



**GET THE FACTS:
On Alzheimer's Disease**





What is Alzheimer's Disease?

Alzheimer's disease is a continuous decline in thinking, behavioral and social skills that affects a person's ability to function independently.

Alzheimer's disease is...

- The most common cause of dementia, accounting for 60-80% of dementia cases.
- Not a normal part of aging and typically impacts those 65 and older.

- A progressive disease that causes the brain to shrink (atrophy) and brain cells to die, with symptoms worsening over time. A person with Alzheimer's lives an average of four to 8 years after diagnosis but can live as long as 20 years.
- Incurable, but does have options for treating symptoms of Alzheimer's along with promising treatments to reduce cognitive and functional decline and slow disease progression.

An estimated 6.5 million Americans age 65 and older are living with Alzheimer's dementia in 2022.

Causes of Alzheimer's Disease

Researchers don't yet know what exactly causes Alzheimer's disease, though it's likely a combination of age-related brain changes, along with genetic, environmental, and lifestyle factors. How these factors increase or decrease the risk varies from person to person.

Alzheimer's disease itself is a progressive disease primarily characterized by changes in the brain—specifically, protein deposits called plaques and tangles that lead to the failure of nearby nerve cells. This process typically begins in the memory part of the brain—in the temporal lobe near the hippocampus—which is why memory loss is one of the first symptoms.

Genetics may play a role in late-onset Alzheimer's disease (those aged 65 or more) but there is no causal relationship. In other words, just because a parent had Alzheimer's is not a guarantee that you'll have it, too. But it may mean that you're more likely to develop it.

The rarer early-onset form of the disease, which can strike those between 30-60 years old, is more often the result of genes passed down from a parent.

Research also suggests that there may be other factors beyond genetics, such as the relationship between brain and heart health (heart disease, stroke, and high blood pressure) and metabolic diseases like diabetes and obesity.

Finally, a healthy diet and regular sleep, as well as physical and social activities and mentally stimulating tasks, may help reduce the risk of cognitive decline overall and Alzheimer's disease in particular.

Further research and clinical trials testing these and other factors continue.

5 Stages of Alzheimer's Disease¹

Although Alzheimer's disease progresses slowly, each person experiences it differently, both in terms of the symptoms they have and the progression of the disease itself. Researchers have identified five general stages:*

- 1. Preclinical Alzheimer's disease** – Because there are no symptoms associated with this stage—and it can last for many years—preclinical Alzheimer's disease is typically only identified in research settings using imaging technologies to detect plaques, biomarkers that may signal an increased risk, and genetic testing.
- 2. Mild cognitive impairment (MCI) due to Alzheimer's disease** – At this stage, your loved one may experience mild changes in their memory and thinking ability, but it may or may not be due to Alzheimer's disease. The same diagnostic tools used in the preclinical stage will help determine cause in this stage as well.
- 3. Mild dementia due to Alzheimer's disease** – This is the stage at which most people are diagnosed with Alzheimer's disease because it becomes clearer that the person is struggling with everyday living. They may have trouble remembering recent events or conversations, struggle to solve problems or complete complex tasks, have difficulty expressing their thoughts or making good decisions, and they may lose things or get lost in once-familiar places. Finally, you may realize that the person no longer acts the same due to personality or mood changes.
- 4. Moderate dementia due to Alzheimer's disease** – People in the moderate stage show deepening memory loss and confusion and will likely need help with daily living activities and caring for themselves. They're often prone to wandering, perhaps in an attempt to find what's familiar to them, so it's difficult to leave them alone.
- 5. Severe dementia due to Alzheimer's disease** – Late-stage Alzheimer's disease typically comes with the loss of ability to communicate coherently. They lose their ability to stand, keep their head up, swallow, and control their bodily functions which severely impacts their daily living.

Signs & Symptoms²

Memory loss is the primary indicator of Alzheimer's, but in the initial stages, people may simply forget everyday things, such as recent events or conversations. You may even chalk up your loved one's "forgetfulness" to the normal aging process. As the disease progresses and the brain changes, you may notice worsening symptoms:

Persistent and worsening memory loss, including:

- Repeating things over and over
- Forgetting appointments or events
- Routinely losing possessions, often putting them in illogical locations
- Getting lost in familiar places
- Having trouble remembering the names of loved ones and common objects
- Having trouble finding the right words, expressing thoughts, or conversing

* "Dementia" is used to describe worsening intellectual and social abilities that gradually interfere with daily functioning.

¹ Alzheimer's stages: How the disease progresses," MayoClinic.org, retrieved 08/18/2022.

² MayoClinic.org.

Decline in critical thinking and decision-making skills, such as:

- Concentrating on or thinking through abstract concepts
- Multitasking
- Managing and paying bills in a timely way
- Recognizing and dealing with numbers
- Making everyday decisions or judgements about everyday situations
- Responding to everyday situations (e.g., hot irons/stoves, burning food, etc.)

Difficulty planning routine activities, such as making a meal or following a recipe, or performing basic tasks (e.g., dressing)

Personality and behavioral changes, such as:

- Depression
- Apathy
- Social withdrawal
- Mood swings
- Distrust in others
- Irritability and aggressiveness
- Changes in sleeping habits
- Wandering
- Loss of inhibitions
- Delusions, such as believing something has been stolen

Finally, your loved one may appear relatively “normal” and continue to read, recall memories, tell stories, sing, dance, paint or draw, and listen to music at the same time that their short-term memory skills are worsening. It’s believed that these “preserved” skills may carry on for a longer period of time because they’re controlled by parts of the brain that are affected later in the disease process.

When to See a Doctor

If you’re concerned about memory loss or other symptoms, ask your doctor about a thorough assessment and diagnosis. Memory loss and other dementia symptoms are found in not just in Alzheimer’s disease, but a number of treatable conditions, too.

If you’re concerned about a loved one, share your concerns and suggest going with them to a doctor’s appointment to learn more.

Diagnosing Alzheimer’s Disease³

Correctly diagnosing your loved one’s symptoms early is an important first step. It helps you rule out other conditions in or out, allows your loved one to take advantage of available treatments, and helps you and your loved one to start planning for the future.

³ “Diagnosing Alzheimer’s: How Alzheimer’s is diagnosed,” MayoClinic.org, retrieved 08/19/2022.

Talking to a doctor is the first step. He or she will review your loved one's symptoms and medical history, ask about medications, conduct an exam, order tests, and speak with friends and family members about symptoms and behavior.

The doctor may also refer you to a neurologist or a geriatrician for more specific testing. These doctors may order additional lab tests or brain-imaging tests or send your loved one for detailed memory testing. The goal is to rule out other conditions, such as symptoms associated with past strokes, Parkinson's disease, depression, sleep apnea, or other conditions like a thyroid condition or a B-12 deficiency.

Clinical assessments—along with a physical exam—often provide enough information for doctors to make a diagnosis of Alzheimer's disease.

- **Mental status testing** – Tests thinking and memory skills to evaluate degree of cognitive impairment.
- **Neuropsychological tests** – Evaluates memory and cognitive skills to determine if your loved one has dementia and if they can safely perform daily tasks, such as managing finances and taking medications.
- **Interviews with friends and family** – Considers details outside of normal functioning and how cognitive skills, behaviors, and abilities may have changed over time.

Lab tests can help with diagnosis if there's any uncertainty following the clinical assessments.

- **Cerebrospinal fluid exam** – Measures the ratio of plaques and tau proteins in the brain—often helpful in atypical or fast-progressing cases.

Imaging tests are often not used alone because there may be overlap between normal aging processes in the brain and Alzheimer's disease processes. But they can rule out other conditions, differentiate between types of degeneration, and provide a baseline.

- **Magnetic resonance imaging (MRI)** – Provides a detailed view of the brain using radio waves and magnets.
- **Computerized tomography (CT)** – Provides cross-sectional images of the brain using X-rays.
- **Fluorodeoxyglucose (FDG) positron emission tomography (PET)** – Detects regions of the brain with decreased glucose metabolism which can help distinguish between different types of degenerative brain disease.
- **Amyloid PET scans** – Detects clusters of amyloid proteins (plaques) or tau (neurofibrillary tangles) associated with Alzheimer's disease—often done in research settings.

Treatments for Alzheimer's Disease⁴

To date, the U.S. Food and Drug Administration (FDA) has approved five drugs to treat the symptoms of Alzheimer's disease—donepezil, rivastigmine, galantamine, memantine and memantine combined with donepezil. They do not deal with the changes in the brain or slow the progression of the disease. (See Get the Facts on Alzheimer's Disease Medications).

⁴ MayoClinic.org



The process for developing new treatments that slow or halt the disease has been frustratingly slow. To expedite the development of more effective treatments, representatives from numerous organizations—including pharmaceutical companies, nonprofit patient advocate groups, academia, the U.S. Food and Drug Administration (FDA), the National Institutes of Health (NIH), the National Institute on Aging (NIA), the National Institute of Neurological Disorders and Stroke (NINDS), and the European Medicines Agency (EMA)—have joined together to share data from more than 6,500 study participants in Alzheimer’s clinical trials and to develop data standards. Their goal is to transform the drug development paradigm for neurodegenerative diseases and serve as a model for other major diseases.

The future looks hopeful. Like many cancers or HIV/AIDS, treatments for Alzheimer’s disease may eventually include a “cocktail” of drugs targeting different disease processes. These may include:

- **Monoclonal antibodies** – These drugs may prevent plaques in the brain from clumping or remove them altogether.
 - **Aducanumab** – The first drug approved in the U.S. to treat the underlying cause of Alzheimer’s, aducanumab received conditional FDA approval in June 2021 pending further studies to prove its benefit.
 - **Lecanemab and donanemab** – Both are showing promise and are moving into phase 3 clinical trials.
 - **Solanezumab** – No benefit for mild or moderate stages of Alzheimer’s disease, but may be beneficial in the pre-clinical stage.
 - **Saracatinib** – Initially developed as a possible cancer treatment, saracatinib reversed some memory loss in mice and human trials are now underway.
- **Tau “detanglers”** – Tau aggregation inhibitors and tau vaccines, are currently in clinical trials to determine if they can prevent tangles, another common brain abnormality associated with Alzheimer’s disease.
- **Sargramostim** – Sargramostim may stimulate the immune system to protect the brain from chronic, low-level brain cell inflammation.

Finally, studies are continuing on the effects of insulin on the brain and brain cell function, the link between heart and blood vessel health and brain health, and the relationship between estrogen and cognitive function.

Family and Caregiver Support

Alzheimer's and Related Dementias Education and Referral (ADEAR) Center National Institutes of Health (NIH)

www.nia.nih.gov/health/alzheimers

Email: adear@nia.nih.gov

Phone: 1-800-438-4380

Alzheimers.gov

National Institute on Aging (NIA)

www.alzheimers.gov

Alzheimer's Association

www.alz.org

Phone: 1-800-272-3900 (24/7 helpline)

Alzheimer's Foundation of America

www.alzfdn.org

Phone: 1-866-232-8484

Eldercare Locator

www.eldercare.acl.gov

Phone: 1-800-677-1116

National Institute on Aging (NIA) Information Center

www.nia.nih.gov/health

Email: niaic@nia.nih.gov

Phone: 1-800-222-2225



Resources

- **Alliance for Aging Research,** www.agingresearch.org
- **BrightFocus Foundation,** www.brightfocus.org
- **Clinical Data Interchange Standards Consortium (CDISC),** www.CDISC.org
- **Coalition Against Major Diseases (CAMD),** www.c-path.org/programs/cpad
- **Mayo Clinic,** www.MayoClinic.org
- **Us Against Alzheimer's,** www.usagainstalzheimers.org
- **Your Guide to Alzheimer's Disease,** www.webmd.com/alzheimers

There are also many state and local resources dedicated to Alzheimer's disease, as well as academic research organizations. Check with your state, city, or nearby research institution.



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