



# What works for reducing the incidence of dementia in Australia's ageing population?

## Background

- Dementia, particularly Alzheimer's disease and vascular dementia, is one of the leading causes of death and disability in older Australians.<sup>36</sup> Future projections estimate that by 2050, more than 1.1 million Australians will be living with dementia, costing around \$6.6 billion per year.<sup>41</sup>
- Modifiable risk/protective factors proposed for dementia include diet, physical activity, smoking, alcohol and educational attainment.<sup>44</sup> The overlap of dementia risk factors with those for lifestyle-related chronic diseases suggest benefits to taking a multi-disease approach to these risk factors in anticipation of broader impacts to population health.
- However, projections suggest significant cost and quality of life impacts can be achieved by even modest delays in the onset of dementia.<sup>46, 47</sup>
- Therefore, a more specific focus on strategies to delay onset of dementia may have a greater impact over the longer term.

## Review purpose

- To identify interventions that may be effective in the primary prevention of Alzheimer's disease and vascular dementia (or delay onset)
- To identify research gaps to inform future research investment.

## Key findings

- A total of 40 papers met the selection criteria.
- There were insufficient follow-up periods in studies to determine the impact of interventions on the incidence of dementia. Rather, impact on cognitive function was used as a proxy outcome measure.
- The diversity of cognitive outcome measures used was often reported in systematic reviews as a limiting factor in the comparison of individual RCTs.
- Cognitive training and physical activity (regular endurance training and tai chi) interventions displayed medium to large effect sizes.<sup>28, 29, 33, 34</sup>
- Separate systematic reviews of trials of omega 3 supplements and anti-hypertensive medication demonstrated small but significant effect sizes.<sup>30, 37</sup> In addition, small effect sizes were found in trials of NSAIDs, cognitive training, improved diabetes control, and dietary supplementation with folic acid and vitamin B<sub>12</sub>.<sup>8, 10, 14, 15, 26, 31, 32, 39</sup> However, outside of controlled study environments, the impacts of these interventions are likely to be further diminished.
- The remaining papers demonstrated nil effect of interventions or inconclusive results.<sup>1-7, 9, 11-13, 16-25, 27, 35, 38, 42, 43</sup>




## Research gaps

- While there is good evidence to support the effectiveness of cognitive training and moderate-intensity physical activity on improved cognitive function, these interventions are yet to be shown to prevent incident dementia in an appropriately designed trial. Such studies are considered an international priority.<sup>33</sup>
- There is a lack of studies on the effectiveness of interventions related to smoking, alcohol misuse and social interaction.
- While only small effect sizes have been demonstrated in trials of omega 3, vitamin B<sub>12</sub>, folic acid and anti-hypertensive medications and diabetes control, it is unknown what impact they may have if combined with cognitive training and physical activity, and what stage of the life course should be targeted for greatest effect. This would be difficult to test in an RCT, however, system dynamics (SD) can help answer such questions. SD modelling can simulate various interventions applied individually, in combination, and at different stages in the life course, to compare likely impacts on incident dementia and cost implications. This would inform the development of cost-effective strategies to reduce the rate of increase in dementia in our aging population. Development of an SD model of dementia prevention in Australia is therefore recommended.
- Future studies would benefit from consensus and consistency in the use of an appropriate cognitive performance measure. In addition, better tools for screening for early onset of dementia would be an advantage.

## Summary of review method

- An electronic search was conducted of relevant articles published up until September 2014, identified from the PubMed, Web of Science, EMBASE, EBM reviews, Cochrane database of systematic reviews, and Google Scholar databases.
- Guidelines for study inclusion, quality assessment and data extraction outlined in the Cochrane 'Guidelines for Systematic Reviews of Health Promotion and Public Health Interventions' were used.<sup>40</sup> Study designs eligible for inclusion were randomised controlled trials, controlled before and after studies, interrupted time series, and systematic reviews of such studies.
- As the scope of the review was primary prevention of Alzheimer's disease and vascular dementia, studies that examined the effectiveness of interventions following onset of disease were excluded. Forty papers met the selection criteria and were grouped according to intervention domain (e.g. diet, mental activity, pharmacotherapy, physical activity and vascular conditions). Data were extracted on study design, study population, intervention characteristics and primary outcomes (impact on dementia).
- **Limitations:** A rapid review approach was used. Rapid reviews streamline traditional systematic review methods and apply search limitations to conduct the review in a shortened timeframe.<sup>45</sup> Completeness of such reviews are determined by time constraints, however, bias associated with potential lack of inclusion of relevant studies was minimised by reliance on recent comprehensive systematic reviews, new searches limited to periods subsequent to publication of existing reviews, and an iterative snowball approach to identify any additional relevant papers from reference lists.<sup>48</sup>

## Summary map of evidence

	Nil effect or inconclusive	Small effect	Medium to large effect
Diet	<p>Diet counselling (5)</p> <p>Ginkgo biloba (4)</p> <p>Folic acid (6)</p> <p>Cyanocoba-lamin+ FA + B6 (7)</p> <p>Vit E (3)</p> <p>Multi-vitamins (9)</p> <p>Ginkgo biloba (1)</p> <p>Anti-oxidants (42)</p> <p>Vit E + Vit C + beta carotene (2)</p>	<p>Omega 3 (37)</p> <p>Folic acid (10)</p> <p>Folate + B12 + Omega 3 (8)</p>	
Mental activity		<p>Computer training (26)</p> <p>Cognitive training (39)</p>	<p>Cognitive training (33)</p> <p>Brain reserve (34)</p>
Multi-factorial	<p>Nutri dense + social + PA (13)</p> <p>Adherence (11)</p> <p>CT + folate + B12 + B6 (12)</p>	<p>Folic acid + B12 + PA (14)</p> <p>CT + PA (15)</p>	
Pharmaco-therapy	<p>Statin (35)</p> <p>Hormone therapy (24)</p> <p>Hormone therapy (21)</p> <p>Hormone therapy (43)</p> <p>DHEA + Wellness (23)</p> <p>Antihyper tensives (16)</p> <p>Antihyper tensives (17)</p> <p>Aspirin (19)</p> <p>Antihyper tensives (20)</p> <p>Antihyper tensives (25)</p> <p>NSAIDs (22)</p> <p>NSAIDs (18)</p>	<p>NSAIDs (18)</p>	
Physical activity	<p>Resistance training (27)</p> <p>Leisurely PA (38)</p>		<p>Endurance cardio (29)</p> <p>Tai chi (28)</p>
Vascular		<p>Antihyper tensives (30)</p> <p>Diabetes control (31)</p>	
<p>Legend  = Results reported as a hazard ratio</p> <p> Systematic review  RCT</p>			

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### The Australian Prevention Partnership Centre

The Prevention Centre is finding out how we can build an effective, efficient and equitable system for the prevention of lifestyle-related chronic disease.

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