



An Australian Government Initiative

Dementia Risk Reduction: A Practical Guide for General Practitioners



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The [Dementia Collaborative Research Centres](#) are an Australian Government funded initiative established to advance Australian research into dementia and the translation of research into clinical practice. The three Centres each focus on a different area of dementia research:

- Assessment and better care
- Early diagnosis and prevention
- Carers and consumers

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1. INTRODUCTION

1.1 About this guide

This guide provides information for GPs about modifiable risk and protective factors for dementia. Each section explains the evidence for the association of that factor with dementia risk and provides a practical guide to the resources available to GPs to assist them to work with their patients to address factors of concern. Where possible, hyperlinks are provided to those resources.

The guide aims to provide GPs with a quick reference source to enable them to offer strategies to patients for maintaining their cognitive health and reducing their dementia risk. As many of the risk factors for dementia overlap with those for heart disease and other chronic conditions that can be addressed by preventative health, the guide draws on existing clinical guidelines for general practice and other available resources, and provides links to these.

Alzheimer's Australia's Mind your Mind is a community education program designed to inform people about what they can do to reduce their risk of dementia. It is based on the scientific evidence that is described in this guide. The program consists of seven 'signposts' toward dementia risk reduction:

- ◆ Mind your Body – be physically active
- ◆ Mind your Brain – keep your brain active
- ◆ Mind your Diet – eat healthily
- ◆ Mind your Habits – don't smoke and drink alcohol only in moderation
- ◆ Mind your Head – protect your head from injury
- ◆ Mind your Health Checks – check and manage blood pressure, cholesterol, blood sugar and weight
- ◆ Mind your Social Life – participate in social activities

The risk and protective factors associated with each of the Mind your Mind signposts and the role of GPs in addressing these are covered in this guide.

1.2 What are the risk factors for dementia?

1.2.1 Non-modifiable risk factors

Age is the most important risk factor for dementia, with prevalence increasing exponentially after age 65. In 2009, the prevalence of dementia in Australia was estimated to rise from 1.7% of men and 1.3% of women aged 65-69, to 37% of men and 47% of women aged 95 and over [1].

Autosomal dominant gene mutations have been identified for some rare causes of dementia. These account for only a small percentage of dementia cases, and usually result in younger onset dementia (diagnosed before 65 years of age). For example, variations in specific genes are known to cause familial Alzheimer's disease, forms of frontotemporal dementia and Huntington's disease [2].

People with Down syndrome are at very high risk of developing Alzheimer's disease [2]. A susceptibility gene, the apolipoprotein E – epsilon 4 allele, is associated with a higher risk of developing Alzheimer's disease and vascular dementia [2]. Routine testing for this gene is not currently recommended.

Having a family history of dementia is associated with an increased risk. Those with a first degree relative having Alzheimer's disease have a 2-3 fold increased risk of developing the disease themselves [3].

The prevalence of Alzheimer's disease is higher in females than males [1]. The prevalence of vascular dementia is higher in males [1].

1.2.2 Modifiable risk factors

Because of the influence of non-modifiable risk factors, especially age and genetics, dementia cannot be definitely prevented, but there is growing evidence that addressing modifiable risk factors can reduce the risk or delay the onset of dementia.

Epidemiological research shows that certain medical and lifestyle factors are consistently associated with a higher or lower risk of developing dementia. Regular physical, mental and social activity are associated with reduced dementia risk, while vascular risk factors are associated with increased dementia risk [4]. Encouraging active lifestyles and effective treatment of vascular risk factors therefore has the potential to reduce the risk of dementia among the population.

The modifiable factors associated with dementia risk include:

- ◆ Alcohol
- ◆ Blood pressure
- ◆ Body weight
- ◆ Cholesterol
- ◆ Depression
- ◆ Diabetes
- ◆ Diet
- ◆ Head injury
- ◆ Mental activity
- ◆ Physical activity
- ◆ Smoking
- ◆ Social activity

This guide provides information about each of the above modifiable factors associated with dementia risk. For each factor, the evidence is explained, and practical strategies and resources are provided.

1.3 Why is dementia risk reduction important for general practice?

Many people, especially those with a family history of dementia, are interested in what they can do to prevent developing the illness themselves. GPs can assist patients by providing advice about the lifestyle and health factors that are consistently associated with the risk of developing dementia. They can use recommended preventative health interventions to reduce the impact of modifiable risk factors for patients.

The incidence of dementia is growing rapidly with the ageing of the population. In Australia in 2010 there are an estimated 257,000 people with dementia. This is expected to increase to 1,131,000 by 2050 [1].

While there is no cure for dementia, addressing modifiable risk factors remains an important strategy for reducing the incidence of dementia. Modelling suggests that if the average onset age could be delayed by 5 years, incidence would be halved by 2050 [5].

Half of Australian adults remain unaware of the potential for dementia risk reduction. Some associate mental activity with reduced risk, but very few acknowledge the important link between vascular risk factors and dementia [6]. GPs can help address this by educating patients about the risk factors, helping patients make appropriate lifestyle changes, and treating medical risk factors.

There is evidence that GPs can assist patients to make lifestyle changes aimed at reducing their risk of chronic disease. For example, brief clinical interventions by GPs have been shown to improve the success of patients' attempts to quit smoking [7] and improve patients' levels of physical activity [8].

Preventative health strategies aimed at maintaining cognitive health have the potential to have a significant impact on future numbers of people developing dementia, and GPs have an important role to play in this.

1.4 References

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2. SUMMARY OF EVIDENCE AND GP ROLE

General practitioners consult with 86% of Australians each year. This makes GPs ideally placed to contribute to preventive health care. Preventative health activities can be opportunistically provided when patients present with other problems and can proactively target high risk individuals.

Dementia is an illness that will affect more and more Australians as our population ages. There is no cure or effective treatment for dementia, but there is evidence that the risk of developing dementia may be reduced by addressing modifiable risk factors. GPs can assist patients to do so through preventative health activities in line with those already recommended by the Royal Australian College of General Practitioners (see the [Red Book](#) and [SNAP guidelines](#)).

2.1 Chronic disease risk factors and dementia

- ◆ Consumption of moderate amounts of alcohol has been associated with better cognitive function and reduced risk of dementia. However, excessive amounts over time can increase the risk.
- ◆ Obesity at midlife is associated with an increased risk of developing dementia, including Alzheimer's disease. In old age, those who are underweight or are losing weight are found to be at increased risk of dementia.
- ◆ Diets low in saturated fat and high in antioxidant rich fruits and vegetables have been associated with better brain function and reduced risk of dementia. What is good for the heart seems to be also good for the brain.
- ◆ Regular physical exercise in midlife and late-life is associated with better brain function and reduced risk of cognitive decline and dementia. Even simple exercise like walking has been shown to be beneficial.
- ◆ Smoking is associated with an increased risk of dementia. Former smokers have lower dementia risk, demonstrating the benefits of quitting.

The smoking, nutrition, alcohol and physical activity (SNAP) risk factors above are common among general practice patients. They contribute significantly to the burden of disease, due to their effect on the incidence and complications of chronic diseases such as diabetes, cardiovascular disease, respiratory disease and some cancers. They are also associated with the risk of dementia. Interventions by GPs can help patients make lifestyle changes and reduce their risk of chronic disease including dementia.

2.2 Vascular disease risk factors and dementia

- ◆ High blood pressure, especially at midlife, is consistently associated with an increased risk of developing dementia. Treatment of hypertension has been found to reduce the risk of cognitive decline and dementia in several studies.
- ◆ High serum total cholesterol, especially at midlife, is associated with an increased risk of developing dementia, especially Alzheimer's disease.
- ◆ Diabetes is associated with an increased risk of developing dementia, including Alzheimer's disease and vascular dementia.

The physiological risk factors above contribute to cardiovascular disease, which is thought to be largely preventable. They also increase the risk of dementia. Lowering blood pressure in patients with hypertension or high absolute cardiovascular risk, reducing blood levels of total cholesterol, low density lipoprotein (LDL) cholesterol, triglycerides and raising high density lipoprotein (HDL) cholesterol levels, and maintaining good glycaemic control in patients with diabetes have been demonstrated to reduce vascular events including stroke and myocardial infarction. They may also reduce the incidence of dementia.

2.3 Psychosocial factors and dementia

- ◆ People with depression or high depressive symptoms have, on average, a higher risk of developing dementia.
- ◆ Higher participation in mentally stimulating activities is associated with reduced risk of cognitive decline and dementia. Those with a history of higher education, mentally demanding occupations or participation in mentally challenging leisure activities are consistently found to have a lower risk of developing dementia.
- ◆ Being more socially active is associated with reduced risk of cognitive decline and dementia. This has been shown in many studies measuring social engagement in different ways.

Depression, social isolation and lack of quality social support are risk factors for coronary heart disease. They are also associated with increased risk of dementia. GPs play an important role in detecting and managing depression and can provide advice and resources to assist patients remain mentally and socially active. Such interventions are likely to have benefits for patients' mental and cognitive health and may reduce their risk of dementia.

2.4 Other risk factors and dementia

- ◆ Head injury, with loss of consciousness, is associated with an increased risk of subsequent cognitive decline and dementia.

Prevention of head trauma is important for a number of reasons, including its potential effect on dementia risk. GPs can encourage patients to follow current safety advice and legislation to prevent head injury. This includes wearing helmets when appropriate and preventing falls in older adults.

Because the risk factors for dementia overlap considerably with those for other chronic diseases, adopting dementia prevention activities need not require GPs to take on additional specific work. This guide points GPs to the resources and guidelines for preventative health activities recommended to address the dementia risk factors summarised above.

3. ALCOHOL

3.1 Moderate alcohol may reduce dementia risk, but heavy drinking increases risk

Consumption of moderate amounts of alcohol has been associated with better cognitive function and reduced risk of dementia. However, excessive amounts over time can increase the risk. Limiting consumption to the recommended no more than 2 standard drinks a day may help reduce the risk of developing dementia.

This section describes the current evidence that suggests alcohol consumption can contribute to dementia risk and provides links to resources on healthy alcohol use for health professionals and resources for patients.

3.2 Alcohol and dementia risk – the evidence

Several studies have shown that light to moderate alcohol consumption is associated with a lower risk of any dementia, Alzheimer's disease and cognitive impairment. There is insufficient evidence to promote alcohol consumption to non-drinkers as a means of reducing dementia risk. However, there may be benefits for those currently using alcohol moderately.

In a large study of 8,000 people in Rotterdam, followed up for an average of 7 years, there was a 45% lower risk of dementia in those who consumed 1-3 alcoholic drinks per day, compared to non-drinkers [1].

Two meta-analyses found reduced risks of around 30 to 40% for those drinking moderate levels of alcohol [2,3]. Both found significant effects for any dementia and Alzheimer's disease. One also found a significant effect for vascular dementia [2].

However, excessive alcohol consumption may increase the risk of dementia. Very heavy drinking over time can cause alcohol-related dementia. While a meta-analysis failed to detect an association between heavy drinking and dementia risk [2], several studies have shown this association. For example, in a study of 554 twins in Finland, followed for 25 years, binge drinking at least monthly in midlife was associated with a more than 3 fold increase in the risk of dementia after the age of 65 years [4].

The upper limit of alcohol consumption that is safe for maintaining cognitive function in old age has not been determined. Alcohol's potential harmful effects for other medical conditions also need to be taken into consideration. The National Health and Medical Research Council's [Australian Guidelines to Reduce Health Risks from Drinking Alcohol](#) recommend limiting alcohol intake to no more than 2 standard drinks on any day to reduce the risk of long term harm [5].

The benefits of alcohol may be produced through its favourable effects on the cardiovascular system, although there may be other mechanisms. Reducing inflammation, increasing HDL cholesterol, increasing cerebral blood flow, increasing insulin sensitivity and antioxidant properties have all been implicated as contributing to alcohol's protective effect [2,3].

3.3 Promoting healthy use of alcohol in clinical practice

All patients, including those concerned about their dementia risk, should be encouraged to drink alcohol responsibly.

The National Health and Medical Research Council's [Australian Guidelines to Reduce Health Risks from Drinking Alcohol](#) outline recommended drinking levels for reducing the

risk of harm. They recommend all adults limit alcohol consumption to no more than 2 drinks on any day to reduce risk of long term harm, and no more than 4 drinks on any day to reduce risk of short term harm.

The Royal Australian College of General Practitioners' [Guidelines for preventive activities in general practice](#) (the 'red book') briefly outline recommendations for early detection and management of problem drinking. All patients should be asked about the quantity and frequency of alcohol intake from 15 years of age. Those with at risk patterns of alcohol consumption should be offered assistance to reduce their intake.

The [SNAP Guide](#) details the guidelines for assessing patients' alcohol consumption and assisting patients needing to reduce their drinking.

The [Implementing Lifestyle Change](#) health professional education series has been developed by the Heart Foundation and the Royal Australian College of General Practitioners, to assist GPs and practise nurses in influencing patients to adopt healthy behaviours including healthy use of alcohol.

[Lifescrpts](#) resources provide guidelines for providing lifestyle advice to patients, including about reducing alcohol consumption, and prescription templates.

The [Australian Drug Foundation](#) provides a range of information, reports and resources on alcohol.

3.4 Alcohol resources for patients

The [Mind your Habits](#) section of the Alzheimer's Australia Mind your Mind website provides information for the general public on alcohol and its relationship to dementia risk.

The National Health and Medical Research Council's [Australian Guidelines to Reduce Health Risks from Drinking Alcohol](#) outline recommended drinking levels for reducing the risk of short term and long term harm.

The [Australian Drug Foundation](#) provides a range of information, fact sheets and resources on alcohol and standard drinks, and contacts for helplines providing counselling and referral.

3.5 References

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2. Anstey KJ, et al. Alcohol consumption as a risk factor for dementia and cognitive decline: meta-analysis of prospective studies. *Am J Geriatr Psychiatry*, 2009, 17:542-555.
3. Peters R, et al. Alcohol, dementia and cognitive decline in the elderly: a systematic review. *Age and Ageing*, 2008, 37:505-512.
4. Jarvenpaa T, et al. Binge drinking in midlife and dementia risk. *Epidemiology*, 2005, 16:766-771.
5. National Health and Medical Research Council. *Australian guidelines to reduce health risks from drinking alcohol*. 2009, Commonwealth of Australia, Canberra.

4. BLOOD PRESSURE

4.1 High blood pressure increases dementia risk

High blood pressure, especially at midlife, is consistently associated with an increased risk of developing dementia. Treatment of hypertension has been found to reduce the risk of cognitive decline and dementia in several studies.

This section describes the current evidence that suggests assessment and control of blood pressure are important for reducing dementia risk and provides links to resources for health professionals and for patients.

4.2 Blood pressure and dementia risk – the evidence

Hypertension is a risk factor for cerebrovascular disease and vascular dementia. Hypertension in midlife is also associated with an increased risk of Alzheimer's disease. Blood pressure may decline in the preclinical stage of Alzheimer's and low blood pressure in late-life may be associated with increased risk [1].

Treatment of hypertension in old age has been identified in several studies to reduce the risk of cognitive decline and dementia. In a 4 year study of 2,400 patients, treatment reduced the risk of dementia by 55% [2].

Studies assessing long term use of antihypertensives from midlife show a cumulative reduction in risk of dementia for each year of treatment [1,3]. A study that followed hypertensive men from midlife found that for each additional year of treatment there was a further reduction in the risk of dementia [3].

Those treated for more than 12 years had a 60% reduced risk of any dementia and 65% reduced risk of Alzheimer's disease compared to those never treated. The risk after 12 years of treatment was similar to those with normal blood pressure.

4.3 How does blood pressure impact on dementia risk?

Hypertension may contribute to both cerebrovascular pathology and Alzheimer's disease pathology [4]. Hypertension may lead to endothelial dysfunction, microinfarcts and cerebral ischaemia. Endothelial changes could also affect microvascular clearance of beta amyloid and exacerbate Alzheimer's disease pathology.

4.4 Blood pressure assessment and management in clinical practice

Everyone, including patients concerned about their risk of developing dementia, should have their blood pressure monitored and hypertension, if present, should be treated. Hypertension increases the risk of dementia, as well as heart disease, stroke and kidney disease.

The Royal Australian College of General Practitioners' [Red Book](#) briefly outlines the guidelines for detecting and managing hypertension in primary care practice. Blood pressure should be measured in all adults at least every 2 years, and those with other risk factors or conditions may require more regular checks.

The Heart Foundation's [Guide to Management of Hypertension](#) provides detailed guidelines for measurement of blood pressure, and diagnosis and treatment of hypertension.

4.5 Blood pressure resources for patients

The [Mind your Health Checks](#) section of the Alzheimer's Australia Mind your Mind website provides information for the general public on blood pressure and its relationship to dementia risk.

The [Heart Foundation](#) has a range of information sheets on blood pressure, including self-measurement and the effects of dietary salt.

The [Stroke Foundation](#) provides information on blood pressure and runs an annual 'Know your Numbers' campaign to promote awareness of the importance of checking blood pressure.

4.6 References

1. Haag MD, et al. Duration of antihypertensive drug use and risk of dementia. A prospective cohort study. *Neurology*, 2009, 72:1727-1734.
2. Forette F, et al. The prevention of dementia with antihypertensive treatment. New Evidence from the Systolic Hypertension in Europe (Syst-Eur) study. *Arch Intern Med*, 2002, 162:2046-2052.
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5. BODY WEIGHT

5.1 Obesity increases dementia risk

Obesity at midlife is associated with an increased risk of developing dementia, including Alzheimer's disease. Weight reduction has not as yet been shown to reduce the risk of dementia. In old age, those who are underweight or are losing weight are found to be at increased risk of dementia.

This section describes the current evidence that suggests maintaining a healthy weight is important for reducing dementia risk and provides links to resources for health professionals and for patients.

5.2 Body weight and dementia risk – the evidence

Obesity, particularly central obesity, at midlife is associated with increased risk of later developing dementia [1]. Whether midlife weight loss for those who are obese can reduce the risk of late life dementia has not yet been determined.

In early old age (65 to 75 years), there is a U-shaped relationship between BMI and dementia risk, with increased risk found for those who are underweight or obese [1].

In late life (after 75 years), lower BMI and weight loss have been associated with an increased risk of dementia [1]. Weight loss may precede dementia onset by more than 10 years.

A recent review summarised the findings of the complex relationship between weight and dementia across the lifespan as follows [1]:

- ◆ central adiposity in middle age predicts dementia in old age
- ◆ the relation between high adiposity and dementia is attenuated with older age
- ◆ waist circumference in old age, a measure of central adiposity, may be a better predictor of dementia than BMI
- ◆ lower BMI predicts dementia in the elderly
- ◆ weight loss may precede dementia diagnosis by decades

While there is still more to learn, the available evidence suggests that maintaining a healthy weight over the life course is a strategy likely to optimise both body and brain health. There is clinical trial evidence that weight loss lowers blood pressure, improves blood lipids and insulin resistance, and positively affects other factors associated with cardiovascular and dementia risk.

5.3 How does excess weight impact on dementia risk?

There are a number of potential mechanisms by which obesity may increase dementia risk [1]. Insulin resistance and hyperinsulemia can result from obesity and may play a role in reducing beta amyloid clearance from the brain, increasing the risk of Alzheimer's disease. Adipose tissue produces adipokines and cytokines, related to hyperinsulemia and inflammation that in turn have effects on the brain. Obesity is also associated with increased risk for cardiovascular and cerebrovascular disease, which increase the risk of dementia.

5.4 Body weight assessment and management in clinical practice

Patients who are overweight or obese, including patients concerned about their risk of developing dementia, should be educated about lifestyle choices to help maintain a healthy weight. Obesity in midlife increases the risk of dementia, as well as heart disease and a range of other conditions.

The Royal Australian College of General Practitioners' [Red Book](#) briefly outlines the guidelines for assessing and managing body weight in primary care practice. Patients' body mass index and waist circumference should be measured, and those who are overweight or obese should be offered individual lifestyle education and skills training.

The Royal Australian College of General Practitioners' [SNAP Guide](#) provides detailed information on assessing BMI and waist circumference and assisting patients who need to lose weight.

[Lifescrpts](#) resources provide brief guidelines and a prescription template for using with patients.

The National Health and Medical Research Council's [Clinical practice guidelines for the management of overweight and obesity in adults](#) outline the aetiology of obesity and provide guidelines for assessing, measuring and treating overweight and obesity.

The National Health and Medical Research Council's [Overweight and obesity: A guide for general practitioners](#) provides a summary of the detailed guidelines, a 10-step guide for management of overweight patients and a weight management plan template.

See also the sections in this guide on physical activity (section 11, p. 24) and healthy eating (section 8, p.16).

5.5 Weight management resources for patients

The [Mind your Health Checks](#) section of the Alzheimer's Australia Mind your Mind website provides information for the general public on body weight and its relationship to dementia risk.

The [Measure Up](#) campaign website provides information and resources and links to further information on weight, physical activity and healthy eating.

The Department of Health and Ageing [Healthy Weight](#) website provides information, tips and resources for maintaining a healthy weight.

The [Heart Foundation](#) provides information for consumers on weight, physical activity and healthy eating.

The [National Physical Activity Guidelines](#) from the Australian Government Department of Health and Ageing outline the minimum levels of physical activity required to gain a health benefit and ways to incorporate physical activity into everyday life.

The [Australian Dietary Guidelines](#) highlight the groups of foods and lifestyle patterns that promote good nutrition and health. Booklets and pamphlets summarising the guidelines for the general public are available at the website.

5.6 References

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6. CHOLESTEROL

6.1 High cholesterol increases dementia risk

High serum total cholesterol, especially at midlife, is associated with an increased risk of developing dementia, especially Alzheimer's disease. Treatment with statins has been found to be associated with reduced risk of dementia in several studies, but there are some conflicting findings.

This section describes the current evidence that suggests assessment and control of cholesterol levels are important for reducing dementia risk and provides links to resources for health professionals and for patients.

6.2 Cholesterol and dementia risk – the evidence

Recent reviews have concluded that high midlife total serum cholesterol is associated with an increased risk of any dementia and of Alzheimer's disease [1,2]. While there are some studies that have not found this association, the majority of studies show that high midlife cholesterol increases the risk of later developing dementia by around 2 times.

A meta-analysis of studies measuring cholesterol at late life and following participants over a few years found no association between late life cholesterol and dementia risk [2]. Another study found that a decrease in cholesterol level from midlife to late life was associated with an increased risk of Alzheimer's disease [3]. Cholesterol levels may decline in the preclinical stages of Alzheimer's [1,2].

Several studies have shown reduced risk of dementia in those treated with statins, but a meta-analysis found only a small non-significant benefit [4].

6.3 How does cholesterol impact on dementia risk?

Some epidemiological and experimental studies suggest the cellular cholesterol level to be involved in the pathogenesis of AD [4]. High cholesterol levels may accelerate the production of beta amyloid [4]. Autopsy findings indicated that low midlife total cholesterol was associated with a lower number of plaques and tangles [1].

6.4 Cholesterol assessment and management in clinical practice

Everyone, including patients concerned about their risk of developing dementia, should have their cholesterol monitored and hypercholesterolaemia, if present, should be treated as appropriate. Hypercholesterolaemia at midlife increases the risk of dementia, as well as heart disease.

The Royal Australian College of General Practitioners' [Red Book](#) briefly outlines the guidelines for detecting and managing high cholesterol in primary care practice. Lipids should be measured in adults 45 and over at least every 5 years, and those with other risk factors or conditions may require earlier and/or more regular checks.

The Heart Foundation's [Position Statement on Lipid Management](#) provides detailed guidelines for assessment, diagnosis and treatment. The 2005 statement is an update of the 2001 lipid management guidelines, a summary of which is also available at the website.

6.5 Cholesterol resources for patients

The [Mind your Health Checks](#) section of the Alzheimer's Australia Mind your Mind website provides information for the general public on cholesterol and its relationship to dementia risk.

The [Heart Foundation](#) has a range of information on cholesterol, how to lower cholesterol levels, and the right foods to eat.

The [Better Health Channel](#) provides a fact sheet on cholesterol for consumers.

The [ABC Health and Wellbeing](#) website has a fact file on cholesterol that explains what it is, how it is tested, and how to treat high cholesterol.

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7. DEPRESSION

7.1 A history of depression is associated with increased dementia risk

People with depression or high depressive symptoms have, on average, a higher risk of developing dementia. Evidence suggests that treatment with antidepressants improves cognition in people with depression, but it is not known if treatment prevents dementia.

This section describes the current evidence that depression increases dementia risk and provides links to resources for health professionals and for patients.

7.2 Depression and dementia – the evidence

A history of depression has been associated with an increased risk of Alzheimer's disease and dementia in several studies [1,2]. Some studies, however, have failed to replicate this finding.

In a study of 1,953 people with Alzheimer's disease, depressive symptoms before dementia onset were twice as common as in controls [3]. It may be that early awareness of cognitive decline contributes to depression, but it seems that this does not fully explain the association. A review of all epidemiological studies also reported an association between depression and Alzheimer's disease even when those episodes of depression had been more than 10 years before the onset of Alzheimer's disease [4].

It is well known that people with depression, especially older adults, have reduced cognitive performance and that many people with dementia also have depression. It is therefore difficult to determine whether depression is a risk factor for dementia or whether it is a prodromal symptom [1,2].

Depression is associated with elevated cortisol production, which may directly damage the hippocampus and increase the risk of dementia. Conversely, depression may arise secondary to dementia due to frontostriatal damage from cerebrovascular or neurodegenerative pathology [1,2]. Recent studies have also suggested that people with depression have enhanced deposition of beta amyloid plaques [1], and depression has been associated with vascular changes in the brain, which may mediate the association [5].

The treatment of depression seems to improve cognitive function, but it may not return cognition to normal levels even when the depression is in remission [1,2]. Whether the treatment of depression decreases the risk of dementia among people with depressive symptoms has not yet been studied, but it is clearly important to identify and treat depression. Preventing new episodes of depression may be a useful preventative approach to dementia [6].

7.3 Assessment and management of depression in clinical practice

Depression is a common disorder in the Australian community and most patients with depression will be treated by a GP. The best outcomes are likely when adequate treatment is provided over a long enough time. Potentially reducing the risk of dementia is only one of the many reasons to identify and effectively treat depression.

The Royal Australian College of General Practitioners' [Red Book](#) briefly outlines the guidelines for detecting and managing depression in primary care practice. There is evidence for opportunistic screening for depression in adults, provided there is effective treatment and follow up offered to those found to have depression. Clinicians should maintain a high level of awareness for depressive symptoms in patients at high risk for depression.

The [Black Dog Institute](#) health professionals website has a wide range of information and resources, including information, education and a newsletter tailored for GPs.

The [beyondblue](#) website has a wide range of information on depression for health professionals, including fact sheets and resources, information about training opportunities, assessment scales, journal articles and reports.

The [beyondblue guidelines for treating depression in primary care](#) provide details of the recommendations for assessment and treatment of mild to severe depression by GPs.

The [beyondblue Guide to the management of depression in primary care - Guide for health professionals](#) provides information about and tools for assessing the problem, making the diagnosis and planning management.

The Royal Australian and New Zealand College of Psychiatrists provide [clinical practice guidelines for the treatment of depression](#), which include detailed treatment recommendations. The [RANZCP](#) website also has clinical guidelines for other related mental disorders.

The [beyondblue Fact sheet 24 - Help for depression under Medicare](#) provides an overview of the *Better Access to Psychiatrists, Psychologists and GPs through the MBS' initiative* (commonly referred to as *Better Access to Mental Health Care*) focusing on who is eligible, what services are involved and the cost.

7.4 Depression resources for patients

[Coping with depression. Australian treatment guide for consumers and carers](#) is an information booklet from the RANZCP that provides information about depression, the treatments available and where to go for more information.

[What is a depressive disorder?](#) is an information booklet from the Australian Government Department of Health and Ageing, explaining what depression is, what causes it, how it is treated and where to go for help.

The [Black Dog Institute](#) public website has a wide range of information and resources on depression, and an online education program for consumers.

The [beyondblue](#) website has a wide range of information on depression for consumers.

The [Reach Out Australia](#) website has a range of information and resources for young people experiencing mental health issues.

7.5 References

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8. DIABETES

8.1 Diabetes increases dementia risk

Diabetes is associated with an increased risk of developing dementia, including Alzheimer's disease. The ability of treatment of diabetes to reduce dementia risk has not been established.

This section describes the current evidence that suggests assessment and control of diabetes are important for reducing dementia risk and provides links to resources for health professionals and for patients.

8.2 Diabetes and dementia risk – the evidence

Diabetes, especially type 2, and pre-diabetes syndromes appear to be risk factors for dementia. A recent review concluded that type 2 diabetes is associated with increased risk of Alzheimer's disease and vascular dementia [1]. Another review reported meta-analyses that found diabetes was associated with a 47% increased risk of any dementia, a 39% increased risk of Alzheimer's disease, and a 138% increased risk of vascular dementia [2].

Diabetes has also been associated with greater risk for cognitive decline in several studies following people for 2 – 7 years [2]. Global cognitive function and executive function have been shown to be affected by diabetes.

Few studies have examined the effect of treatment of diabetes on dementia risk and the results are mixed [2]. The effect of the duration of diabetes on dementia risk has also not been determined, however duration has been associated with increased risk of cognitive decline [2].

Insulin resistance has also been associated with increased dementia risk. Insulin inhibits the degradation of beta amyloid through competitive inhibition of insulin-degrading enzyme, thus increasing the formation of plaques. Hyperinsulinemia may also activate inflammation in the brain, thereby increasing the risk of dementia [2].

The mechanisms underpinning the association between diabetes and dementia risk are unclear. Multiple processes may be involved, such as the effects of insulin resistance, vascular pathology, oxidative stress, glucocorticoids excess and inflammation [1,2].

8.3 Diabetes assessment and management in clinical practice

Everyone, including patients concerned about their risk of developing dementia, should be educated about lifestyle choices to help prevent diabetes and the importance of screening. Diabetes, if present, should be treated as appropriate. Diabetes increases the risk of dementia, as well as heart disease and a range of other diseases.

The Royal Australian College of General Practitioners' [Red Book](#) briefly outlines the guidelines for screening for type 2 diabetes in primary care practice. Patients should be screened at least every 3 years from the age of 40, and those with other risk factors or conditions may require more regular and/or earlier checks.

The [Diabetes Australia](#) website provides links to best-practice guidelines for the prevention, diagnosis and management of diabetes for health professionals.

The Department of Health and Ageing's [Prevention of Type 2 Diabetes Program](#) provides resources for assessing diabetes risk and referring patients to lifestyle modification programs.

8.4 Diabetes resources for patients

The [Mind your Health Checks](#) section of the Alzheimer's Australia Mind your Mind website provides information for the general public on diabetes and its relationship to dementia risk.

[Diabetes Australia](#) provides a range of information for consumers on diabetes.

The Better Health Channel provides fact sheets on [pre-diabetes](#) and [diabetes](#) for consumers.

8.5 References

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9. DIET

9.1 A brain healthy diet may reduce dementia risk

Diets low in saturated fat and high in antioxidant rich fruits and vegetables have been associated with better brain function and reduced risk of dementia. While the benefits of specific nutrients are not yet clear, what is good for the heart seems to be also good for the brain. A healthy diet is likely to contribute to brain health and may reduce the risk of developing dementia.

This section describes the current evidence that suggests a healthy diet is important for reducing dementia risk and provides links to resources on healthy eating promotion for health professionals and resources for patients.

9.2 Diet and dementia risk – the evidence

There is growing evidence that a healthy diet is important for brain health and may help reduce the risk of developing dementia. In particular, avoiding saturated fat and including unsaturated fats, fruits and vegetables and fish may be important for brain health.

Several prospective studies have found that high intakes of saturated and transunsaturated (hydrogenated) fats are associated with increased risk of dementia, while higher intake of polyunsaturated and monounsaturated fats is associated with reduced risk of dementia [1].

The omega 3 fatty acids contained in fish oils are thought to reduce inflammation in the brain and promote neurogenesis. Results are conflicting as to whether omega 3 protects against dementia [2], but several studies have shown an association between higher fish consumption and lower dementia risk.

Antioxidants may help protect against oxidative damage, considered part of the pathology of Alzheimer's disease. Lower levels of antioxidants have been observed in people with Alzheimer's in cross-sectional studies [3]. Prospective studies provide some evidence of lower dementia risk for higher intake of specific antioxidants, but results are conflicting [3].

Several studies have found a lower risk of dementia is associated with higher intake of fruit and vegetables and higher adherence to the Mediterranean diet [4].

Folate and vitamin B12 deficiencies have been associated with cognitive impairment and dementia. However, whether increasing intake or using supplements of folate or vitamin B12 reduces the risk of developing dementia is as yet unknown [5]. Deficiencies or elevated homocysteine should be treated.

There is insufficient evidence to promote a specific diet for reducing dementia risk. However, the Australian Dietary Guidelines recommend avoiding saturated fat and eating plenty of fruits and vegetables [6]. This general healthy diet is likely to help reduce the risk of dementia, in addition to cardiovascular disease and other health conditions.

9.3 Promoting healthy diets in clinical practice

All patients, including those concerned about their dementia risk, should be encouraged to eat healthily, minimise saturated fat intake and increase fruit and vegetable consumption.

Patients should be advised to follow the [Dietary Guidelines for Australians](#). These recommend that all adults:

- ◆ Eat plenty of vegetables, legumes and fruits
- ◆ Eat plenty of cereals, preferably wholegrain
- ◆ Include lean meat, fish, poultry and/or alternatives
- ◆ Include reduced-fat milks, yoghurts, cheeses and/or alternatives
- ◆ Drink plenty of water
- ◆ Limit saturated fat and moderate total fat intake
- ◆ Choose foods low in salt
- ◆ Consume only moderate amounts of sugars and foods containing added sugars

Referral to a dietician may be appropriate for some patients. An Accredited Practising Dietician in your area can be found on the [Dieticians Association of Australia](#) website, which also provides information on healthy eating.

[Lifescrpts](#) resources include guidelines, prescription templates and other resources to support helping patients to eat well.

The Royal Australian College of General Practitioners' [SNAP Guide](#) outlines the recommendations for assessment and intervention to help patients improve their diet.

The Royal Australian College of General Practitioners' [Guidelines for preventive activities in general practice](#) (the 'red book') summarise the nutrition intervention recommendations for patients at different levels of risk.

The [Implementing Lifestyle Change](#) health professional education series has been developed by the Heart Foundation and the Royal Australian College of General Practitioners, to train GPs and practise nurses in influencing patients to adopt healthy behaviours including healthy eating.

The [Australian Government Department of Health and Ageing](#) website provides a range of information and resources related to nutrition, and links to state and territory health department websites and other nutrition related organisations and services.

9.4 Healthy diet resources for patients

The [Mind your Diet](#) section of the Alzheimer's Australia Mind your Mind website provides information for the general public on healthy eating and its relevance to dementia risk.

The [Australian Dietary Guidelines](#) highlight the groups of foods and lifestyle patterns that promote good nutrition and health. Booklets and pamphlets summarising the guidelines for the general public are available at the website.

The [Heart Foundation's Healthy Eating](#) website provides information, advice and recipes to help patients/clients enjoy a healthy diet.

The [Nutrition Australia](#) website provides information about food and nutrition, related services and activities, and healthy recipes.

The [Go for 2&5 Campaign](#) website provides tips and recipes for increasing fruit and vegetable consumption.

Alzheimer's Australia has an Update Sheet [What you eat and drink and your brain](#) that provides information about the role of diet in potentially reducing the risk of developing dementia and in improving the health of people with dementia.

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10. HEAD INJURY

10.1 Head injury increases the risk of dementia

Head injury, with loss of consciousness, is associated with an increased risk of subsequent cognitive decline and dementia.

This section describes the current evidence that suggests preventing head injury increases dementia risk and provides links to further information.

10.2 Head injury and dementia – the evidence

Several studies have examined the association between head injury and risk of dementia in late-life. Head injury has been shown to increase the risk of cognitive decline, dementia and Alzheimer's disease [1]. The association may be mediated by the severity of head injury, whether loss of consciousness occurs, the time between head injury and dementia onset and genetic factors [1]. Boxing has also been associated with head injury and a form of dementia (dementia pugilistica), but not with Alzheimer's disease [2].

Long term follow up of US World War II veterans who were admitted to hospital during service showed that those who had suffered a head injury with loss of consciousness had an increased risk of subsequently developing Alzheimer's disease compared to those admitted for other reasons. Those with moderate head injuries had 2.3 times the risk and those with severe head injuries had 4.5 times the risk [3].

A meta-analysis of case control studies found a 58% increased risk of Alzheimer's disease for those with a history of head injury [4]. The association was found to be significant only in males. Males with a history of head injury had 2.3 times the risk of Alzheimer's, compared to 0.9 times the risk for females with a history of head injury. A possible explanation for the gender difference is the role of female hormones, which may confer a neuroprotective and neuroregenerative effect [4].

Several mechanisms have been proposed to explain the association between head injury and increased dementia risk. Damage to the blood brain barrier, increased oxidative stress, neuronal loss, increased enzyme activity leading to increased beta-amyloid deposition and increased tau pathology have all been implicated [1,2].

10.3 Prevention of head injury in clinical practice

Prevention of head trauma is important for a number of reasons, including its potential effect on dementia risk. Children and adults should be encouraged to follow current safety advice and legislation to prevent head injury. This includes wearing helmets when riding bicycles or motorcycles, or participating in contact sports or other activities associated with a high risk of falls, and preventing falls in older adults.

Older people are more likely to suffer head or other injury due to falls, and the risk factors include [5,6]:

- ◆ Stroke
- ◆ Parkinson's disease
- ◆ Arthritis
- ◆ Postural hypotension
- ◆ Dizziness
- ◆ Diabetes
- ◆ Depression
- ◆ Dementia
- ◆ Incontinence

- ◆ Poor nutrition
- ◆ Poor balance
- ◆ Weak muscles
- ◆ Poor eyesight
- ◆ Some medications and polypharmacy
- ◆ Foot problems and inadequate footwear

GPs can assist patients to prevent falls by [5,6]:

- ◆ managing health conditions and medications
- ◆ providing advice about exercise, particularly balance and strength exercises
- ◆ providing referrals to a podiatrist, ophthalmologist, occupational therapist, physiotherapist, or other appropriate health professional
- ◆ referring patients to their local council, [Commonwealth Respite and Carelink Centre](#), [Independent Living Centre](#) or other appropriate agency for advice about services and supports available to them

10.4 Injury prevention information for patients

The [Mind your Head](#) section of the Alzheimer's Australia Mind your Mind website provides information for the general public on the links between head injury and dementia risk and tips for preventing head injury.

The Better Health Channel [Accidents and Injury – Reducing the Risks](#) web page provides information for consumers about preventing injury in the car, as a pedestrian, as a cyclist, in the workplace, at home, and when participating in sport and leisure activities.

The Better Health Channel [Falls Prevention for Older People](#) web page provides information for consumers about preventing falls through appropriate exercise, improving safety inside and outside the home, and managing health conditions and medications that may increase falls risk.

[Don't fall for it. Falls can be prevented! A guide to preventing falls for older people](#) is a booklet from the Australian Government Department of Health and Ageing. The booklet is aimed at community dwelling older people and their families and carers. It contains information about reducing falls risk factors relating to a person and their health and falls risk factors relating to the environment. It also describes what to do in the event of a fall.

The National Prescribing Service provides information for consumers about [avoiding falls caused by the side effects of medications](#).

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11. MENTAL STIMULATION

11.1 Mental stimulation may reduce dementia risk

Higher participation in mentally stimulating activities is associated with better cognitive function and reduced risk of cognitive decline and dementia. Those with a history of higher education, mentally demanding occupations or participation in mentally challenging leisure activities are consistently found to have a lower risk of developing dementia. Mental activity is likely to contribute to brain reserve, providing increased capacity to maintain normal cognitive function in the face of neurodegenerative disease. This may reduce the risk or delay the onset of dementia.

This section describes the current evidence that suggests mental activity is important for reducing dementia risk and provides links to resources for health professionals and resources for patients.

11.2 Mental activity and dementia risk – the evidence

There is consistent evidence that higher participation in mentally stimulating activities may protect against cognitive decline and dementia in old age.

A reduced risk of dementia is associated with:

- ◆ Higher levels of education
- ◆ Mentally demanding occupations
- ◆ More cognitively stimulating leisure activities
- ◆ Higher intelligence

Meta-analysis suggests around half the risk of dementia for those with high educational attainment compared to low, those with high occupational status compared to low, and those participating in more cognitively stimulating leisure activities compared to those participating in few such activities [1].

Importantly for older or retired people, increased complex mental activity in late life is associated with lower dementia risk independent of other predictors such as education [1]. A dose–response relationship is also evident, so the more activity that can be done, the better.

Complex mental activity across the lifespan may reduce the risk or delay the onset of dementia by improving brain reserve [1,2]. Mental activity, challenge and learning stimulate neurogenesis and new synapses [2]. Complex cognitive activity contributes to neurological brain reserve (increased synapses, neural numbers and brain volume) and behavioural brain reserve (flexible cognitive strategies). This reserve may allow normal cognitive function to continue for longer in the face of underlying neural dysfunction or degeneration [3].

Commercial brain training games and programs have as yet not been shown to reduce the risk of dementia [4].

Activities that combine mental, social and physical components may provide even greater protection against dementia [2].

11.3 Promoting mental activity in clinical practice

Patients concerned about their risk of developing dementia should be encouraged to remain mentally active throughout life. Older patients or those who are retired may be at particular risk of becoming less mentally active and should be encouraged to maintain regular participation in cognitively challenging activities.

Mental activity should be regular, reasonably complex and varied. It should involve continued new learning. It should also be something the patient enjoys so it can be sustained. It could include anything that challenges the mind, for example:

- ◆ Working (full-time or part-time) or volunteering
- ◆ Hobbies – gardening, art, craft, collecting, etc
- ◆ Taking a course, learning a language or a new skill

Patients wanting to increase their cognitive activities could be referred to their local council or adult education provider. Health professionals can also provide follow up to monitor progress and encourage continued participation.

The 5As model based on interventions shown to be effective in motivating behaviour change in general practice patients could be applied to mental activity.

- ◆ Ask about the patient's current mentally challenging activities
- ◆ Assess their level of risk and their readiness to change
- ◆ Advise them of the need for mental stimulation and provide information about what they can do
- ◆ Assist them to find activities they will enjoy and to plan how they will increase their level of mental activity
- ◆ Arrange referral to any appropriate services and follow up appointments

The 5As model for detection, assessment and management of risk factors is outlined in the [SNAP guide](#).

11.4 Mental activity resources for patients

The [Mind your Brain](#) section of the Alzheimer's Australia Mind your Mind website has information for the general public explaining why we believe mental activity is important and provides ideas and resources for brain exercise.

Your local council should be able to advise your patients about providers of locally available courses, activities, groups, volunteer opportunities, etc.

The internet is a good source of brain games. For example:

- ◆ The [Lipton BrainTrain](#) website has puzzles and games to challenge memory, maths skills and reaction time. Patients can play just for fun or sign up to play against others.
- ◆ The [SBS ADbc quiz](#), based on the TV program, tests history knowledge.
- ◆ The [Games for Brain](#) website has many different types of games challenging different cognitive skills.
- ◆ The [BrainBashers](#) website has games, puzzles, jigsaws, brain teasers riddles, optical illusions and more.

Brain games and puzzles can also be found in daily newspapers and in various puzzle books available at newsagents and bookstores.

Alzheimer's Australia has an Update Sheet [Keep Your Brain Active: Mental Exercise and Dementia](#) that provides information about the role of mental activity in reducing the risk of developing dementia and in improving the quality of life of people with dementia.

U3A - the University of the Third Age - is an international movement that encourages retired people to take part in lifelong learning. They offer many educational, creative and leisure activities to their members to encourage positive ageing. The [University of the Third Age Online](#) website provides up-to-date contacts for all Australian and New Zealand U3As. U3A Online also offers short online courses and many other resources for older people, especially those who are geographically, physically or socially isolated.

The [Sharp Brains](#) website has independent information about the many 'brain training' products commercially available. The University of New South Wales has an [information sheet](#) summarising what the research to date says about the effectiveness of these products.

Dr Michael Valenzuela's book, [It's Never Too Late to Change Your Mind. The Latest Medical Thinking on What You Can Do to Avoid Dementia](#), published by ABC Books, explains dementia and the major risk factors and provides practical advice for consumers on keeping active.

11.5 References

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12. PHYSICAL ACTIVITY

12.1 Physical exercise may reduce dementia risk

Regular physical exercise is associated with better brain function and reduced risk of cognitive decline and dementia. This has been shown in many studies for exercise undertaken in midlife and in late-life. Even simple exercise like walking has been shown to be beneficial. Getting the recommended 30 minutes of physical activity on most days is likely to contribute to brain health and may reduce the risk of developing dementia.

This section describes the current evidence that suggests physical activity is important for reducing dementia risk and provides links to resources on physical activity promotion for health professionals and resources for patients.

12.2 Physical Activity and dementia risk – the evidence

There is growing evidence that physical activity may protect against cognitive decline and dementia in old age.

Several longitudinal studies have found that older people who exercise are less likely to experience cognitive decline or develop dementia. For example, exercising at least 3 times per week in people over age 65 was associated with a 38% reduced risk of developing dementia after 6 years follow up [1]. In a randomised controlled trial of people aged 50 and over with subjective memory impairment, a 6 month program of physical activity resulted in improved cognition at the end of the trial and after 18 months follow up [2].

Regular exercise during midlife may also protect against later developing dementia. In one study, exercising at least twice a week at midlife was associated with a 52% reduced risk of dementia at age 65-79 [3].

Several mechanisms have been proposed to explain the association between physical inactivity and cognitive decline [4,5].

- ◆ Inactivity increases the risk of vascular disease and vascular risk factors. Vascular disease, in turn, increases the risk and severity of cognitive decline and dementia.
- ◆ Inactivity is associated with higher levels of inflammatory markers in the blood (e.g. C-reactive protein). Inflammation has been associated with an increased risk of cognitive decline and dementia.
- ◆ Physical activity appears to stimulate neurogenesis, providing another pathway by which physical activity could protect against cognitive decline and dementia.

Regular physical exercise provides a range of health benefits. The evidence supporting the beneficial effects of physical activity on brain health provides yet more reasons to encourage regular physical activity among people of all ages.

Additionally, there is a body of evidence that brief interventions by primary care practitioners can be effective in increasing the physical activity levels of patients [6].

12.3 Promoting physical activity in clinical practice

Everyone, including patients concerned about their risk of developing dementia, should be encouraged to be physically active. All adults should be advised to participate in 30 minutes of moderate activity on most, preferably all days of the week. More vigorous exercise may confer additional health and disease prevention benefits.

Interventions in general practice that have been shown to have short term benefit in changing behaviour related to physical activity include:

- ◆ patient screening to identify current level of activity and readiness to be more active
- ◆ provision of brief advice or counselling on exercise
- ◆ provision of supporting written materials
- ◆ provision of a written prescription for exercise

[Lifescrpts](#) are tools for GPs to use when providing lifestyle advice to patients, including about increasing physical activity. They include guidelines and prescription templates.

The Royal Australian College of General Practitioners' [SNAP guide](#) provides recommendations and advice on implementing interventions to encourage patients to be more physically active.

The Royal Australian College of General Practitioners' [Guidelines for preventive activities in general practice](#) (the 'red book') summarise the recommendations for assessing patients' physical activity levels and encouraging behavioural change when appropriate.

The Royal Australian College of General Practitioners' [Physical Activity Policy](#) provides background information, recommendations and resources related to physical activity promotion in general practice.

The [Implementing Lifestyle Change](#) health professional education series has been developed by the Heart Foundation and the Royal Australian College of General Practitioners, to assist GPs and practise nurses in influencing patients to adopt healthy behaviours including physical activity.

The Royal Australian College of General Practitioners website provides information on services provided by [Exercise Physiologists](#), and links to the Australian Association for Exercise and Sports Science referral directory.

The [Australian Government Department of Health and Ageing](#) website provides a range of information and resources related to physical activity, and links to state and territory health department websites, which provide information about the many state based physical activity initiatives and resources.

12.4 Physical activity resources for patients

The [Mind your Body](#) section of the Alzheimer's Australia Mind your Mind website provides information for the general public on physical activity and its link to dementia risk, and provides links to some physical activity programs.

The [Heart Foundation](#) runs walking groups and exercise programs nationally, and the website provides consumer information on physical activity.

[An active way to better health: National Physical Activity Guidelines for Adults](#) from the Australian Government Department of Health and Ageing outlines the minimum levels of physical activity required to gain a health benefit and ways to incorporate physical activity into everyday life.

[Choose Health: Be Active: A physical activity guide for older Australians](#) is a booklet that offers ideas for keeping active at no cost, including balance and strength exercises that can be done at home.

Alzheimer's Australia has an Update Sheet [Keep on Moving: Physical Exercise and Dementia](#) that provides information about the role of physical activity in reducing the risk of developing dementia and in improving the health of people with dementia.

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13. SMOKING

13.1 Smoking increases dementia risk

Smoking is associated with an increased risk of dementia. Assisting smokers to quit may help reduce their risk of developing dementia.

This section describes the current evidence that suggests smoking increases dementia risk and provides links to resources on smoking cessation for health professionals and resources for patients.

13.2 Smoking and dementia risk – the evidence

Smoking has been demonstrated to be a risk factor for dementia. Two recent meta-analyses concluded that current smokers have an increased risk of any dementia, Alzheimer's disease, vascular dementia and cognitive decline compared to non-smokers [1,2].

Former smokers were not found to be at increased risk compared to never-smokers, suggesting quitting smoking may be beneficial for dementia risk [1,2].

A recent study examined the association between a history of heavy alcohol use and smoking and age of disease onset in 685 people with Alzheimer's disease. Heavy smoking (defined as one pack per day or more) was associated with a 2-3 year earlier onset of Alzheimer's disease [3].

The adverse health effects of exposure to secondhand smoke are similar to those of active smoking. There is some evidence that passive smoking may also be associated with increased risk of cognitive impairment and dementia [4].

These findings fit with other evidence of smoking as a risk factor for cardiovascular and cerebrovascular disease, stroke, increased oxidative stress, atherosclerosis and inflammation. Smoking may affect dementia risk via its negative effects on the cardiovascular system, increasing risk for both Alzheimer's disease and vascular dementia. Smoking may also interact with other cardiovascular risk factors in an additive manner [1,2].

The evidence suggests that reducing the risk of dementia is another good reason for smokers to be advised to quit.

The [Smoking Cessation Guidelines for Australian General Practice](#) outline the evidence that interventions from health professionals increase rates of smoking cessation. Identifying and documenting tobacco use, offering brief advice to quit smoking, and following up with the patient have been shown to improve patient motivation to quit and to increase quit rates [5].

13.3 Promoting smoking cessation in clinical practice

Patients who smoke should be offered advice and assistance to quit. Smoking cessation is associated with reduced risk of cardiovascular disease and cancer, and may reduce the risk of developing dementia.

The [Smoking Cessation Guidelines for Australian General Practice](#) provide effective strategies to identify smokers and assist them to stop smoking.

The Royal Australian College of General Practitioners' [Guidelines for Preventive Activities in General Practice](#) (the 'red book') briefly outline the recommendations for assessment and intervention for patients who smoke. Smoking status and interest in quitting smoking should be assessed for every patient over 10 years of age. All patients who smoke, regardless of the amount they smoke, should be:

- ◆ asked about their interest in quitting
- ◆ assessed whether they are nicotine dependent and if so, offered appropriate pharmacotherapy
- ◆ advised to stop smoking
- ◆ offered referral to a proactive telephone service such as Quitline

The Royal Australian College of General Practitioners' [SNAP guide](#) provides recommendations and advice on implementing these interventions and encouraging patients to quit smoking.

[Lifescrpts](#) resources provide guidelines and prescription templates for helping patients set goals and get the help they need to quit smoking.

The [Implementing Lifestyle Change](#) health professional education series has been developed by the Heart Foundation and the Royal Australian College of General Practitioners. It provides training to assist GPs and practise nurses in influencing patients to adopt healthy behaviours, including smoking cessation.

Further information and resources are available from the [QUIT](#) website or Quitline on 13 7848 (13 QUIT).

13.4 Smoking cessation resources for patients

The [Mind your Habits](#) section of the Alzheimer's Australia Mind your Mind website provides information on the link between dementia and smoking and resources for consumers.

Quitline (13 7848 or 13 QUIT) is a confidential telephone service providing information, support and advice for quitting smoking. Trained advisors are available 8 am to 8 pm Monday to Friday.

The [National Tobacco Campaign](#) website provides information and resources to help patients quit smoking.

The [Quit Victoria](#) website provides access to an online Quit Coach, a 4 step guide to quitting, information about attending Quit courses, and a free Quit Pack that can be ordered.

The [Quit SA](#) website provides resources to help people quit smoking, including a free Quit Pack, and information for schools, health professionals and workplaces on what they can do to help reduce smoking in the community.

The [Quit Tasmania](#) website provides resources for quitting, information on programs and campaigns and resources for young people.

13.5 References

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14. SOCIAL ACTIVITY

14.1 Social interaction may reduce dementia risk

Being more socially active is associated with reduced risk of cognitive decline and dementia. This has been shown in many studies measuring social engagement in different ways. Combining social activity with mental and/or physical activity may provide even greater benefit in reducing the risk of developing dementia.

This section describes the current evidence that suggests social activity is important for reducing dementia risk and provides links to resources for health professionals and for patients.

14.2 Social Activity and dementia risk – the evidence

A history of being more socially active is associated with a reduced risk of developing dementia. Participating in more social activities, having larger networks of friends and feeling less lonely have all been associated with a lower risk of developing dementia.

The association between social engagement and dementia risk has been shown by several studies, for example:

- ◆ Participation in high numbers of different leisure activities was associated with a 38% lower risk of developing dementia in 1,772 people over age 65 [1]. Activities included going to clubs, visiting friends or being visited, playing cards and community or volunteer work.
- ◆ Larger social networks were associated with a 36% lower risk of dementia in 2,249 elderly women [2].
- ◆ Loneliness (perceived isolation) was associated with more than double the risk of developing dementia in 823 older persons [3]. Loneliness was also associated with worse cognition at baseline and more rapid cognitive decline during follow-up.

Research suggests that social activities that also involve mental stimulation and/or physical activity can provide even greater benefit.

A study in Stockholm investigated mental, physical and social components of the leisure activities of people aged 75 years and older [4]. It found that all 3 components were associated with a reduced risk of dementia after 6 years follow up. Combining components offered the greatest benefit, with those whose activities included higher levels of 2 or all 3 components having a 47% reduced risk of dementia.

14.3 How does social activity reduce dementia risk?

Social activity may contribute to brain reserve. Interacting with other people involves many cognitive functions. As with other mentally stimulating activity, this is believed to help build up a reserve of healthy neurons and synapses that may protect against dementia.

14.4 Promoting social activity in clinical practice

Everyone, including patients concerned about their risk of developing dementia, should be encouraged to be socially active as far as they feel comfortable. Social isolation can increase the risk of dementia, heart disease and mental illness.

There are many reasons why a person may not be socially engaged. For example, patients who are older, geographically isolated, disabled or suffering chronic illness may be at higher risk of social isolation.

The 5As model for detection, assessment and management of risk factors, as outlined in the [SNAP guide](#), could be applied to social activity.

- ◆ Ask about the patient's current social activities
- ◆ Assess their level of risk and their readiness to change
- ◆ Advise them of the need for social engagement and provide information about what they can do
- ◆ Assist them to find activities they will enjoy and to plan how they will increase their level of social activity
- ◆ Arrange referral to any appropriate services and follow up appointments

14.5 Social activity resources for patients

Local councils can provide information about clubs, groups, courses, etc in your local area that patients could get involved in.

The [Mind your Social Life](#) section of the Alzheimer's Australia Mind your Mind website has information for the general public explaining why we believe social activity is important and provides ideas for social engagement.

Alzheimer's Australia's booklet [Mind your Mind: How to keep your brain healthy and reduce your risk of dementia](#) lists a variety of tips for staying socially active.

The [Heart Foundation](#) runs walking groups and exercise programs nationally, that could help patients increase their social and physical activity.

14.6 References

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15. TERTIARY PREVENTION IN DEMENTIA

15.1 Tertiary prevention for those diagnosed with dementia

Many of the primary and secondary preventative measures addressed in this guide are also likely to benefit people diagnosed with dementia. Remaining active and socially engaged, treating depression and managing vascular risk factors may help slow the progression of cognitive decline in those with dementia.

This section describes the current evidence that suggests preventative health and lifestyle strategies are beneficial for people with dementia, and provides links to resources for health professionals and for patients.

15.2 Tertiary prevention and dementia – the evidence

Management of dementia should include preventative approaches to maintain health and wellbeing as much as possible. The management of comorbid conditions may have to be modified in the presence of dementia according to the patient's declining ability to self-manage their healthcare. Responsibilities will typically have to be assumed by another person such as a family carer.

Drugs with anticholinergic effects can worsen cognition in patients with Alzheimer's disease and may blunt the effects of cholinesterase inhibitors [1]. Their use should be minimised in patients with Alzheimer's disease and other dementias.

15.2.1 Depression

Depression is a common comorbidity in dementia and is itself associated with cognitive impairment. Continuous antidepressant use has been associated with a reduced rate of cognitive decline in depressed patients diagnosed with Alzheimer's disease, compared to non-depressed and untreated depressed patients with Alzheimer's [2]. Depression has also been identified as a risk factor for early transition to residential care in dementia patients, with antidepressant treatment seeming to protect against this outcome [3].

Depression has consequences detrimental to people with dementia and should be managed with appropriate behavioural and/or pharmacological treatments, with careful monitoring to determine effectiveness and any adverse effects [4]. Selective serotonin reuptake inhibitors (SSRI's) are considered preferable to tricyclics, due to less anticholinergic action which can make confusion worse [4].

15.2.2 Vascular risk factors

Careful treatment of hypertension (whilst avoiding hypotensive episodes), hyperlipidemia and diabetes (particularly avoidance of hypoglycemia) is recommended for patients with vascular dementia [4]. It is likely to also be important for patients with other forms of dementia including Alzheimer's disease.

Treating hypertension, hyperlipidemia and diabetes has been associated with slower progression of dementia. For patients with Alzheimer's disease without cardiovascular disease, vascular risk factor treatment was associated with significantly less cognitive decline over an average follow up time of 2.3 years [5]. In this study, only 7% of the Alzheimer's disease patients had no vascular risk factors, suggesting they are common in the dementia population. Neuroimaging studies have also demonstrated benefits of vascular risk factor treatment in patients with dementia, such as slowed progression of white matter lesions [6].

15.2.3 Mental stimulation

There is ongoing research to determine whether cognitive training can improve, maintain or slow decline of cognitive function in dementia. A meta-analysis of the literature on cognitive training for people with Alzheimer's disease concluded that it may improve the cognitive and functional abilities of patients, or at least slow the rate of decline [7].

There is evidence that cognitive and functional decline in dementia may be delayed by continued participation in mentally stimulating activities [4,8]. Patients with dementia should be encouraged, as far as possible, to maintain their usual hobbies and activities. While adjustments may be needed as dementia progresses, keeping socially involved and mentally active may be important for the patient's cognitive and functional status and mental wellbeing.

15.2.4 Physical activity

There is good evidence to recommend an individualised exercise program for patients with mild to moderate dementia [8]. Benefits include increased strength, fitness, and improvements in cognitive and functional performance [9]. A randomized controlled trial of nursing home residents with Alzheimer's disease reported that a simple exercise program (1 hour twice a week), compared with routine medical care, was associated with slower functional decline [10]. An Australian randomized controlled trial of older people with subjective memory complaints found that a six month physical activity intervention improved cognition over 18 months follow up [11]. This trial is currently being repeated in patients with Alzheimer's disease.

Physical exercise should be continued for as long as possible for people with dementia as it can help prevent muscle weakness, mobility problems, falls and other health complications. It may also help promote a normal day-night routine, improve mood, increase social participation and reduce stress and depression.

15.2.5 Diet

Eating a well balanced diet can be beneficial for patients with dementia, giving the person more energy and helping to avoid health problems. Eating or drinking too little or missing out on essential nutrients can increase confusion. Special attention needs to be paid to avoid or deal with obesity or loss of weight, to ensure an adequate dietary intake of vitamins and other essentials, and to avoid dehydration [4]. Regular inquiries about what the patient is eating should be made.

Higher adherence to the Mediterranean diet has been associated with lower mortality in patients with Alzheimer's disease [12]. For each additional point on an adherence scale of 0 to 9, patients had a 24% lower risk of dying over 4.4 years of follow up, suggesting a dose-response effect. A balanced diet low in saturated fat and high in vegetables and fruit may increase survival in patients with dementia.

15.3 Clinical resources

The Royal Australian College of General Practitioners endorsed [Care of Patients with Dementia in General Practice Guidelines](#) provides recommendations for the assessment and management of dementia in general practice patients, including health promotion and prevention measures.

The Royal Australian College of General Practitioners' [Red Book](#) briefly outlines the guidelines for detecting and managing depression, hypertension, hypercholesterolaemia and diabetes in primary care practice.

[Lifescrpts](#) resources include guidelines, prescription templates and other resources to support patients to eat well and undertake physical exercise.

15.4 Resources for patients and families

Alzheimer's Australia's Update Sheet 9 [Keep on Moving: Physical Exercise and Dementia](#) provides information about the role of physical activity in improving the health of people with dementia.

Alzheimer's Australia's Update Sheet 10 [Keep Your Brain Active: Mental Exercise and Dementia](#) provides information about the role of mental activity in improving the quality of life of people with dementia.

Alzheimer's Australia's Update Sheet 11 [What you eat and drink and your brain](#) provides information about the role of diet in improving the health of people with dementia.

Alzheimer's Australia's Update Sheet 15 [Depression and Dementia](#) provides information about the co-occurrence of depression and dementia.

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Visit the Mind your Mind website at
www.mindyourmind.org.au
for further information about dementia risk reduction

Visit the Alzheimer's Australia website at
www.alzheimers.org.au
for comprehensive information about

- dementia and care
- information, education and training
- other services offered by member organisations

Or for information and advice contact the
National Dementia Helpline on 1800 100 500

Visit the Dementia Collaborative Research Centres website at
www.dementia.unsw.edu.au
for further information about the people involved and the research activities