



**TRACS** Community of Interdisciplinary Practice  
for People with Dementia

## An Overview of Dementia

Prevalence, Causes and Hallmark Features



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## Acknowledgements

- The information contained within this course draws from two important BPSD guides:
  - 1) *Behaviour Management. A Guide to Good Practice. Managing Behavioural and Psychological Symptoms of Dementia* (developed by a joint collaboration between DCRC and DBMAS)
  - 2) *The IPA Complete Guides to Behavioural and Psychological Symptoms of Dementia* (developed by the International Psychogeriatric Association)
- It is appropriate to acknowledge that these two resources have contributed greatly to evidence-based practice in the management of BPSD and the content provided in this course is not intended to re-create this information. Rather, the aim is to help translate this information into an online based resource for aged care staff and other professional staff working with people with dementia.
- The content in this course is intended to be general and therefore does not purport to be generalisable to all BPSD for all persons with dementia. Clinical judgment in the use of these techniques is considered imperative.



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## Learning Objectives

- Understand trends in population ageing and why this is an important consideration with regards aged care professionals
- Describe the basic neurobiological changes that occur within the context of dementia
- Describe the types of cognitive deficits that may result from these neurobiological changes
- Demonstrate an understanding of common types of dementia and describe their hallmark cognitive features
- Demonstrate an understanding of how cognitive changes may contribute to how an individual behaves

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## Ageing Population

- The world's population is currently experiencing an unprecedented shift in terms of the underlying makeup of the population
- In the year 2000 there were 600,000 people aged over the age of 60
- In the year 2050 the number of people aged over 60 is projected to be 2 billion
- Within the developed world, the 80+ age group is the fastest growing sector
- This is important to consider since from the age of 65, the chances of developing a dementia doubles every 5 years

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## Ageing Population & Dementia

- Current estimates indicate that there are approximately 266,000 people with dementia in Australia
- This is expected to rise to ~553,000 by 2030 and ~940,000 by 2050
- It is readily acknowledged that this will place increasing demands on health care systems and providers
- This highlights the need to continue refining skills in the care of older adults with dementia

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## Dementia Projections 2011-2050

- Have a read through the “Dementia Across Australia” article located on the *Learning Modules* page.
- Throughout the course you will be guided in reading articles that will describe varying prevalence rates of dementia. This particular article, however, provides one of the most recent explorations of dementia projections.
- Consider the figures in the article and look not only at the overall population figures, but also how they are split by states and territories.
  - Consider what might contribute to the differences and the similarities in these figures?

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## Dementia Projections 2011-2050

- Note that throughout these Learning Modules, you will be asked questions related directly to the content of the provided articles and/or the slides.
- You can use the Forum on the TRACS CIP-D website to share your thoughts with the other people working within the aged care industry.
- This will help to create an active learning environment in which you can learn from the skills, experiences, and knowledge of each other. It will also broaden your network of support within the aged care industry.

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## Dementia

- Dementia is a term used to describe a number of different disorders that result from progressive deterioration of the brain
- These include, but are not limited to: Alzheimer's Disease, Vascular Dementia, Fronto-Temporal Dementia, dementia in Parkinson's Disease, and Dementia with Lewy Bodies
- In broad terms, dementia describes a syndrome of cognitive impairment and behavioural disturbance resulting from changes in the brain

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## Dementia

- Dementia is a condition that results in the death of brain cells, which means that the brain is no longer able to function as well as it did previously. This impacts on the person with dementia's ability to perceive and interpret the world around them.
- Dementia is most commonly understood as a problem with memory because this is often the most readily noticeable clue that something is not quite right... however this is an overly simplistic explanation

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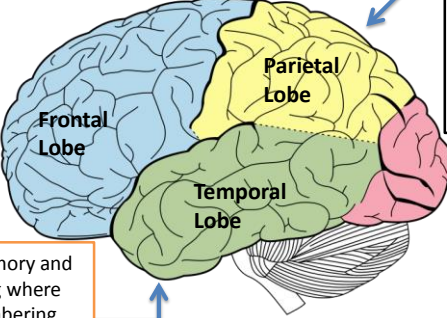
## Brain Regions & Their Function

- Before we discuss more about dementia, take some time to look at the following links and work through the associated content. This will increase your understanding of the various areas of the brain, as well as the behavioural and cognitive functions associated with those areas.
- Spend some time learning the names of the more prominent brain regions and the types of behaviours or cognitive functions associated with these regions. This will help to increase your understanding of the next sections of the Learning Modules.
- Scientific American Brain tour:
  - <http://www.scientificamerican.com/article.cfm?id=memory-brain-tour-video>
- New Scientist Brain tour:
  - <http://www.newscientist.com/movie/brain-interactive>

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## Brain Regions & Their Function




**FRONTAL LOBE:** controls executive functioning - organisation, planning, inhibiting a response/behaviour, social behaviours, reasoning, judgment, and problem solving

**PARIETAL LOBE:** controls visuospatial functioning (visual cognition) – important for driving, awareness of limbs in space, walking down a narrow stair case, threading a needle, or drawing a picture

**TEMPORAL LOBE:** memory and language – remembering where glasses were put, remembering names, learning new things, and language comprehension

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## Dementia (continued)

- Dementia often results in impairment in multiple cognitive domains including memory, language, visual perception, planning, problem solving, and executing motor movements
- These cognitive deficits are linked to the loss of brain cells in particular brain regions
- Such cognitive deficits can make it difficult for the person with dementia to complete activities of daily living and to function in a complex social environment
- Take a look at the following picture and notice the marked cell loss in the brain autopsied from a dementia patient

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**Left:** Autopsied brain of a person with dementia. Note the loss of brain volume



Source: [http://www.ehow.com/how-does\\_5008150\\_alzheimers-disease-through-brain-tissue.html](http://www.ehow.com/how-does_5008150_alzheimers-disease-through-brain-tissue.html)

**Right:** Autopsied brain of an older adult without dementia

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## Dementia: Neurotransmitter Changes

- Not only are there structural changes in the cortex (top layers of the brain) and subcortical regions (inner layers of the brain), but there are also changes in neurotransmitter function
- Neurotransmitters are chemicals in the brain that communicate information throughout the brain and the body. They act to stimulate or stop actions (e.g., telling your heart to beat; telling you that you need to sleep; enabling you to carry out the many tasks associated with driving a car; indeed, they are working right now, enabling you to read this information while at the same time wondering what you will have for dinner tonight!).

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## Dementia: Neurotransmitter Changes

- There are a number of neurotransmitters in the body, those particularly impacted upon by dementia include acetylcholine, dopamine, norepinephrine, serotonin, glutamate and gamma-aminobutyric acid
- Changes to neurotransmitter function have been linked to cognitive impairment. For example changes to the cholinergic system can cause such things as memory impairment, confusion, and delirium.
- Acetylcholinesterase inhibitors are sometimes prescribed for dementia patients to help counteract these biological changes and help slow the cognitive decline.

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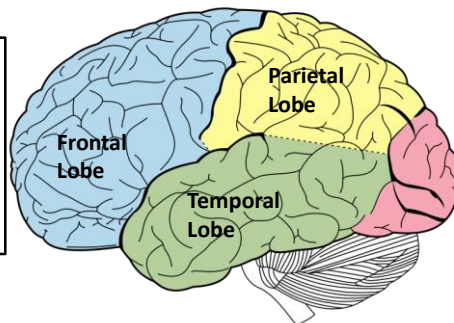
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## Dementia: Alzheimer's disease

- One of the hallmark features of Alzheimer's disease is significant cell loss in the temporal lobes, which then progresses to cell loss in the frontal lobe and parietal lobes.

• Have a think back to what cognitive problems might occur due to damage to these brain regions (if you get stuck refer back to slide 11).

• Remember, as changes in the brain occur, so do people's cognitive ability.



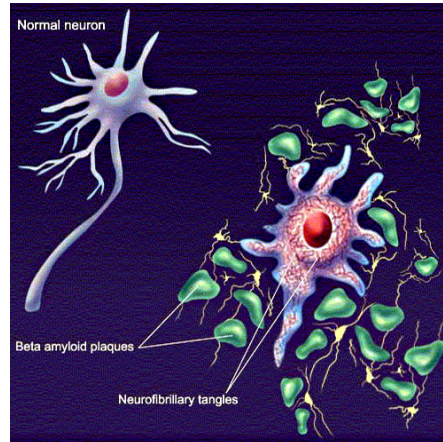
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## Alzheimer's disease: Neurological Changes

- The cause of cell death in Alzheimer's disease is not well understood, however there are increases in proteins in the brain (beta-amyloid and tangles), which are suspected to be involved in this cell loss
- Beta-amyloid forms plaques which build up between brain cells
- Tangles prevent the transport of nutrients to brain cells resulting in cell death



Source: <https://sites.google.com/site/bme365ralzheimers/pathophysiology>

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## Alzheimer's disease: Cognition

- Given the loss of cells in the brain from Alzheimer's disease, there are hallmark cognitive changes that occur in line with this damage
- The hallmark cognitive deficit in Alzheimer's disease is that of new learning (memory relating to remembering something new). Often, a person with Alzheimer's disease will be able to recall autobiographical information from their life (e.g., where they went to school) but won't be able to learn and remember the name of the nursing staff in the aged care facility.
- Impairment in new learning is more severely impaired in Alzheimer's disease compared with the other dementias

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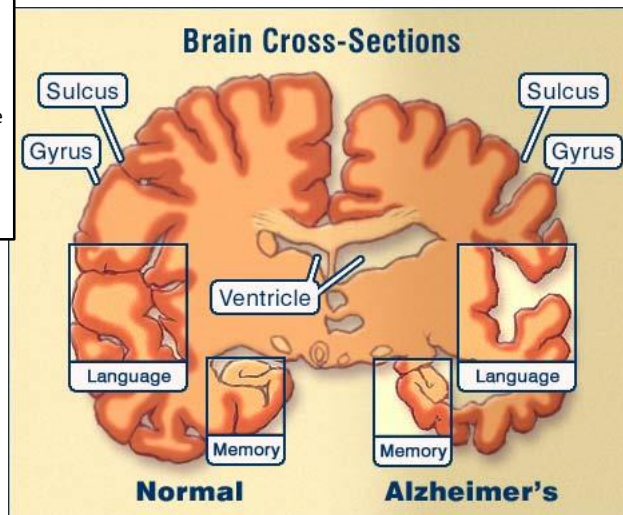


## Alzheimer's disease: Cognition

- Poor memory can result in being unable to remember where a pair of glasses were placed, poor recall of recent events, or repetition of conversations
- As the disease progresses, the frontal lobe and parietal lobe areas experience cell loss, resulting in deficits in cognitive functions such as planning, working memory, response inhibition, and nonverbal abilities
- Language also becomes impaired, which impacts on the persons ability to communicate effectively

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Observe the loss of brain cells in regions that are in control of memory and language functions in the brain of someone with Alzheimer's disease



Source: <http://health.mashangel.com/alzheimers-disease/causes-of-alzheimers-disease/#axz3Ge3WHID2>

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Check out this website for a guided tour of the neurological changes that occur within the context of Alzheimer's disease:

[http://www.alz.org/braintour/3\\_main\\_parts.asp](http://www.alz.org/braintour/3_main_parts.asp)

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## Questions to Guide Learning

- Now that you have an understanding of important brain structures, including those affected by cell loss in Alzheimer's disease, take a moment to think about the types of cognitive changes you would expect in Alzheimer's disease in relation to these brain changes
- Think back on your own clinical or personal experience with dementia. Can you think of someone with Alzheimer's disease? Did you notice any of these types of cognitive changes? Take a moment to describe those deficits and how they impacted on that person's ability to function day-to-day
- Remember to use the Forum on the TRACS CIP-D website to create a more active learning experience and to ask questions or seek clarification

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## Dementia: Vascular dementia

- When it comes to a vascular dementia, damage to the circulatory system in the brain causes problems in functioning in the affected region(s) of the brain.
- The damage may have resulted from multiple mini strokes or some other cerebrovascular disorder that disrupts blood flow or damages the blood vessels within the brain.
- These changes in blood supply deprive the brain of normal levels of nutrients and can stop blood from being delivered to the affected areas of the brain
- This results in cell death/damage in those regions affected by the lack of blood flow

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## Dementia: Vascular dementia

- As seen via the *New Scientist* web link (slide 10), the brain contains parts on the outside (the cortex), the visible part of the brain broken up into the left and right hemispheres, and the frontal, parietal, temporal, and occipital lobes. The parts on the inside, below the cortex, are referred to as the subcortex.
- Brain damage will therefore vary depending on which parts of the brain were unable to obtain adequate blood supply and as a result, the type of cognitive dysfunction experienced will also vary depending on the location of the damage

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## Dementia: Vascular dementia

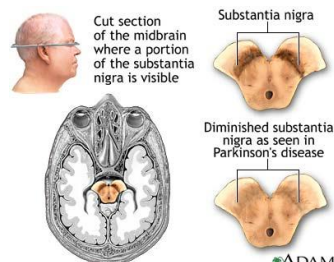
- One of the hallmark cognitive deficits in vascular dementia, however, is slowed processing speed. Essentially, information no longer flows around the brain as effortlessly as it did prior to the deterioration in blood supply.
- Other damage may include memory problems (but usually not as severe as that seen in Alzheimer's disease) and difficulties planning, paying attention, and problem solving.

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## Dementia: Parkinson's disease

- Parkinson's disease results from cell death in those brain regions found beneath the cortex, including the substantia nigra, which changes the way that certain brain chemicals are regulated within the brain.
- Cell loss also occurs in the brain stem



Source: <http://www.rnpedia.com/home/notes/medical-surgical-nursing-notes/parkinson-s-disease>

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## Dementia: Parkinson's disease

- One of the hallmark features of Parkinson's disease is a deterioration in motor movement
- It should be noted, however, that despite all the changes that occur within the brain as a result of Parkinson's disease, not all people with a diagnosis of Parkinson's Disease actually develop dementia. So some people can have this impairment in motor function without prominent deterioration in cognitive function.

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## Dementia: Parkinson's disease

- For those that do develop dementia in Parkinson's disease, deficits in cognitive functioning can include reduced processing speed, poor attention and executive function
- Some memory impairment may also be observed but not necessarily as prominent as that seen in Alzheimer's disease

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## Dementia: Parkinson's disease

- Dementia with Lewy Bodies is a very similar type of disease as dementia in Parkinson's disease, however the onset of cognitive problems is one of the main criteria that separates these diagnoses.
- Visual hallucinations also tend to be experienced by people with a diagnosis of Dementia with Lewy Bodies
- For a point of comparison, read the "Consensus Guidelines Lewy Body Dementia" article located on the *Learning Modules* page to understand the characteristics of Lewy Body dementia

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## Dementia: Frontotemporal dementia

- As the name suggests, in frontotemporal dementia, cell loss occurs most dramatically in the frontal regions of the brain
- Cell loss can also impact the anterior (towards the front of the head) regions of the temporal lobes



Source: <http://www.the-scientist.com/?articles.view/articleNo/29570/title/New-mechanism-for-dementia/>

Note how the frontal region of the brain has reduced brain volume evidenced by a shrinking of the frontal cortex

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## Dementia: Frontotemporal dementia

- So what are the major changes noticed in a person who has been diagnosed with a frontotemporal dementia?
  - Behavioural and personality change predominate
  - Loss of empathy – the person may appear cold and harsh
  - Often there are inappropriate social conduct issues and inappropriate sexual behaviours
    - Rude comments or laughing at inappropriate moments
  - The person may demonstrate aggressive behaviours
  - They may demonstrate perseverative (can't stop performing a repetitive action) behaviour

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## Dementia: Frontotemporal dementia

- So what are the major changes noticed in a person who has been diagnosed with a frontotemporal dementia? (cont'd)
  - Executive dysfunction – e.g. lack of judgment
  - Reduced communication abilities – reduced speech, problems with word finding
  - Some memory problems – not as prominent as Alzheimer's disease
    - cued recall often helps
  - May develop a liking for sweet foods
  - Over-eating

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## Dementia: Frontotemporal Dementia

- Have a read through the “Frontotemporal Lobar Degeneration” article if you are interested in more information about frontotemporal dementia

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## Overview of dementia in Australia

- Time to take stock... and catch our breath...
- Read through the “Dementia Epidemic” article. It gives a great overview of most of the information presented so far and will therefore help to consolidate the range of topics we have covered up to now.
- Once again, use the Forum on the website to ask questions, discuss points of interest, and seek clarification on anything that is not making sense at the moment
- The information that we have covered in the course to now provides a good, strong basis on which to build the rest of the course

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## Dementia: Behaviours

- While dementia is often thought of as a problem with cognition, dementia also results in changes in behaviours.
- Dementia can, however, occur with and without behavioural disturbance.
- When behavioural disturbances do occur, they can be distressing to the person with dementia, and can have a significant impact on their family and care staff.

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## Dementia: Behaviours

- These behaviours are often referred to as Behavioural and Psychological Symptoms of Dementia (or BPSD), and this will be the focus of Module 2.
- For now, we look at the relationship between changes in cognition and the display of BPSD.

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## Linking Behaviours and Cognition

- Sometimes it can be assumed that a person with dementia is purposefully acting in a certain way – i.e., they have intent, they are trying to be annoying, trying to hurt someone
- Just like in the legal system though, in order for a behaviour to have intent the person must have enough cognitive capacity to be able to plan the carrying out of the behaviour, think of different things they could do (particularly if something doesn't go according to plan initially), remember the plan, and act out the plan. Remember from our previous discussions, that these are all common deficits associated with dementia.

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## Linking Behaviours and Cognition

- Given that you now have an understanding of the neurobiology and the subsequent cognitive deficits commonly associated with dementia, behaviours may best be understood and interpreted as the only way a person with dementia can make sense of, and communicate within, their environment.
- The behaviours of persons with dementia should not be viewed as the person being difficult “on purpose”, but rather as resulting from a compromised brain and an associated deterioration in cognitive function.

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## Linking Behaviours and Cognition

- Consider for a moment your own behaviour when you have, for example, a bad headache or are particularly stressed. Each of these things has an impact of sorts on cognition and an associated impact on how we might behave (e.g., just want to lie down; less patient with those around us, etc...)

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## Linking Behaviours and Cognition: Memory

- Have a think about how problems with remembering things in general might impact on someone's behaviour. What about a time when you weren't able to remember a key piece of information, like where you parked the car or where you put your purse or wallet. How did you react?
- Now imagine that it is a person with dementia, with more significant memory issues. How might you think they would react when they can't remember why they are now living in an aged care facility, rather than their home?

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## Linking Behaviours and Cognition: Memory

- Here are some other examples...
  - Memory problems might make a person constantly repeat conversations despite having only had the conversation 5 minutes ago
  - They might forget that their partner has passed away and keep asking about them
  - They might forget what their partner looks like and attempt to develop a relationship with someone they think is their partner
  - Since memory and learning go hand-in-hand, memory problems will also prevent people from learning new things, even simple tasks or routines, such as finding the toilet

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## Linking Behaviours and Cognition: Planning & Organisation

- Have a think about how planning and organisation deficits might impact on behaviours. Have you ever had to plan something or organise something that was challenging? How did that make you feel? What impact did it have on your behaviour? Were you more easily frustrated by little things, were you sleeping poorly?
- Now see if you can think about this from the perspective of a person with dementia. What are some examples of the types of behaviours that these types of deficits might create?

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## Linking Behaviours and Cognition: Planning & Organisation

- Here are some other examples...
  - Wearing clothes that are inappropriate for the weather
  - Unable to plan a meal like they once would have, resulting in frustration and maybe aggression

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## Linking Behaviours and Cognition: Language

- Have a think about how language deficits might impact on someone's behaviour. Have you ever been at a noisy party or restaurant and tried to have a conversation? How frustrating is that? Aren't there times when you feel like walking out and getting away from it, but you stay to be polite or socially acceptable?
- Try to think how a language deficit would impact on a person with dementia. Also, have a think about how frustrating it would be to have that deficit and what ways you might try and express a need within this context.

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## In the next module...

- Now that you have built on your knowledge about the brain, different types of dementia, and how the changes in the brain can impact on behaviour in a person with dementia, we next turn our attention to looking in more detail at the behavioural and psychological symptoms of dementia (BPSD)



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