashboard. Accessed December 24, 2025.
941. Agarwal R, Connolly J, Gupta S, Navathe AS. Comparing Medicare Advantage and traditional Medicare: A systematic review. Health Aff (Millwood) 2021;40(6):937-944.
942. Jacobson M, Ferido P, Zissimopoulos J. Health care utilization before and after a dementia diagnosis in Medicare Advantage versus traditional Medicare. J Am Geriatr Soc 2024;72(6):1856-1866.
943. Sengupta M, Lendon JP, Caffrey C, Melekin A, Singh P. Post-acute and long-term care providers and services users in the United States, 2017—2018. Vital Health Stat 3 2022:(47):1-93.
944. Centers for Medicare & Medicaid Services. Home health services. Available at: https://www.medicare.gov/coverage/home-health-services. Accessed January 19, 2026.
945. Davis-Ajami ML, Lu ZK, Wu J. Exploring the home healthcare workforce in Alzheimer's disease and related dementias: Utilization and cost outcomes in US community dwelling older adults. Arch Gerontol Geriat 2022;98;104536.
946. National Center for Health Statistics. Biennial Overview of Postacute and Long-term Care in the United States. Available at: https://data.cdc.gov/d/wibz-pb5q. Accessed January 19, 2026.
947. Knox S, Downer B, Haas A, Ottenbacher KJ. Home health utilization association with discharge to community for people with dementia. Alzheimers Dement 2022;8(1):e12341.
948. Rome V, Penn Lendon J, Harris-Kojetin L. Differences in characteristics of adult day services centers by level of medical service provision. National Center for Health Statistics 2020;3(45): 1-28.
949. Sengupta M, Caffrey C. Characteristics of residential care communities by percentage of resident population diagnosed with dementia: United States, 2016. National Health Statistics Reports 2020;148:1-7.
950. Caffrey C, Melekin A, Lu Z, Sengupta M. Variation in residential care community resident characteristics, by size of community: United States, 2020. NCHS Data Brief, no 454. Hyattsville, MD: National Center for Health Statistics; 2022.
951. Caffrey C, Harris-Kojetin L, Rome V, Sengupta M. Variation in operating characteristics of residential care communities by size of community: United States, 2014. NCHS Data Brief, No. 222. November 2015.

952. Colelo KJ., Sorenson I. Who pays for long-term services and supports? Congressional Research Service, In Focus, IF10343. August 28, 2025. Available at: https://www.congress.gov/crs-product/IF10343. Accessed December 19, 2025.
953. McGarry BE, Grabowski DC. Medicaid home and community-based services spending for older adults: Is there a "woodwork" effect? J Am Geriatr Soc 2023;71(10):3143-3151.
954. Murray C, Stepanczuk C, Carpenter A, Wysocki A. Trends in Users and Expenditures for Home and Community-Based Services as a Share of Total Medicaid LTSS Users and Expenditures, 2022. Mathematica, August 29, 2024.
955. Bynum J. Characteristics, Costs, and Health Service Use for Medicare Beneficiaries with a Dementia Diagnosis: Report 1: Medicare Current Beneficiary Survey. Unpublished; provided under contract with the Alzheimer's Association. Lebanon, N.H.: Dartmouth Institute for Health Policy and Clinical Care, Center for Health Policy Research, January 2009.
956. Clarkson P, Davies L, Jasper R, Loynes N, Challis D. Home Support in Dementia (HoSt-D) Programme Management Group. A systematic review of the economic evidence for home support interventions in dementia. Value in Health 2017;20:1198-1209.
957. Nickel F, Barth J, Kolominsky-Rabas PL. Health economic evaluations of non-pharmacological interventions for persons with dementia and their informal caregivers: A systematic review. BMC Geriatrics 2018;18:69.
958. Callahan CM, Arling G, Tu W, et al. Transitions in care among older adults with and without dementia. J Am Geriatr Soc 2012;60(5):813-820.
959. Gozalo P, Teno JM, Mitchell SL, et al. End-of-life transitions among nursing home residents with cognitive issues. N Engl J Med 2011;365(13):1212-1221.
960. Teno JM, Mitchell SL, Skinner J, et al. Churning: The association between health care transitions and feeding tube insertion for nursing home residents with advanced cognitive impairment. J Palliat Med 2009;12(4):359-362.
961. Genworth. Cost of Care Trends & Insights. Available at: https://www.genworth.com/aging-and-you/finances/cost-of-care/cost-of-care-trends-and-insights. Accessed January 19, 2026.
962. Genworth Financial, Inc. Cost of Care Survey: Median Cost Data Tables (2021). January 31, 2022.
963. Unpublished data from the 2018 Medicare Current Beneficiary Survey (MCBS), analyzed by the Alzheimer's Association. October 2020.
964. Cottrill A, Cubanski J, Neuman T, Smith K. Income and assets of Medicare beneficaries in 2024. Issue Brief. Kaiser Family Foundation. August 2025. https://www.kff.org/medicare/income-and-assets-of-medicare-beneficiaries/Income and Assets of Medicare Beneficiaries in 2024 | KFF. Accessed April 2, 2026.
965. Hamel L, Montero A. The affordability of long-term care and support services: Findings from a KFF survey. Kaiser Family Foundation. November 14, 2023. Available at: https://www.kff.org/health-costs/poll-finding/the-affordability-of-long-term-care-and-support-services/. Accessed January 19, 2026.
966. U.S. Centers for Medicare & Medicaid Services. What Are Medicare and Medicaid? CMS Product No. 11306. May 2023. Available at: https://www.medicare.gov/publications/11306-Medicare-Medicaid.pdf. Accessed January 19, 2026.
967. U.S. Centers for Medicare & Medicaid Services. Your Medicare Coverage. Long-Term Care. Available at: https://www.medicare.gov/coverage/long-term-care. Accessed January 19, 2026.
968. U.S. Centers for Medicare & Medicaid Services. What Are Long-Term Care Hospitals? CMS Product No. 11347. Revised July 2022. CMS Product No. 11347. Available at: https://www.medicare.gov/publications/11347-What-are-long-term-care-hospitals.pdf. Accessed January 19, 2026.
969. National Association of Insurance Commissioners and the Center for Insurance Policy and Research. The State of Long-Term Care Insurance: The Market, Challenges and Future Innovations. CIPR Study Series 2016-1. May 2016.
970. U.S. Centers for Medicare & Medicaid Services. Skilled nursing facility care. Available at: https://www.medicare.gov/coverage/skilled-nursing-facility-care. Accessed January 19, 2026.
971. Boards of Trustees, Federal Hospital Insurance and Federal Supplementary Medical Insurance Trust Funds. (2025). 2025 annual report of the Boards of Trustees of the Federal Hospital Insurance and Federal Supplementary Medical Insurance Trust Funds. Available at: https://www.cms.gov/oact/tr/2025. Accessed December 19, 2025.
972. U.S. Department of Health and Human Services. What is Long-Term Care Insurance? Available at: https://acl.gov/ltc/costs-and-who-pays/what-is-long-term-care-insurance. Accessed January 19, 2026.
973. National Association of Insurance Commissioners. Long-Term Care Insurance Experience Reports for 2020. 2021. Available at: https://content.naic.org/sites/default/files/LTC-LR.pdf. Accessed October 21, 2025.
974. National Association of Insurance Commissioners. Long-Term Care Insurance Experience Reports for 2023. 2025. Available at: https://content.naic.org/sites/default/files/publication-ltc-lr-care-experience-report.pdf. Accessed October 21, 2025.
975. U.S. Department of the Treasury. Long-Term Care Insurance: Recommendations for Improvement of Regulation. Report of the Federal Interagency Task Force on Long-Term Care Insurance. August 2020. Available at: https://home.treasury.gov/system/files/136/Report-Federal-Interagency-Task-Force-Long-Term-Care-Insurance.pdf. Accessed January 19, 2026.
976. American Association for Long-Term Care Insurance. 2024 Long-Term Care Insurance Facts - Prices - Data - Statistics - 2024 Reports. Available at: https://www.aaltci.org/long-term-care-insurance/learning-center/ltcfacts-2024.php#2024costs. Accessed on October 21, 2025.
977. American Association for Long-Term Care Insurance. Long-term care insurance facts - data -statistics - 2022 reports. Available at: https://www.aaltci.org/long-term-care-insurance/learning-center/ltcfacts-2022.php. Accessed January 19, 2026.
978. Washington State Legislature. Chapter 50B.04 RCW. Long-Term Services and Supports Program. Available at: https://app.leg.wa.gov/RCW/default.aspx?cite=50B.04. Accessed January 19, 2026.
979. Washington State Department of Social and Health Services. About the WA Cares Fund. Available at: https://wacaresfund.wa.gov/about. Accessed January 19, 2026.
980. LTC News. Multiple states considering implementing long-term care tax. Updated April 25, 2024. Available at: https://www.ltcnews.com/articles/multiple-states-considering-implementing-long-term-care-tax. Accessed January 19, 2026.
981. U.S. Centers for Medicare & Medicaid Services. Seniors & Medicare and Medicaid enrollees. Available at: https://www.medicaid.gov/medicaid/eligibility/seniors-medicare-and-medicaid-enrollees/index.html. Accessed January 19, 2026.
982. Medicaid and CHIP Payment and Access Commission. (2024). Medicare Advantage dual eligible special needs plans. Available at: https://www.macpac.gov/subtopic/medicare-advantage-dual-eligible-special-needs-plans-aligned-with-medicaid-managed-long-term-services-and-supports/. Accessed December 19, 2025.
983. Sachar A, Fuglesten Biniek J, Mohamed M, Burns A. A Closer Look at the Growing Role of Special Needs Plans in Medicare Advantage. KFF. September 25, 2025. Available at: https://www.kff.org/medicare/a-closer-look-at-the-growing-role-of-special-needs-plans-in-medicare-advantage/. Accessed December 22, 2025.

984. Xu W, Raver E, Carlin C, et al. Outcomes for dual-eligible beneficiaries with dementia in special needs plans and other Medicare advantage plans. JAMA Netw Open 2025;8(2):e2461219.
985. U.S. Centers for Medicare & Medicaid Services. Medicare and hospice benefits: Getting Started. Care and support for people who are terminally ill. CMS Product No. 11361. May 2023. Available at https://www.medicare.gov/publications/11361-medicare-hospice-getting-started.pdf. Accessed January 19, 2026.
986. Centers for Medicare & Medicaid Services. Medicare Hospice Benefits. March 2023. CMS Product 02154. Available at: https://www.medicare.gov/publications/02154-medicare-hospice-benefits.pdf. Accessed January 19, 2026.
987. Davis MA, Chang C-H, Simonton, S, Bynum J. Trends in US Medicare decedents' diagnosis of dementia from 2004 to 2017. JAMA Health Forum 2022;3(4):e220346.
988. U.S. Centers for Medicare & Medicaid Services. Post-Acute Care and Hospice Provider Data 2017. Available at: https://www.hhs.gov/guidance/document/post-acutecare-and-hospice-provider-data-0. Accessed January 19, 2026.
989. De Vleminck A, Morrison RS, Meier DE, Aldridge MD. Hospice care for patients with dementia in the United States: A longitudinal cohort study. J Am Med Dir Assoc 2018;19:633-638.
990. Aldridge MD, Hunt L, Husain M, Li L, Kelley A. Impact of Comorbid Dementia on Patterns of Hospice Use. J Palliat Med 2022;25(3):396-404.
991. Russell D, Diamond EL, Lauder B, et al. Frequency and risk factors for live discharge from hospice. J Am Geriatr Soc 2017;65:1726-1732.
992. U.S. Department of Health and Human Services. Centers for Medicare & Medicaid Services. 42 CFR Part 418. Medicare Program; FY 2025 Hospice Wage Index and Payment Rate Update, Hospice Conditions of Participation Updates, and Hospice Quality Reporting Program Requirements. Available at: https://www.federalregister.gov/documents/2024/04/04/2024-06921/medicare-program-fy-2025-hospice-wage-index-and-payment-rate-update-hospice-conditions-of. Accessed January 19, 2026.
993. National Archives. Code of Federal Regulations (eCFR). Certification of terminal illness. Available at: https://www.ecfr.gov/current/title-42/chapter-IV/subchapter-B/part-418/subpart-B/section-418.22. Accessed January 19, 2026.
994. Centers for Medicare & Medicaid Services. Annual Change in Medicaid Hospice Payment Rates—ACTION [Memorandum]. Available at: https://www.medicaid.gov/medicaid/benefits/downloads/medicaid-hospice-rate-letter-FY2026.pdf. Accessed December 19, 2025.
995. Miller SC, Lima JC, Looze J, Mitchell SL. Dying in U.S. nursing homes with advanced dementia: How does health care use differ for residents with, versus without, end-of-life Medicare skilled nursing facility care? J Palliat Med 2012;15:43-50.
996. Miller SC, Gozalo P, Mor V. Hospice enrollment and hospitalization of dying nursing home patients. Am J Med 2001;11(1):38-44.
997. Kiely DK, Givens JL, Shaffer ML, Teno JM, Mitchell SL. Hospice use and outcomes in nursing home residents with advanced dementia. J Am Geriatr Soc 2010;58(12):2284-2291.
998. Shega JW, Hougham GW, Stocking CB, Cox-Hayley D, Sachs GA. Patients dying with dementia: Experience at the end of life and impact of hospice care. J Pain Symptom Manage 2008;35(5):499-507.
999. Wladkowski SP, Wallace CL, Coccia K, et al. Live Discharge of Hospice Patients with Alzheimer's Disease and Related Dementias: A Systematic Review. Am J Hosp Palliat Care 2024;41(2):228-239.
1000. Lin PJ, Zhu Y, Olchanski N, et al. Racial and ethnic differences in hospice use and hospitalizations at end-of-life among Medicare beneficiaries with dementia. JAMA Netw Open 2022;5(6):e2216260.
1001. Miller SC, Lima JC, Orna I, Martin E, Bull J. Hanson LC. Specialty palliative care consultations for nursing home residents with dementia. J Pain Symptom Manage 2017;54:9-16.
1002. Palmer MK, Jacobson M, Enguidanos S. Advance care planning for Medicare beneficiaries increased substantially, but prevalence remained low. Health Aff 2021;40:613-621.
1003. Zhu Y, Olchanski N, Cohen JT, Freund KM, Faul JD, Fillit HM, Neumann PJ, Lin PJ. Life-sustaining treatments among Medicare beneficiaries with and without dementia at the end of life. J Alzheimers Dis 2023;96(3):1183-1193.
1004. Bynum JPW, Meara E, Chang C-H, Rhoads JM. Our Parents, Ourselves: Health Care for an Aging Population. A Report of the Dartmouth Atlas Project. The Dartmouth Institute for Health Policy & Clinical Practice; 2016.
1005. Gozalo P, Plotzke M, Mor V, Miller SC, Teno JM. Changes in Medicare costs with the growth of hospice care in nursing homes. N Engl J Med 2015;372:1823-1831.
1006. Mitchell SL, Mor V, Gozalo PL, Servadio JL, Teno JM. Tube feeding in U.S. nursing home residents with advanced dementia, 2000-2014. JAMA 2016;316(7):769-770.
1007. Centers for Disease Control and Prevention, National Center for Health Statistics. National Vital Statistics System, Mortality 1999-2022 on CDC WONDER Online Database, released in 2024. Data are from the Multiple Cause of Death Files, 1999-2022, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Available at: http://wonder.cdc.gov/ucd-icd10.html. Accessed January 19, 2026.
1008. Davis-Ajami ML, Chang CH, Gupta S, et al. Mortality and Discharge Location of Intensive Care Patients With Alzheimer Disease and Related Dementia. Am J Crit Care 2023;32(4):249-255.
1009. Park S, Chen J. Racial and ethnic patterns and differences in health care expenditures among Medicare beneficiaries with and without cognitive deficits or Alzheimer's disease and related dementias. BMC Geriatrics 2020;20:482.
1010. Olchanski N, Zhu Y, Liang L, et al. Racial and ethnic differences in disease course Medicare expenditures for beneficiaries with dementia. J Am Geriatr Soc 2024;72(4):1223-1233.
1011. Estrada LV, Barcelona V, Dhingra L, et al. Potentially avoidable hospitalizations among historically marginalized nursing home residents. JAMA Netw Open 2024;7(5):e249312.
1012. Gilligan AM, Malone DC, Warholak TL, Armstrong EP. Health disparities in cost of care in patients with Alzheimer's disease: An analysis across 4 state Medicaid populations. Am J Alzheimers Dis Other Dement 2013;28(1):84-92.
1013. Lin P-J, Zhong Y, Fillit HM, Cohen JT, Neumann PJ. Hospitalizations for ambulatory care sensitive conditions and unplanned readmissions among Medicare beneficiaries with Alzheimer's disease. Alzheimers Dement 2017;13(10):1174-1178.
1014. U.S. Department of Health and Human Services. Reduce the proportion of preventable hospitalizations in older adults with dementia — DIA-02. Healthy People 2030. Available at: https://odphp.health.gov/healthypeople/objectives-and-data/browse-objectives/dementias/reduce-proportion-preventable-hospitalizations-older-adults-dementia-dia-02. Accessed January 19, 2026.
1015. Davydow DS, Zibin K, Katon WJ, et al. Neuropsychiatric disorders and potentially preventable hospitalizations in a prospective cohort study of older Americans. J Gen Intern Med 2014;29(10):1362-1371.
1016. Guterman EL, Allen IE, Josephson SA, et al. Association between caregiver depression and emergency department use among patients with dementia. JAMA Neurol 2019;76:1166-1173.
1017. Patel A, Parikh R, Howell EH, Hsich E, Landers SH, Gorodeski EZ. Mini-Cog performance: Novel marker of post discharge risk among patients hospitalized for heart failure. Circ Heart Fail 2015;8(1):8-16.
1018. Lin PJ, Fillit HM, Cohen JT, Neumann PJ. Potentially avoidable hospitalizations among Medicare beneficiaries with Alzheimer's disease and related disorders. Alzheimers Dement 2013;9(1):30-38.

1019. MacNeil-Vroomen JL, Nagurney JM, Allore HG. Comorbid conditions and emergency department treat and release utilization in multimorbid persons with cognitive impairment. Am J Emerg Med 2020;38(1):127-131.
1020. Feng Z, Coots LA, Kaganova Y, Wiener JM. Hospital and ED use among Medicare beneficiaries with dementia varies by setting and proximity to death. Health Aff 2014;33(4):683-690.
1021. White EM, Kosar CM, Rahman M, Mor V. Trends in hospitals and skilled nursing facilities sharing medical providers. Health Affairs 2020;39(8):1312-1320.
1022. Chidambaram P, Burns A. Ten things about long-term services and supports (LTSS). Kaiser Family Foundation. July 2024. Available at: https://www.kff.org/medicaid/issue-brief/10-things-about-long-term-services-and-supports-ltss/. Accessed January 19, 2026.
1023. U.S. Centers for Medicare & Medicaid Services. Medicare COVID-19 cases & hospitalizations. January 2022. Available at: https://data.cms.gov/covid-19/medicare-covid-19-cases-hospitalizations/data. Accessed January 19, 2026.
1024. Lamont H, Samson LW, Zuckerman R, Dey J, Oliveira I, Tarazi W. The Impact of COVID-19 on Medicare Beneficiaries with Dementia (Issue Brief). Washington, DC: Office of the Assistant Secretary for Planning and Evaluation, U.S. Department of Health and Human Services. April 6, 2021.
1025. Wang Q, Davis PB, Gurney ME, Xu R. COVID-19 and dementia: Analyses of risk, disparity, and outcomes from electronic health records in the US. Alzheimers Dement 2021;17(8):1297-1306.
1026. Centers for Medicare & Medicaid Services. The Impact of COVID-19 on Medicare Beneficiaries in Nursing Homes. Available at: https://www.cms.gov/files/document/medicare-covid-19-nursing-home-analysis.pdf. Accessed January 19, 2026.
1027. Johnson AL, Chin NA, Piasecki TM, et al. COVID-19 outcomes among patients with dementia and age-matched controls who were hospitalized in 21 US health-care systems. Alzheimers Dement 2024 Sep;20(9):6395-6406.
1028. Cubanski J, Neuman T. FAQs on Medicare Financing and Trust Fund Solvency. Kaiser Family Foundation, May 29, 2024. Available at: https://www.kff.org/medicare/issue-brief/faqs-on-medicare-financing-and-trust-fund-solvency/. Accessed January 19, 2026.
1029. Lin GA, Whittington MD, Wright A, et al. Beta-Amyloid Antibodies for Early Alzheimer's Disease: Effectiveness and Value; Evidence Report. Institute for Clinical and Economic Review, April 17, 2023. Available at: https://icer.org/assessment/alzheimers-disease-2022/#timeline. Accessed December 23, 2025.
1030. Tysinger B, Wei Y, Heun-Johnson H, Zissimopoulos JM. Long-term value of lecanemab to individuals and families. Alzheimers Dement (N Y) 2025 Aug 28;11(3):e70151.
1031. Burke JF, Kerber KA, Langa KM, Albin RL, Kotagal V. Lecanemab: Looking before we leap. Neurology 2023;101(15):661-665.
1032. Rosenthal MB. Novel Alzheimer Disease Treatments and Reconsideration of US Pharmaceutical Reimbursement Policy. JAMA 2023;330(6):505-506.
1033. Global Eisai. Eisai's Approach to U.S. Pricing for Leqembi (Lecanemab), a Treatment for Early Alzheimer's Disease, Sets Forth Our Concept of "Societal Value of Medicine" in Relation to "Price of Medicine." Published January 7, 2023. Available at: www.eisai.com/news/2023/news202302.html. Accessed January 19, 2026.
1034. BIogen. BIogen Announces Reduced Price for ADUHELM(R) to Improve Access for Patients with Early Alzheimer's Disease. Published December 20, 2021. Available at: https://investors.biogen.com/news-releases/news-release-details/biogen-announces-reduced-price-aduhelmr-improve-access-patients#:~:text=CAMBRIDGE%2C%20Mass.%2C%20Dec.,United%20States%20by%20approximately%2050%25. Accessed January 19, 2026.
1035. U.S. Centers for Medicare & Medicaid Services. CMS announces new details of plan to cover new Alzheimer's drugs. Published June 22, 2023. Available at: https://www.cms.gov/newsroom/fact-sheets/cms-announces-new-details-plan-cover-new-alzheimers-drugs. Accessed January 19, 2026.
1036. Arbanas JC, Damberg CL, Leng M, Harawa N, Sarkisian CA, Landon BE, Mafi JN. Estimated annual spending on lecanemab and its ancillary costs in the US Medicare program. JAMA Intern Med 2023;183(8):885-889.
1037. Pittock RR, Aakre J, Castillo AM, et al. Eligibility for Anti-Amyloid Treatment in a Population-Based Study of Cognitive Aging. Neurology 2023;101(19):e1837-e1849.
1038. Alzheimer's Association. Changing the Trajectory of Alzheimer's Disease: How a Treatment by 2025 Saves Lives and Dollars. Available at: https://www.alz.org/media/documents/changing-the-trajectory-r.pdf. Accessed January 19, 2026.
1039. Zissimopoulos J, Crimmins E, St Clair P. The value of delaying Alzheimer's disease onset. Forum Health Econ Policy 2014;18(1):25-39.
1040. Alzheimer's Association. 2018 Alzheimer's Disease Facts and Figures. Alzheimers Dement. 2018;14(3):408-411.
1041. Liu JL, Hlavka JP, Hillestad R, Mattke S. Assessing the Preparedness of the U.S. Health Care System Infrastructure for an Alzheimer's Treatment. Santa Monica, CA: RAND Corporation; 2017. Available at: https://www.rand.org/pubs/research_reports/RR2272.html. Accessed January 19, 2026.
1042. Mattke S, Hanson M. Expected wait times for access to a disease-modifying Alzheimer's treatment in the United States. Alzheimer's Dement 2021;1-4.
1043. Centers for Disease Control and Prevention National Center for Health Statistics. Life expectancy. Available at: https://www.cdc.gov/nchs/fastats/life-expectancy.htm. Accessed March 17, 2026.
1044. Alzheimer's Association. 10 healthy habits for your brain. Available at: https://www.alz.org/help-support/brain_health/10-healthy-habits-for-your-brain. Accessed March 17, 2026.
1045. Baker LD, Snyder HM, Espeland MA, et al. Study design and methods: U.S. study to protect brain health through lifestyle intervention to reduce risk (U.S. POINTER). Alzheimer's Dement. 2024;20(2):769-782. doi:10.1002/alz.13365
1046. Whitmer RA, Baker LD, Carrillo MC, et al. Baseline characteristics of the U.S. Study to Protect Brain Health Through Lifestyle Intervention to Reduce Risk (U.S. POINTER): Successful enrollment of a diverse clinical trial cohort at risk for cognitive decline. Alzheimer's Dement. 2025;21(6):e70351. doi:10.1002/alz.70351
1047. McKinsey Health Institute. The human advantage: Stronger brains in the age of AI. Available at: https://www.mckinsey.com/mhi/our-insights/the-human-advantage-stronger-brains-in-the-age-of-ai. Accessed March 17, 2026.
1048. Alzheimer's Association. Alzheimer's Association earns Joint Accreditation to train entire health care teams in brain health and dementia care. Available at: https://www.alz.org/news/2026/alzheimers-association-earns-joint-accreditation-brain-health-dementia-care-training. Accessed March 17, 2026.
1049. Brookmeyer R, Gray S, Kawas C. Projections of Alzheimer's disease in the United States and the public health impact of delaying disease onset. Am J Public Health. 1998;88:1337-1342.
1050. U.S. Department of Labor. Changes in Basic Minimum Wages in Non-Farm Employment Under State Law: Selected Years 1968 to 2020. Available at: https://www.dol. gov/agencies/whd/state/minimum-wage/history. Accessed January 19, 2026.
1051. U.S. Centers for Medicare & Medicaid Services. Your coverage options. Available at: https:// www.medicare.gov/basics/get-started-with-medicare/getmore-coverage/your-coverage-options. Accessed December 15, 2025.

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