UNDERSTANDING ALZHEIMER'S AND DEMENTIA

THE IMPACT OF ALZHEIMER'S AND DEMENTIA

Currently, over 55 million people worldwide are living with Alzheimer's or another dementia, including more than 6 million Americans. Without changes in prevention or treatment, this number will nearly triple by 2050.

The disease also affects the more than 11 million Americans who provide unpaid care for people living with Alzheimer's or another dementia.

The Alzheimer's Association® is available across the country and online to help people understand Alzheimer's and dementia, and receive information and support they can trust.

ALZHEIMER'S AND DEMENTIA

The terms "dementia" and "Alzheimer's" are often used as though they mean the same thing. They are related, but there are important differences between the two.

Dementia

Dementia is a broad ("umbrella") term for an individual's changes in memory, thinking or reasoning. There are many possible causes of dementia, including Alzheimer's.

Alzheimer's

Alzheimer's disease is the most common cause of dementia. It is not a normal part of aging — it's a progressive brain disease, meaning it gets worse over time.

Two abnormal brain structures called plaques and tangles are the main features of Alzheimer's disease. Scientists believe they damage and kill nerve cells. Plaques are pieces of a protein fragment called beta-amyloid that build up in the spaces between nerve cells. Tangles are twisted fibers of another protein called tau that build up inside cells.

Other common dementias

- **Vascular dementia** is a decline in thinking skills that happens when blood flow to the brain is blocked or reduced so that brain cells can't get important oxygen and nutrients. Sometimes these changes occur suddenly, such as

during a stroke that blocks major brain blood vessels. Vascular dementia is the second most common cause of dementia after Alzheimer's disease.

- **Lewy body dementia (LBD)** is a type of progressive dementia related to buildup of a protein called alpha-synuclein that damages brain cells. Early symptoms include hallucinations and sleep problems.
- **Frontotemporal dementia (FTD)** is a group of disorders. Progressive cell degeneration (or breakdown) causes FTD in two places. One is in the brain's frontal lobes (the areas behind the forehead). The other is in the brain's temporal lobes (the regions behind the ears).

Visit **alz.org/dementia** to learn about other types of dementia.

ALZHEIMER'S IN THE BRAIN

More than 100 years ago, Dr. Alois Alzheimer described specific changes in the brain. Scientists now call them beta-amyloid plaques and tau tangles. Today we know that Alzheimer's is a progressive brain disease. It is marked by these key changes and impacts memory, thinking and behavior.

What goes wrong in the brain

The brain has three main parts: the cerebrum, cerebellum and brain stem. Each has a job to do to make the body work properly.

The cerebrum fills up most of the skull. It's the part of the brain most involved in remembering, problem-solving and thinking. There are about 100 billion nerve cells called neurons throughout the brain that send messages in order to make memories, feelings and thoughts.

Alzheimer's disease causes nerve cells to die. This causes the brain to lose tissue (also called shrinkage) and the loss of function and communication between cells. These changes can cause the symptoms of Alzheimer's disease. These include memory loss; problems with thinking and planning; behavioral issues; and, in the last stage, a further decline in functioning, which can even include trouble swallowing.

Visit **alz.org/brain** to explore *Inside the Brain: A Tour of How the Mind Works*.

RISK FACTORS

Scientists know that nerve cell failure is a part of Alzheimer's disease, but they don't yet know why this happens. However, they have identified certain risk factors that increase the likelihood of developing Alzheimer's.

Age
The greatest known risk factor for Alzheimer's is age. After age 65, a person's risk of developing the disease doubles every five years. Thirty-three percent of people age 85 or older have Alzheimer's.

Family history
Researchers have learned that people who have a parent or sibling with Alzheimer's are more likely to develop it than those who do not. The risk is due to shared genetic, environmental and lifestyle factors, and increases if more than one family member has the disease.

Genetics
Two types of genes may influence whether a person develops a disease: risk genes and deterministic genes. Risk genes increase the chance of developing a disease but do not guarantee it will happen. Deterministic genes cause a disease. This means anyone who inherits a deterministic gene will develop a disorder.

Rare deterministic genes cause Alzheimer's in a few hundred extended families worldwide. Scientists estimate these genes cause less than 1% of cases. Individuals with these genes usually develop symptoms in their 40s or 50s.

Ethnicity, race and sex
Research shows that Hispanic older adults are about one-and-a-half times as likely as White older adults to have Alzheimer's and other dementias, while Black older adults are about twice as likely.

No one knows the exact reason for these differences, but researchers believe the connection may be due to higher rates of cardiovascular disease in these groups — and likely other contributing factors, such as health and socioeconomic disparities. Scientists need to learn more about other potential causes behind this increased risk. To do so, it is critically important to increase the participation of individuals from underrepresented communities in clinical research.

Also, women live longer than men, making them more likely to develop Alzheimer's. However, longevity doesn't completely explain this difference. Researchers are exploring how biological, social and cultural differences in women may impact disease risk.

Lowering the risk of cognitive decline
Age, family history and genetics are all risk factors we can't change. However, research is starting to show there are lifestyle habits that may help keep your brain healthy and lower your risk of cognitive decline.

Science tells us there is a strong connection between brain health and heart health. The risk of developing Alzheimer's or vascular dementia appears to be increased by many conditions that damage the heart and blood vessels. These include high blood pressure, diabetes, stroke and obesity. Therefore, eating a balanced, heart-healthy diet and getting regular exercise may benefit both your heart and your brain.

Other healthy lifestyle habits that may also be good for your brain include avoiding tobacco and excess alcohol, regularly getting a good night's sleep, and staying socially and mentally active.

Science also shows a strong connection between serious head injury and future risk of cognitive decline. For this reason, it's important to protect your head by buckling your seat belt and taking home safety measures to help prevent falls.

STAGES OF ALZHEIMER'S DISEASE

Alzheimer's disease progresses in stages with a range of symptoms that increase in severity over time.

Because the disease affects people in different ways, the rate of progression will vary. On average, a person with Alzheimer's may live four to eight years after diagnosis, but some people live as long as 20 years.

The following descriptions provide a general idea of changes at each stage. Stages of Alzheimer's may overlap, which can make it difficult to know which stage a person is in.

Asymptomatic

On the earliest end of the continuum are people who are asymptomatic (i.e., without symptoms). This means that they may have the biological changes of the disease in their brain but do not show any cognitive symptoms.

Mild cognitive impairment (MCI) due to Alzheimer's disease

Mild cognitive impairment (MCI) is an early stage of memory loss or other loss of cognitive ability in individuals who can still independently perform most activities of daily living. MCI can develop for multiple reasons, and some individuals living with MCI may go on to develop dementia while others will not. MCI can be an early stage of Alzheimer's disease if hallmark changes in the brain, such as beta-amyloid buildup, are present. Symptoms of MCI can include:

- Forgetting important information such as appointments, conversations or recent events.

- Difficulty with making sound decisions, judging the time or recalling a sequence of steps needed to complete a complex task.

Early stage (mild dementia due to Alzheimer's disease)
If hallmark changes in the brain are present, the person may progress into dementia due to Alzheimer's disease. Dementia due to Alzheimer's disease can be further divided into three stages: early, middle and late — with a progressive loss of independence in each stage.

A person in the early stage will typically start to experience symptoms that interfere with some daily activities, such as:

- Problems coming up with the right word or name for something.
- Trouble remembering names when introduced to new people.
- Difficulty with familiar tasks.
- Forgetting something that was just read.
- Getting lost in familiar places.
- Increasing trouble with planning or organizing.

Middle stage (moderate dementia due to Alzheimer's disease)
In the middle stage, symptoms are more pronounced and will interfere with many of the person's daily activities. This is typically the longest stage of the disease and can last for many years. Challenges can include:

- Forgetting events or one's own personal history.
- Feeling frustrated, angry or withdrawn, especially in socially or mentally challenging situations.
- Confusion about where they are or the day of the week.
- Trouble controlling bladder and bowels.
- Needing help to choose the right clothes for the weather or occasion.
- Changes in sleep patterns, such as sleeping during the day and restlessness at night.
- A higher risk of wandering and becoming lost.
- Personality and behavioral changes, such as becoming suspicious or delusional, believing that others are lying, or, repeating a behavior over and over.

Late stage (severe dementia due to Alzheimer's disease)
In the late stage, major personality changes can occur, and a person will experience symptoms that interfere with most daily activities. The person will need a lot of help with personal care.

In this stage, individuals may:

- Lose awareness of recent experiences as well as of their surroundings.
- Go through changes in physical abilities. This may affect their ability to walk, sit and, eventually, swallow.
- Have more trouble communicating.
- Be at higher risk of infections, especially pneumonia.

FDA-APPROVED TREATMENTS

Although current medications cannot cure Alzheimer's, two U.S. Food and Drug Administration (FDA)-approved treatments address the underlying biology. Other medications may help lessen symptoms, such as memory loss and confusion. When considering any treatment, it's important to have a conversation with your doctor.

Non-drug treatments
Non-drug treatments for dementia related behaviors can offer physical and emotional comfort. Many of these strategies aim to identify and take care of the needs of the person living with Alzheimer's.

Tips for coping with symptoms include:

- Check for personal comfort. Look for pain, hunger, thirst, constipation, full bladder, fatigue, infections and skin irritation. Keep the room temperature comfortable.
- Don't argue about facts. For example, if a person would like to visit a parent who died years ago, don't point out that the parent is no longer alive. Instead, say, "Your mother is a wonderful person. I would like to see her, too."
- Redirect the person's attention by getting them to think about something new. Try to be flexible, patient and supportive. Respond to the emotion, not the behavior.
- Create a calm environment. Avoid noise, bright lights and television, which causes distraction.
- Have rest times between lively events.
- Give the person an object to hold that makes them feel safe.
- Show the person that you hear them and answer his or her questions.

- Look for reasons behind each behavior. Talk to a doctor about behaviors that could be connected to medications or illness.
- Try to find more than one solution for the issue the person is experiencing.

FDA-approved drugs for Alzheimer's

The FDA has approved medications that fall into two categories: drugs that change disease progression in people living with early Alzheimer's disease, and drugs that may temporarily mitigate some symptoms of Alzheimer's dementia.

When considering any treatment, it is important to have a conversation with a health care professional to determine whether it is appropriate. A clinician who is experienced in using these types of medications should monitor people who are taking them and ensure that the recommended guidelines are strictly observed.

Be sure to discuss all medications with your doctor to understand why they were prescribed and how to take them. To prevent drug interactions and unwanted side effects, make sure your physician, pharmacist and care team are aware of any over-the-counter and alternative remedies you are taking.

Drugs that change disease progression

Drugs in this category slow disease progression. They slow the decline of memory and thinking, as well as function, in people living with Alzheimer's disease.

Changes disease progression

Name (Generic/Brand)	Approved for	Side effects
Aducanumab Aduhelm™	Alzheimer's disease (MCI or mild dementia)	ARIA, headache and falls
Lecanemab Leqembi™	Alzheimer's disease (MCI or mild dementia)	ARIA, infusion-related reactions

Aducanumab (Aduhelm™)

Aducanumab (Aduhelm™) is an anti-amyloid antibody intravenous (IV) infusion therapy approved for Alzheimer's disease. Aducanumab works by targeting beta-amyloid, a protein that forms in the brain and makes plaques.

- This drug is approved for people with early Alzheimer's disease: mild cognitive impairment (MCI) or mild dementia due to Alzheimer's disease.

- Doctors should confirm the presence of elevated beta-amyloid in the brain prior to starting treatment.
- The most common side effects are amyloid-related imaging abnormalities (ARIA), headache and fall. ARIA does not usually cause symptoms but can be serious. It is typically a temporary swelling of the brain or small areas of bleeding in the brain. It usually resolves over time.
- At this time, Medicare coverage is limited.

To learn more about aducanumab, visit **alz.org/aducanumab**

Lecanemab (Leqembi™)

Lecanemab (Leqembi™) is an anti-amyloid antibody intravenous (IV) infusion therapy approved for Alzheimer's with confirmation of elevated beta-amyloid. Lecanemab works by targeting beta-amyloid, a protein that forms in the brain and makes plaques. Although lecanemab also targets beta-amyloid, it works in a different way than aducanumab.

- This drug is approved for people with early Alzheimer's disease: mild cognitive impairment (MCI) or mild dementia due to Alzheimer's disease.
- Doctors should confirm the presence of elevated beta-amyloid in the brain prior to starting treatment.
- The most common reported side effects were infusion-related reactions, headache, and amyloid-related imaging abnormalities (ARIA).
- ARIA does not usually cause symptoms but can be serious. It is typically a temporary swelling of the brain or small areas of bleeding in the brain. It usually resolves over time.
- At this time, Medicare coverage is limited.

To learn more about lecanemab, visit **alz.org/lecanemab**

Drugs that treat symptoms

Cognitive symptoms (memory and thinking)

As Alzheimer's progresses, brain cells die and connections among cells are lost, causing cognitive symptoms to worsen. While these medications do not stop the damage Alzheimer's causes to brain cells, they may help lessen or stabilize symptoms

for a limited time by affecting certain chemicals involved in carrying messages among and between the brain's nerve cells.

The following medications are prescribed to treat symptoms related to memory and thinking.

Treats cognitive symptoms (memory and thinking)

Name (Generic/Brand)	Approved for	Side effects
Donepezil Aricept®	Mild to severe dementia due to Alzheimer's	Nausea, vomiting, loss of appetite, muscle cramps and increased frequency of bowel movements.
Galantamine Razadyne®	Mild to moderate dementia due to Alzheimer's	Nausea, vomiting, loss of appetite and increased frequency of bowel movements.
Rivastigmine Exelon®	Mild to moderate dementia due to Alzheimer's or Parkinson's	Nausea, vomiting, loss of appetite and increased frequency of bowel movements.
Memantine Namenda®	Moderate to severe dementia due to Alzheimer's	Headache, constipation, confusion and dizziness.
Memantine + Donepezil Namzaric®	Moderate to severe dementia due to Alzheimer's	Nausea, vomiting, loss of appetite, increased frequency of bowel movements, headache, constipation, confusion and dizziness.

Donepezil, galantamine and rivastigmine are cholinesterase inhibitors, which treat symptoms related to memory, thinking, language, judgment and other thought processes. Memantine regulates the activity of a different chemical messenger in the brain that is also important for learning and memory. These two types of drugs work in different ways to help manage symptoms. The fifth drug on the chart combines donepezil (a cholinesterase inhibitor) with memantine (a glutamate regulator).

These four types of drugs work in different ways to help manage symptoms. The effectiveness of the types of treatments varies from person to person. While they may temporarily help symptoms, they do not slow or stop brain changes that cause Alzheimer's to become more severe over time.

Drugs that treat non-cognitive symptoms (behavioral and psychological symptoms)

Treats non-cognitive symptoms (behavioral and psychological)

Name (Generic/Brand)	Approved for	Side effects
Suvorexant Belsomra®	Insomnia, has been shown to be effective in people living with mild to moderate Alzheimer's disease	Impaired alertness and motor coordination, worsening of depression or suicidal thinking, complex sleep behaviors, sleep paralysis, compromised respiratory function.

Alzheimer's affects more than just memory and thinking. A person's quality of life may be impacted by a variety of behavioral and psychological symptoms that accompany dementia, such as sleep changes. Suvorexant, can be prescribed to treat insomnia for individuals living with mild-to-moderate Alzheimer's.

To learn more about these drugs, including the different types available, who is eligible and potential side effects, visit **alz.org/medications**

ADVANCING ALZHEIMER'S RESEARCH

Research shows that Alzheimer's starts many years before people living with the disease notice symptoms. With this knowledge, researchers are working to identify people who are most at risk before symptoms appear, and driving the effort to develop treatments to slow, stop or prevent the disease.

As the world's largest nonprofit funder of dementia research, the Alzheimer's Association has played a vital role in every significant development in Alzheimer's science, and paves the way for future progress.

Clinical studies drive progress

Taking part in a clinical study is one way that anyone can help fight Alzheimer's disease. Without volunteers for research, scientists cannot find ways to prevent, treat and, ultimately, cure the disease. It's important that people of all racial and ethnic backgrounds participate in clinical research so that any treatments discovered work for all populations.

Some clinical studies involve drugs and physical tests, while others involve observation and questionnaires. Every clinical study gives us important knowledge, whether or not the study was successful.

For people living with dementia, there are other benefits to taking part in clinical studies, including access to expert medical care and promising treatments.

Visit **alz.org/trialmatch** to learn more about Alzheimer's Association TrialMatch®, a free service that provides customized lists of clinical studies based on user-provided information. The easy-to-use platform allows people living with dementia, caregivers and healthy volunteers to find studies and actively fight against the disease. Search for studies, sign up for study updates, or connect with researcher teams with the click of a button.

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