

# HEALTHY BRAIN AGEING AND BRAIN FITNESS

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**Dr Nicole Kochan**

Senior Research Fellow and Clinical Neuropsychologist  
Centre for Healthy Brain Ageing (CHeBA), School of Psychiatry  
Medicine and Health UNSW

# Today's talk

- Ageing & Dementia: a few facts & figures
- Maintaining healthy brains, gaining mental fitness: the latest evidence
- Protective factors against cognitive impairment
  - Cognitive reserve
- Modifiable risk factors for cognitive impairment
- Four pillars of a healthy lifestyle and possible Alzheimer's prevention
  - Mental activity
  - Physical exercise
  - Diet/nutrition
  - Sleep
  - Plus one more....

INFOGRAPHIC

# The global impact of dementia

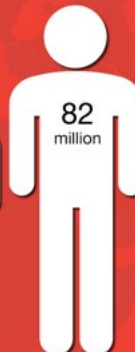


Around the world,  
there will be one new case  
of dementia  
**every  
3 seconds**

50 million people worldwide are  
living with dementia in 2018.  
This number will more than  
**triple to 152  
million by 2050**



2018



2030



2050



2018



2030

The total estimated  
worldwide cost of dementia  
in 2018 is US\$1 trillion.  
This figure will rise to  
**US\$ 2 trillion  
by 2030**



**Alzheimer's Disease  
International**

*The global voice on dementia*

# WHY?

Rapidly increasing ageing of the population

Projections of ageing popn Australia  
current → 2057:

65+ = 4.4M → 8.2M

85+ = 560,000 → 1.7M



Single biggest risk factor of dementia is age

but.....

**The incidence of new cases of dementia is falling??**

# Why is this topic so important?

The World Health Alliance was founded on 3 premises:

1. There is no health without brain health
2. Brain health and health begin with the mother and the child and their education
3. Our brains are our future!



## Why brain fitness matters

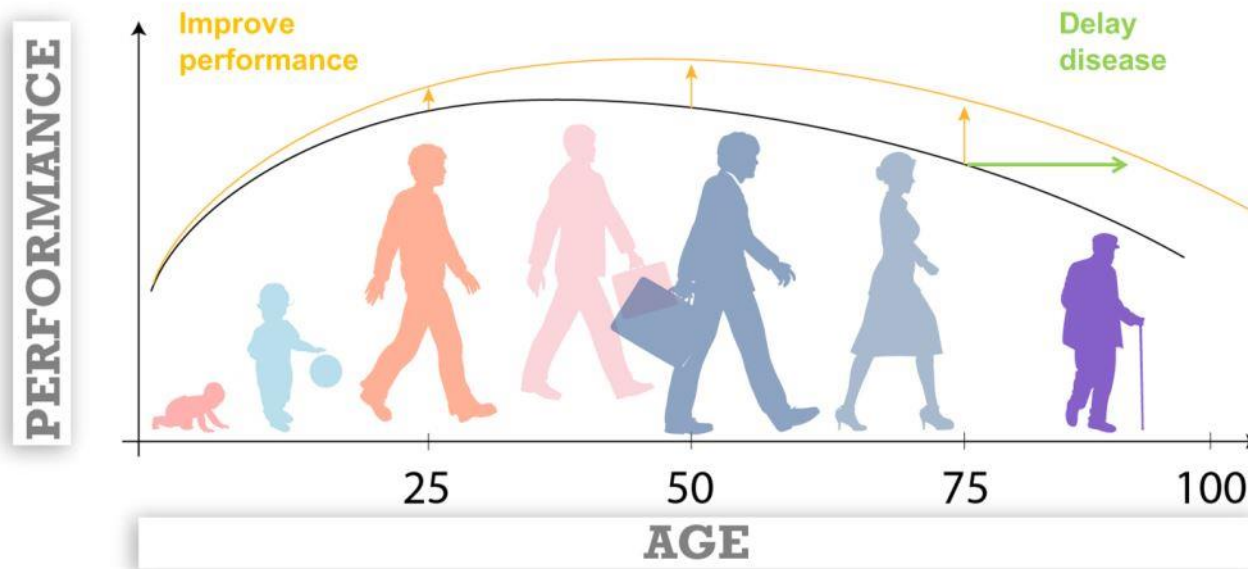


Image from SharpBrains.com (16.10.19)



SMH Good Weekend Oct 5 2019

 **CHeBA**  
Healthy Brains • Positive Ageing

 **CogSCAN**



*By Alvaro Fernandez*

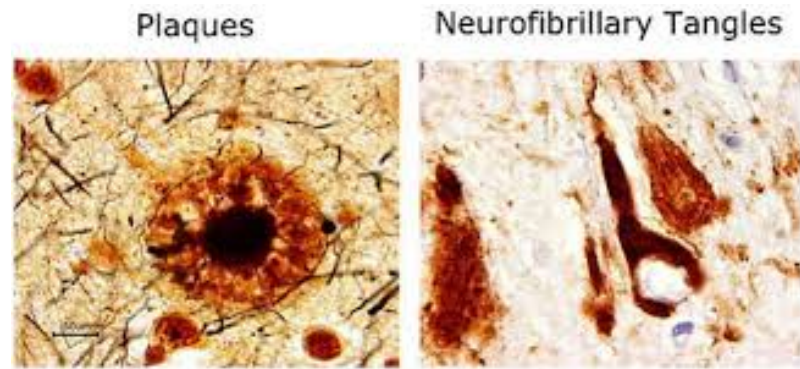
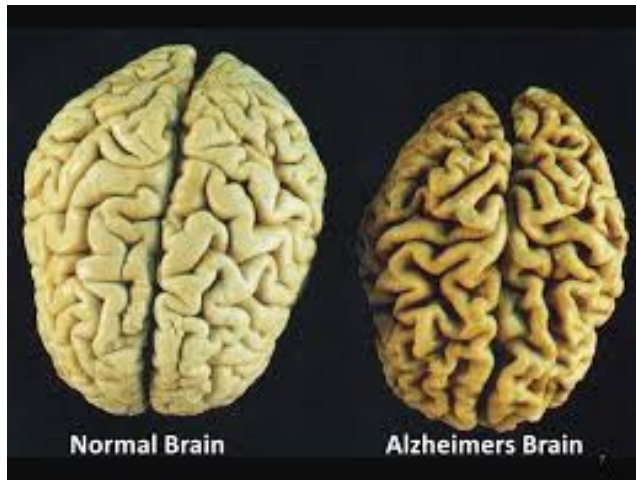
# Solving the Brain **Fitness** Puzzle Is the **Key** to **Self-Empowered** Aging

What works to preserve cognitive abilities?  
Much like the human brain, the answer is  
complicated, individual, and nuanced.



# Protective factors against cognitive impairment

- Resilience against dementia?
- Some people with Alzheimer's changes in their brains do not have dementia.



# The Nun Study



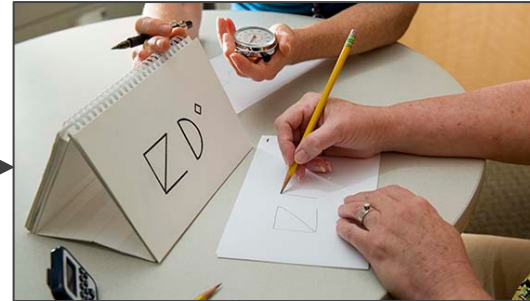
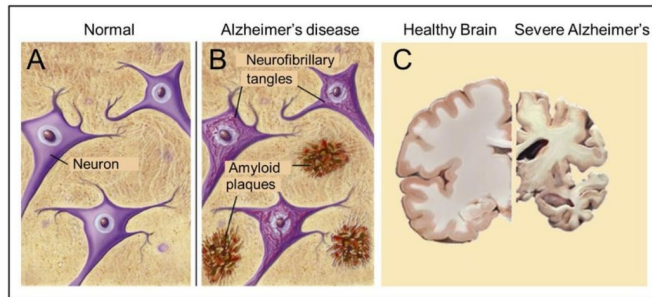
- 678 Sisters of Notre Dame across the USA
- Annual assessments of cognitive function
- Brains donated for neuropathological exam

# The Nun Study



- Some brains showed all the physical signs of Alzheimer's, yet the nuns had no symptoms in life & remained physically sharp into very old age.
- Sisters who read, wrote and kept intellectually stimulated during their early life had a better chance of staving off dementia later in life.

# Cognitive reserve



Reserve

# Protective factors against cognitive impairment

- Resilience against dementia?
- Enriched lifetime experiences can help protect the brain against memory loss
- Observation that high education protects an individual from developing dementia



# Cognitive reserve

an active & dynamic process that allows an individual to cope more successfully with disease-related brain changes.

Cognitive reserve CR reflects lifetime of:

education



occupational roles



mentally stimulating leisure activities



# Cognitive reserve – a secret to coping with neurodegeneration in the brain.

- Recent study (JAMA Neurology 2019) showed that the protective effects of CR can build throughout the lifespan
- Those with high CR accumulated through education, early-life cognitive activities, mid-life activities, late life activities & social activities in late life had a reduced risk of dementia in a dose-dependent manner
- Reduced dementia risk even in individuals with high degrees of Alzheimer pathology and cerebrovascular pathology (like mini-strokes)





# How flexible is your brain?



# Modifiable risk factors for dementia

**Early life:** less education

**Mid-life:** hearing loss  
brain injury  
high blood pressure  
alcohol

**Late life:** smoking  
obesity  
depression  
social isolation  
physical inactivity  
air pollution  
diabetes

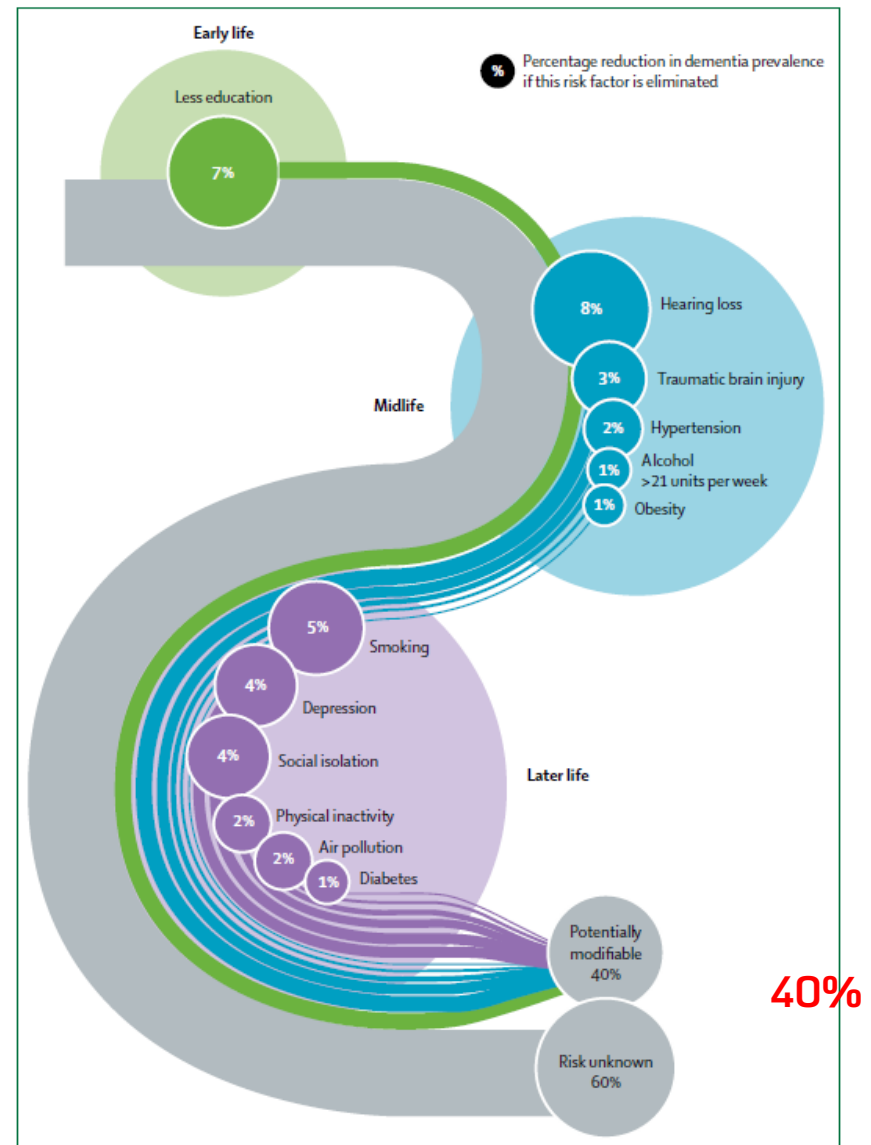


Figure 7: Population attributable fraction of potentially modifiable risk factors for dementia

# Four pillars of a healthy lifestyle to maximise brain fitness

1. Mental activity
2. Exercise
3. Diet/nutrition
4. Sleep

*Plus one more –*  
Alcohol intake



# Mental activity

Taking on new skills such as hobbies late in life is beneficial

New research: learning digital photography or how to use an ipad improved memory



**ARTICLE** **OPEN**

# Age is no barrier: predictors of academic success in older learners

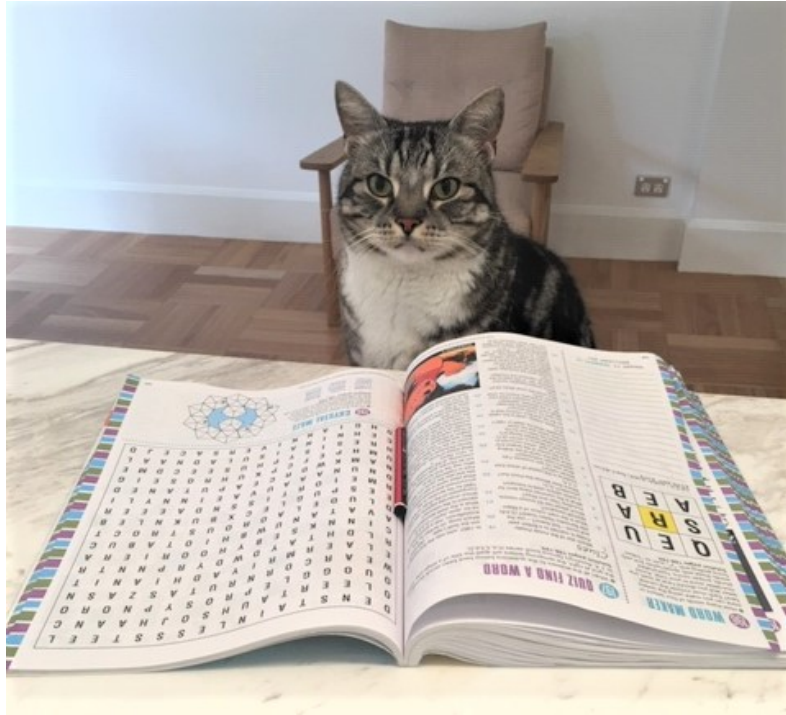


Imlach A 2017 npj Science of Learning



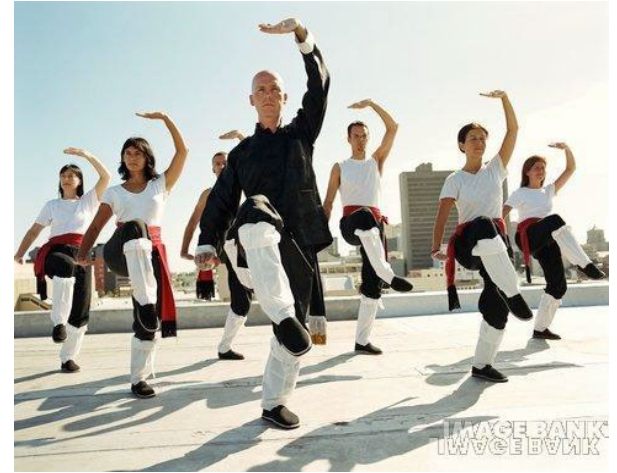
A man with grey hair, wearing a green polo shirt and blue jeans, is sitting on a wooden bench outdoors. He is leaning forward, intently focused on a chessboard set up on a small table in front of him. His right hand is near the chess pieces, suggesting he is in the middle of a game. The background is a soft-focus view of green foliage, indicating a park or garden setting. A small copyright symbol (©) is visible in the top left corner of the image.

A photograph of three elderly people, two women and one man, sitting together and playing cards. They are all smiling and holding fans of pink cards. The man in the center is wearing a blue patterned shirt, and the two women are wearing white tops. The background is a simple indoor setting with a framed picture on the wall.





# Physical exercise



# Diet/ good nutrition

## Mediterranean diet

Olive oil

Legumes

Vegetables

Oily fish



Low dairy & meat, low sugars, saturated fats, processed foods

## MIND diet

Mediterranean-DASH diet Intervention for Neurodegenerative Delay (MIND) diet specifically designed to be neuroprotective.

Similar to MED diet but also emphasises vegetables including green leafy vegetables, nuts, berries, beans, whole-grains, fish, poultry, olive oil

<https://www.neura.edu.au/news/mind-over-mediterranean-australian-study-suggests-mind-diet-reduces-the-risk-of-dementia/>

# MIND diet

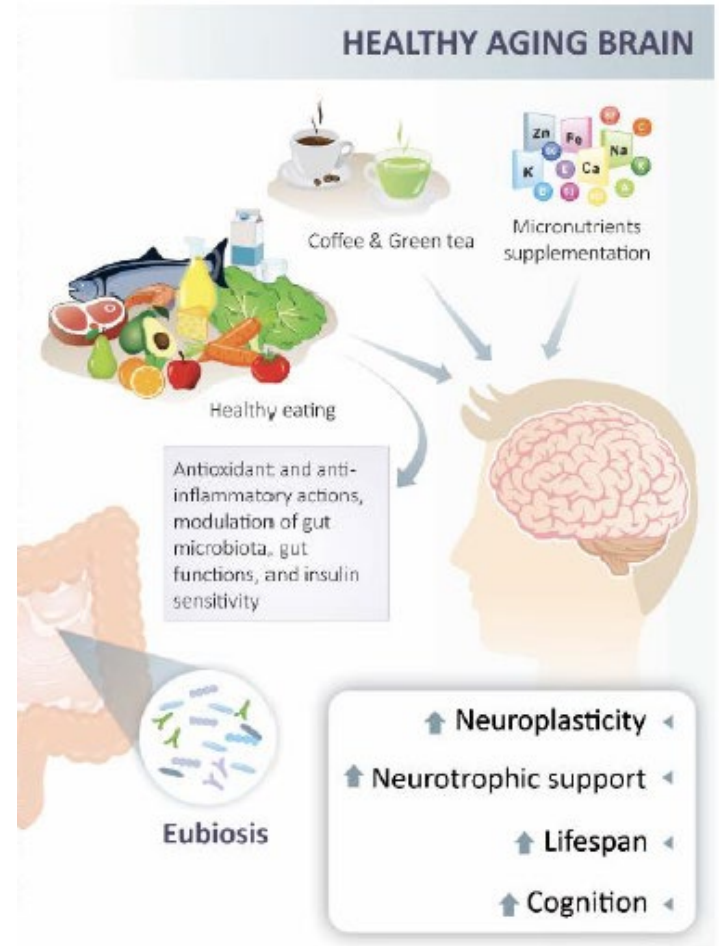
Improving gut health



May improve gut-brain communication  
through microbiota-gut-brain axis



Potential benefits in cognitive functioning  
and ageing



Melzer 2021 International Journal of  
Molecular Science

# Sleep



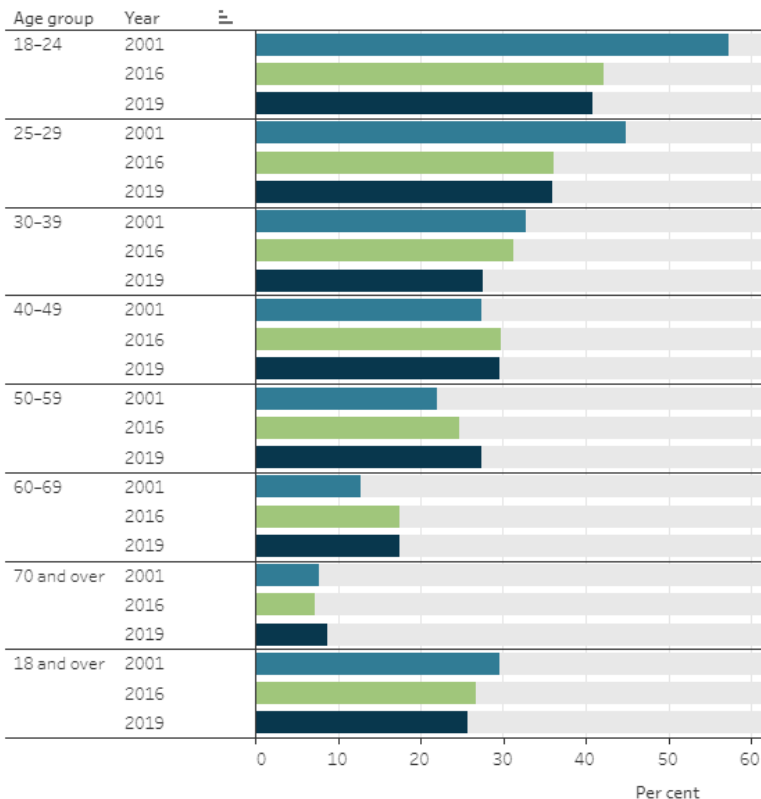
# One more pillar – Alcohol use





# Age-based trends in alcohol use

**Australian national data on proportion of people reporting risky drinking (5+ drinks/occasion) 2001-2019**



- Recent decades have seen significant shifts in the epidemiology of alcohol use
- There are significant declines in the rates of alcohol use in young people
- But alcohol use and related harms are increasing in older people
- People in their 60s are the most likely to drink daily and the most likely to drink in a high risk pattern on at least 5 days/week
- Alcohol-related deaths, hospitalisations and other harms also on the increase in older people

# Alcohol and the brain: Acute effects

## How alcohol affects the brain

Drinking alcohol affects the way your brain works—changing everything from the way you act to your ability to walk. Some effects can be long-lasting. Learn about how alcohol affects different parts of the brain.<sup>1</sup>

**Hippocampus:** Your memory is controlled by the hippocampus. Drinking a lot of alcohol at one time can cause you to blackout, or forget a period of time. Long-term alcohol abuse can permanently damage the hippocampus, making it difficult for a person to learn.

**Hypothalamus:** Many body processes, such as heart rate and the feeling of hunger or thirst, are controlled in this small area. Alcohol can slow your heart rate and may make you hungrier and thirstier.

**Central Nervous System:** Alcohol slows down this system, which is made up of the brain, spinal cord, and nerves. That affects how signals flow through your body, making you think, speak, and move more slowly.

**Cerebral Cortex:** This is the main area involved in thinking, decision-making, emotions, and the five senses. Alcohol's effects on this area can impair your ability to think clearly and lower your inhibitions. It may make you act without thinking or make you angry for no reason. Alcohol may affect your senses, such as blurring your vision. Long-term alcohol abuse can permanently damage this region.

**Cerebellum:** This part of the brain is important for coordinating many of your daily movements, such as walking and grabbing objects. Alcohol can slow your reflexes. It may cause you to lose your balance or make your hands shake.

**Medulla:** Involuntary processes, such as breathing and maintaining body temperature, are controlled here. Drinking a lot of alcohol at one time can shut down the medulla, leading to a coma.

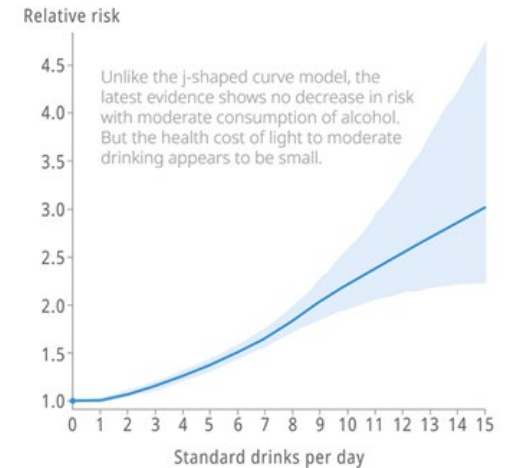


# Moderate alcohol use and dementia

- *Chronic, heavy alcohol use* is related to dementia, but what about *moderate* use?
- For many health conditions, particularly cancer, alcohol consumption shows a linear dose-response relationship – there is no “safe” level of consumption
- For some health conditions, like dementia, there seems to be a “J-shaped” relationship with alcohol use
- Light-moderate alcohol use is protective when compared with abstaining, as well as heavier patterns of use
- Lowest risk of dementia: 4 drinks/week

## The risk of drinking alcohol

Weighted relative risk of alcohol for all attributable causes, by standard drinks consumed per day.



The Conversation

Source: The Lancet

## The J-shaped curve

The curve models the risk of dying against the number of alcoholic drinks consumed per day.



The Conversation

slide contributed by Dr Louise Newton



## Welcome to Rethink my drink

This specially designed website has been designed by GPs and other healthcare professionals to help you reflect on your drinking and the possible impact it might be having on your health and wellbeing. It will also give you the chance to make some positive choices about how you are going to drink in the future.

[Read more >](#)

***The research study is looking recruit people who meet the following criteria:***

- ***Are aged 60-75 years.***
- ***Regularly consume alcohol***
- ***Have access to a computer and the internet.***
- ***Are based in Australia.***

**TO EXPRESS INTEREST IN THIS STUDY  
OR LEARN MORE ABOUT JOINING  
PLEASE CONTACT THE RMD TEAM  
E: [RethinkMyDrink@unsw.edu.au](mailto:RethinkMyDrink@unsw.edu.au)  
M: 0466 046 988**

# Five pillars of a healthy lifestyle to maximise brain fitness

1. Mental activity
2. Exercise
3. Diet/nutrition
4. Sleep
5. Alcohol



# Thank you!

