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Alzheimer's disease is the most common form of dementia, constituting 60-80% of all dementia cases (Alzheimer's Association, 2009a). Diseases classified as dementia cause declines in memory severe enough to impede daily functions in at least one of the following cognitive abilities:

- 1) Ability to generate coherent speech and understand both written and spoken language
- 2) Ability to recognize or identify objects
- 3) Ability to exercise motor activities
- 4) Ability to think abstractly, make sound judgments, and plan/carry out complex tasks (Alzheimer's Association, 2009a)

Dementia "causes irreversible cognitive decline as a result of various biological mechanisms that damage brain cells" (Alzheimer's Association, 2007, p.2). Plaques represent one type of physical abnormality seen in the brains of people with Alzheimer's disease. Plaques occur when the protein amyloid-beta builds up between neurons, causing the neurons to clump and die. Another brain abnormality in Alzheimer's patients is the presence of tangles. Tangles occur when the protein tau causes neurons to twist, resulting in tremendous neuron damage (Mayo Clinic, 2009).

The Progression of Alzheimer's

Alzheimer's disease gradually affects memory, thinking, and behavior. According to the Global Deterioration Scale (Alzheimer's Association, 2008c), there are seven key stages of Alzheimer's development:

Stage One: *No cognitive impairment*

- No memory problems evident

Stage Two: *Very mild cognitive decline*

- Memory lapses for familiar words and names
- Lapses not evident to friends, family, co-workers, or doctors

Stage Three: *Mild cognitive decline*

- Friends, family, and co-workers begin to notice deficiencies in memory
- Problems with memory, retention, and concentration
- Difficulty naming objects or people
- Decreased performance of daily activities
- Decline in ability to plan or organize

Stage Four: *Moderate cognitive decline*

- Clear cut deficiencies in knowledge of recent events
- Decreased capacity to perform complex tasks such as planning Thanksgiving dinner or managing finances
- Demeanor may be subdued or withdrawn

Stage Five: *Moderately severe cognitive decline*

- Major gaps in memory and cognitive functioning
- Need for assistance with daily functions
- Confusion about location and date

Stage Six: *Severe cognitive decline*

- Increased memory deficits
- Significant personality changes
- Difficulty recalling personal history
- Tendency to wander and become lost
- Impaired ability to execute common actions such as dressing oneself

Stage Seven: *Very severe cognitive decline*

- Little to no ability to speak
- Failure to recognize objects and people
- Loss of voluntary muscle control
- Assistance required for all daily functions

Patients may not exhibit all signs and symptoms of each stage, nor does every patient progress through the stages equally. The Alzheimer's Association (2008c) reports that the average lifespan after a diagnosis of Alzheimer's disease is eight years, but an individual may live anywhere from three to twenty years post diagnosis.

Prevalence and Risk Factors

Currently, an estimated 5.3 million people in the United States are living with Alzheimer's disease. The majority, 5.1 million, are older than 65 years old, while only 200,000 are younger than 65 (Alzheimer's Association, 2009a).

Age is the greatest known risk factor for Alzheimer's disease; the risk of Alzheimer's doubles every five years for someone above the age of 65. By the time people reach the age of 85, they currently have a 50% risk of developing the disease (Alzheimer's Association, 2008a). As a result of a longer life expectancy, women are almost twice as likely to develop Alzheimer's disease. A recent study found that, of people at 65 years of age with no dementia, women had a 20% lifetime risk of developing dementia in the future, compared to a 17% rate in men (Alzheimer's Association, 2009a).

As Americans live longer, and the baby boomer generation ages, rates of Alzheimer's disease are projected to grow exponentially:

<u>Year</u>	<u>Estimated new U.S. cases</u>
2010	454,000
2030	615,000
2050	959,000

(Alzheimer's Association, 2009a)

This growth in Alzheimer's cases is also expected to occur in Texas. While 270,000 Texans were diagnosed with Alzheimer's disease during 2000, this rate is projected to increase to 340,000 a year by 2010, a 26% increase (Alzheimer's Association, 2009a).

Other risk factors for Alzheimer's disease include family history, genetics, environmental factors, and history of severe head injury. It is believed that certain genetic factors may increase the potential for developing Alzheimer's disease. For example, the genetic presence of particular forms of the protein Apolipoprotein-e 4 (ApoE4), which occurs in about 40% of people with late-onset Alzheimer's disease, has been identified as a potential risk factor. In 2007, the SORL1 gene was determined to be another risk factor for Alzheimer's disease (Alzheimer's Disease Education and Referral Center, 2009a).

There also appears to be a link between cardiovascular diseases, most significantly diabetes, but also heart disease, stroke, high blood pressure, and high cholesterol, and the risk for developing Alzheimer's disease (Alzheimer's Association, 2009a). Studies are showing that brain damage due to excess blood sugar or insufficient insulin production, caused by diabetes, may increase the risk of Alzheimer's (American Academy of Neurology, 2008).

Recent research suggests that the prevalence and risk of Alzheimer's disease is higher in both Hispanics and African Americans, as compared with other Americans, perhaps due to genetic risk factors as well as higher rates of cardiovascular diseases. For example, incidence of diabetes is 64% higher in Hispanic Americans and 60% higher in African Americans than in white Americans (Alzheimer's Association, n.d.; Alzheimer's Association, 2004).

Additionally, new research is linking factors apart from race to Alzheimer's disease. For instance, fewer years of education (related to less mental activity and thus a smaller reserve of synapses, the connection points between neurons) has been found to increase the risk of Alzheimer's disease (Mayo Clinic, 2009).

Treatment

No known cure for Alzheimer's disease exists, but two types of drugs have been FDA approved to decrease its progression. The first type of drug, cholinesterase inhibitors, prevents the breakdown of the chemical acetylcholine (which

aids memory and learning) in those with mild to moderate Alzheimer's. These drugs delay symptoms for 6-12 months in approximately half of patients. The second type of drug, Memantine, helps regulate the activity of glutamate (which aids information processing) in moderate to severely affected patients. Scientists are currently focused on developing and testing new medications and other medical procedures which target the protein beta-amyloid, thereby reducing the development of the plaques in the brain (Alzheimer's Association, 2008d).

Other medical treatments seek to alleviate Alzheimer's symptoms beyond cognitive impairment, such as insomnia, anxiety, anger, depression, and wandering (Alzheimer's Disease Education and Referral Center, 2009b). Proper care and support is also essential to reduce the complications common to Alzheimer's, including pneumonia, infections, falls, and disorientation (Mayo Clinic, 2009).

Respite Services

In 2008, 9.9 million Americans, usually relatives, friends, and neighbors, provided unpaid care for an individual with dementia or Alzheimer's disease (Alzheimer's Association, 2009a). Because an individual with Alzheimer's can live with the disease for years, the emotional burden on caregivers can be overwhelming. In fact, it is common for the caregivers themselves to suffer from illnesses such as heart disease, high-blood pressure, and poor mental health (depression), most likely directly related to the stress and anxiety that comes with caring for a loved one with Alzheimer's (Family Caregiver Alliance, 2005).

Several types of services exist to support caregivers while they care for those with Alzheimer's disease. Common options include in-home services, adult day services, and emergency or long-term respite care facilities (Louis, 2002). In-home services consist of home health aides, companion services, and skilled nursing care.

Outside of the home, adult day care services provide "health, social, and support services in a protective setting during daytime hours" (Louis,

2002, p.1). Services often include meals, social and educational activities, exercise, and various types of therapy, counseling, and medical treatment. According to the University of Texas Health Science Center library (2009), there are currently 39 adult day care centers in Bexar County, two in Kendall County, one in Comal County, and none directly located in Bandera County. Among the adult day care centers in San Antonio, several are not for profit. Some of the non-profit agencies include: Grace Place, operated by Christian Senior Services; Casa de Amistad; CentroMed Ascot, operated by El Centro Del Barrio, Inc.; the Ella Austin Community Center, supported in part by the United Way and the City of San Antonio; and the Mission Road Development Center operated by Mission Road Ministries.

Respite care facilities include assisted living facilities, residential care facilities, and nursing homes. They provide overnight and weekend stays when a caregiver experiences illness or other emergency situations, or long-term stays. Services include meals, daily living help, therapeutic activities, and a safe setting to reduce wandering. "Respite programs help families prevent crisis by reducing stress. They allow caregivers to take a break from caring for ...dependent adults with serious medical...conditions" (Chapel Hill Training-Outreach Project, Inc., 2003).

At present, there are 29 facilities listed in the Alzheimer's Association Senior Housing Finder (2008b) that provide temporary respite care for Alzheimer's patients in Bexar County, some of which are not for profit. Esplanade Gardens in Converse is another non-profit respite care not included in the above listing; this organization is funded by the J. A. Wedum Foundation of Minnesota. The Senior Housing Finder currently lists 5 temporary respite facilities in Comal County, 2 in Kendall County, and none in Bandera County (Alzheimer's Association, 2008b).

The High Cost of Alzheimer's Disease

Alzheimer's disease also demands an enormous economic responsibility, not only on the caregivers, but also on the government, through Medicare and Medicaid, as well as on

businesses who are indirectly involved through their employees (Alzheimer's Association 2009a). The following statistics, provided by the Alzheimer's Association (2009a), represent typical costs associated with Alzheimer's care.

2008 average costs for Alzheimer's services:

- Home health aides= \$16.35 per hour
- Homemaker/companion services = \$18 per hour
- Adult day care service= \$64 per day
- Assisted living = \$3,031 per month or \$36,372 per year (dementia care often results in additional charges of, on average, \$1,236 more per month)
- Nursing Homes = \$219 per day or \$79,935 per year for a private room

In addition to costs associated with the patient, caregivers and the general public are also affected economically by Alzheimer's disease. During 2008 in Texas alone, there were 760,548 Alzheimer's/dementia caregivers who provided 656,505,018 hours of unpaid care, valued at approximately \$7.3 billion (Alzheimer's Association, 2009a). This financial loss affects not only the caregiver, but also eventually translates to enormous cost to United States businesses, due to caregiver absenteeism, loss of productivity, and turnover along with the business cost of health care and long term care. The latest published statistics estimate that the aggregate of Alzheimer's and other dementia related costs (both direct and indirect) total more than \$148 billion annually (Alzheimer's Association, 2009b).

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