



## Alzheimer's disease Fact Sheet

### Key Facts

- Alzheimer's disease (AD) is the leading cause of dementia
- AD is characterized by a progressive decline in brain function, which typically begins with deterioration in memory
- Incidence of AD increases significantly with age
- There is currently no cure for AD. However, drug treatments are available that can temporarily alleviate some symptoms or slow down their progression in some people

### What is Alzheimer's disease?

Alzheimer's disease (AD) is the most common type of dementia, causing about half of all cases. In AD the brain begins to shrink (atrophy) and the number of nerve fibres in the brain gradually reduces. Levels of some neurotransmitters (brain messengers) are also reduced - in particular, acetylcholine. Tiny deposits called plaques also form throughout the brain. It is not known why these changes in the brain occur, or exactly how they cause dementia. Alzheimer's disease gradually gets more severe over time as the brain becomes increasingly affected.<sup>1</sup>

### The scale of the problem

The incidence of AD increases with age.<sup>2</sup> In 2001 there was an estimated **4.9 million** people affected by AD in Europe, which was estimated to double by 2040.<sup>3</sup> Worldwide it is thought that there are more than 15 million people affected by AD.<sup>4</sup>

### How severe is Alzheimer's disease?

Dementia affects one in 14 people over the age of 65 and one in six over the age of 80. However, dementia is not restricted to older people, with many being affected under the age of 65 although these are often undiagnosed.<sup>5</sup> The course of AD is generally unpredictable, but the disease can progress for up to 10 years.<sup>5</sup> Beginning with memory problems, the increasing loss of brain function renders patients unable to care for themselves. Eventually, they will need help with all their daily activities. In the later stages

of AD, problems with mobility, incontinence, and general frailty lead to a susceptibility to other health problems, particularly infections such as pneumonia; for this reason AD is known as a life-shortening illness.<sup>5</sup>

### Causes of Alzheimer's disease

The key changes that are observed in Alzheimer's brain tissue at post-mortem are increased levels of a peptide which is deposited as plaques outside brain cells, and a protein that accumulates within brain cells as neurofibrillary tangles (NFTs). In addition widespread loss of brain cells is observed. The mechanisms underlying these changes are unknown.<sup>6</sup>

So far, no one single factor has been identified as a cause for AD other than increasing age. It is likely that a combination of factors, including age, genetic inheritance, environmental factors, lifestyle and overall general health are responsible.<sup>5</sup>

Various risk factors have been found to be associated with dementia and AD. Of note, many vascular risk factors for ischemic heart disease and stroke are also risk factors for dementia, although the reasons for this are still unclear. Diabetes, hypertension, smoking and obesity have all been found to increase dementia risk.<sup>6</sup>

### Diagnosis

There is no single test to determine whether someone has AD. It is diagnosed by a process of elimination, as well as a careful examination of a person's physical and mental state. A psychological assessment is usually carried out which involves finding out about possible problems with memory, language, planning and attention, e.g. the Mini-Mental State Examination.

Some forms of brain imaging can be used to reveal differences between the brains of people with AD and those without, although they cannot lead to a certain diagnosis of AD.

- ▲ **MRI** (Magnetic Resonance Imaging) permits an extremely detailed image of the brain's structure. When one image is placed over another, taken a few months' later, it is possible to see changes at an early stage in a certain part of the brain.
- ▲ **CT** (Computed Tomography) scanning measures the thickness of a part of the brain which becomes rapidly thinner in people with Alzheimer's disease.
- ▲ **SPECT** (Single Photon Emission Computed Tomography) can be used to measure the flow of blood in the brain, which has been found to be reduced in people with AD as a consequence of nerve cells not working properly.
- ▲ **PET** (Positron Emission Tomography) is often restricted to research settings. It can detect changes in the way the brain of someone with AD functions.<sup>7</sup>

## Main features of the disease

AD can affect different people in different ways, but the most common symptom pattern begins with gradually worsening difficulty in remembering new information. This is because disruption of brain cells usually begins in regions involved in forming new memories. As damage spreads, individuals experience other difficulties. The following are warning signs of AD:

- ▲ Memory loss that disrupts daily life
- ▲ Challenges in planning or solving problems
- ▲ Difficulty completing familiar tasks at home, at work, or at leisure
- ▲ Confusion with time or place
- ▲ Trouble understanding visual images and spatial relationships
- ▲ New problems with words in speaking or writing
- ▲ Misplacing things and losing the ability to retrace steps
- ▲ Decreased or poor judgment
- ▲ Withdrawal from work or social activities
- ▲ Changes in mood and personality

In advanced AD, people need help with bathing, dressing, using the bathroom, eating, and other daily activities. Those in the final stages of the disease lose their ability to communicate, fail to recognize loved ones, and become bed-bound and reliant on fulltime care. The inability to move around in late-stage AD can make a person more vulnerable to infections, including pneumonia. AD is ultimately fatal, and AD-related pneumonia is often the cause.<sup>8</sup>

## Treatments and therapies

There is no cure for AD and no drug that will reverse the effects of dementia. However, there are some medicines that may be used to help in certain types of dementia.

- ▲ **Acetylcholinesterase inhibitors** – People with AD have been shown to have a shortage of the chemical acetylcholine in their brains. The drugs donepezil hydrochloride, rivastigmine and galantamine work by maintaining existing supplies of acetylcholine. They are generally recommended as an option for people in the mild-to-moderate stages of AD. These drugs are not a cure, but they may stabilise some of the symptoms of Alzheimer's disease for a limited period, typically 6-12 months or longer.<sup>9</sup>
- ▲ **Memantine** – Glutamate is released in excessive amounts when brain cells are damaged by Alzheimer's disease, and this causes the brain cells to be damaged further. Memantine can protect brain cells by blocking the release of excess glutamate, and can temporarily slow down the progression of symptoms in people in the middle and later stages of the disease.<sup>9</sup>

- ▲ **Other medications** - Antidepressants, aspirin, sleeping tablets and tranquilisers are also frequently prescribed to patients with AD for symptom management.<sup>9</sup>

Despite the current lack of disease-modifying therapies, studies have consistently shown that active medical management of AD can significantly improve quality of life through all stages of the disease for individuals with AD and their caregivers.<sup>8</sup>

### **Impact on the lives of those affected and carers**

Living with AD or caring for someone who has AD presents many challenging issues. Loss of memory can have consequences on daily life in many ways, leading to communication problems, safety hazards and behavioural problems. In the early stages, social interactions, the ability to drive and to work (for younger patients) are all affected. Later on, patients require support with their general activities of daily living, such as washing, dressing and feeding.<sup>7</sup>

Although families generally prefer to keep the person with AD at home, most people with the disease eventually move into a nursing home or another residence where professional care is available.<sup>8</sup>

### **Unmet needs**

As the deterioration of brain tissue seen in AD appears to be irreversible, the main focus of current research is on ways to detect, diagnose and manage the disease as early as possible.

Researchers are studying numerous treatment strategies that may have the potential to change the course of the disease. Approximately 75 to 100 experimental therapies aimed at slowing or stopping the progression of AD are in clinical testing in human volunteers. It is believed that treatments to slow or stop the progression of AD and preserve brain function will be most effective when administered early in the course of the disease, 10 years or more before symptoms appear. Much research in recent years has focused on identifying biomarkers that will aid in early detection and inform physicians which patients should receive treatment during these very early stages of AD.<sup>8</sup>

#### **Further information**

- Alzheimer Europe <http://www.alzheimer-europe.org/>
- Alzheimer's Society [www.alzheimers.org.uk](http://www.alzheimers.org.uk)
- Alzheimer's Association [www.alz.org/](http://www.alz.org/)



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