

Challenges, solutions and future directions for public health innovations targeting dementia prevention for rural and remote populations

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Abstract

Currently, individuals living in rural and remote areas experience 1.4 times the total burden of chronic disease, including an 80% greater risk of late-life cognitive impairment and dementia, 2.5 times the number of preventable hospitalisations and a reduced life expectancy of up to 12 years compared to their metropolitan counterparts. Traditionally, health service planning and public health interventions have been largely built on the needs and characteristics of metropolitan populations. This disproportional focus can contribute to significant physical and cognitive health status disparities for rural and remote communities. This article focuses on existing challenges and strategies surrounding the cognitive health of rural and remote populations and provides short and long-term opportunities involving Australian public health policy and clinical practice to innovate dementia prevention for rural and remote communities.

KEYWORDS

ageing, dementia prevention, dementia risk, public health, rural population

1 | DEMENTIA PREVALENCE, KNOWLEDGE AND CHALLENGES FOR RURAL AND REMOTE AREAS

Dementia is the second leading cause of death in Australia and is currently costing the country over \$15 billion annually.^{1,2} There are an estimated 472,000 Australians suffering from dementia, with numbers predicted to rapidly reach 1,076,000 by 2058.^{2,3} Dementia has no cure; however, there is increasing recognition that modifying risk factors for dementia,^{4,5} and the adoption of risk reduction methods in national strategy and health professional practice can reduce dementia risk.⁶ However, a population-wide

level of knowledge about dementia and its protective factors remains low.⁷

Within the Australian general public, 40% are unaware that dementia is not a normal part of ageing,¹ only 41.5% believe dementia risk can be reduced, and only 26.9% are very confident that this is realistically achievable.⁸ Furthermore, only 19% had a good understanding of the term dementia, alongside substantial uncertainty (i.e. 50% or below) surrounding the influence of evidence-based modifiable dementia risk factors.⁹ Similarly, in a U.S. study, only 59% of the general public scored correctly across items related to knowledge of dementia symptoms, risk factors, early detection and treatment, with 76.5% of

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rural older adults believing Alzheimer's disease is a normal part of ageing, and 76% believing nothing can be done to decrease their chances of getting Alzheimer's dementia.¹⁰ With age being the strongest predictor of dementia, and the growing proportion of older adults in Australia, the burden of the disease and public misconceptions surrounding the condition are set to increase. Thus, raising awareness of protective factors alongside the integration of preventive measures and interventions is crucial.

Dementia is of particular concern in rural and remote Australia, which houses 30% of the Australian population. The term 'rural and remote' herein refers to all areas outside Australia's major cities as classified by the Australian Statistical Geography Standard Remoteness Structure, and covers inner regional, outer regional, remote or very remote locations.^{11,12} In rural and remote areas, individuals are typically older, with two in five persons living with dementia and a projected increase in prevalence rate similar to metropolitan areas.^{1,6,13,14} Indeed, dementia contributes to the top five causes of total disease burden and death in regional areas, particularly amongst women.¹⁵ Furthermore, unlike major cities, with each level of geographical remoteness, relative access to diagnostic, medical, specialist and support services becomes increasingly more challenging.^{3,11}

Embedded environmental, systemic and societal challenges in regional health systems predispose rural and remote communities towards poorer health outcomes. In particular, geographical isolation, limited transportation and financial limitations are characteristics of rural communities and have detrimental effects on health-care capacity and access, leading to increased rates of morbidity, mortality, hospital admissions and prolonged hospitalisations.^{11,16,17} This is compounded by health professionals' perception of rural and remote areas as unfavourable locations, which means clinician relocation is frequent and a contributing factor to chronically understaffed, under-resourced and constrained regional facilities.¹⁸ High turnover and staff burnout are also common^{11,17} causing many health professionals to employ a treatment/reactive framework focusing on acute health crises rather than encouraging preventive health behaviours.^{18,19}

Rural and remote communities comprise Aboriginal and Torres Strait Islander populations, who have three to five times higher dementia prevalence than the general population.^{2,12,20} Risk factors for dementia including diabetes, cardiovascular disease, high blood pressure, stroke, risky alcohol use, unskilled work and obesity amongst others, are also more prevalent amongst Indigenous compared to non-Indigenous Australians.²¹ Supplementary to the existing pressures in rural and remote populations, Aboriginal and Torres Strait Islander communities face additional systemic challenges in accessing quality

Policy Impact

This paper recognises the unique challenges faced by the rural health system targeting dementia prevention and proposes that evidence-based, multi-factorial, public health campaigns that are driven by a united multi-level approach and supported by appropriate funding is required to translate the benefits of dementia risk reduction into real-world solutions.

Practice Impact

This paper explores the missed opportunities for dementia risk reduction in rural and remote areas. It identifies the challenges for regional populations and builds upon the strengths and community values that rural areas are known for to propose innovative and evidence-based strategies that can be applied in practice.

health services. For example, lower socio-economic status, communication barriers, racism and discrimination can lead to considerably lower health service utilisation than the general population.²² However, adopting the same approach to address dementia awareness and cognitive needs of both Indigenous and non-Indigenous populations is misguided and unlikely to be constructive. Dementia risk reduction strategies targeting rural and remote Aboriginal and Torres Strait Islander individuals merits a more comprehensive, culturally relevant exploration of existing strategies that build the capacity of community members,²³ and have been explored elsewhere.²⁴

Not all rural and remote areas have similar health-care needs. Geographical distance from regional hubs and sparsely populated areas are associated with poorer health outcomes including longer hospital stays, non-attendance at check-ups and higher mortality.²⁵ In contrast, rural communities that are more population dense and located closer to regional centres experience better health outcomes due to more locally accessible services.^{25,26} Despite this, consistent across regional communities is their characteristic cohesiveness and regenerative social capital.²⁷ A recent scoping review highlighted that rural older adults who participated in formal and/or informal activities with and for others helped foster a strong sense of meaning, inclusivity, and had advantages for overall health and mortality despite living rurally.^{27,28}

Thus, reducing dementia risk and prevalence in rural and remote areas is complex and requires consideration of these differences in rurality as well as the underlying untapped resources that differentiate regional communities

from urban centres, like social capital. The challenge is in developing and implementing innovative approaches that are easily accessible, context-specific and incorporate the best available evidence.

2 | WHAT IS THE CURRENT EVIDENCE ON DEMENTIA RISK REDUCTION INTERVENTIONS?

A growing body of research recognises that dementia risk can be best modified through a population-based approach of behaviour change and primary prevention.²⁹ At a public health policy level, current guidelines suggests that small, cumulative changes to behaviour can lead to large-scale improvements in population health outcomes.³⁰ Dementia risk factors have been identified and of these, low education, obesity, smoking, risky alcohol intake and physical inactivity are more of a concern in regional and remote areas, and should be addressed.^{4,11,16}

Recent studies have focused on investigating the effectiveness of multidomain interventions aimed at targeting lifestyle risk factors simultaneously.³¹ Globally, the World-Wide Fingers Network (WW-FINGERS) has united over 25 countries with a central aim of adapting multidomain approaches to prevent cognitive decline in different populations. Underpinning the network is the Finnish Geriatric Intervention Study to Prevent Cognitive Impairment and Disability (FINGER), the first large multidomain, two-year randomised control lifestyle trial to demonstrate improvement and maintenance of cognitive function in at-risk older adults.³² Other countries have followed suit and implemented their own programs, including France (Multidomain Approach for Preventing Alzheimer's disease; MAPT)³³, the Netherlands (Prevention of Dementia by Intensive Vascular care; PreDIVA)³⁴, Canada (CAN-Thumbs-UP),³⁵ Japan (Japan Multidomain Intervention Trial for prevention of dementia; J-MINT),³⁶ and the United States (United States Study to Protect Brain Health Through Lifestyle Intervention to Reduce Risk; U.S. POINTER).³⁷

However, outcomes from the trials already underway have been inconsistent, with the PreDIVA study finding no change in incident dementia following a nurse-led intervention targeting cardiovascular risk factors,³⁴ and the MAPT trial finding an increase in physical activity in the short-term but that this was not maintained at long-term follow-up.³³ This may be due to a lack of understanding of what mechanisms work in specific settings leading to substandard trial design or neglecting the importance of interaction between dementia risk factors.³⁸ Hence, ensuring the effectiveness of these trials when applied to

geographically, economically and culturally diverse settings requires further investigation.³¹

In Australia, trials that are currently underway (e.g. Australian-Multidomain Approach to Reduce Dementia Risk by PrOTecting Brain Health with Lifestyle Intervention; AU-ARROW and Maintain Your Brain; MYB),³⁹ show promise. Previously, Body Brain Life, a randomised control trial that delivered an online dementia risk reduction intervention to middle-aged adults through both GP practices and lifestyle modification programs⁴⁰ had participants complete self-directed, one-hour online modules based on modifiable dementia risk factors. Participants then received an intervention that was tailored to their individual dementia risk and used goal setting to encourage adherence, which significantly increased participants' dementia literacy and adoption of protective factors (e.g. fish consumption and cognitive engagement). The program also reduced risk of cognitive decline, and this was sustained up to 6 months after the intervention.⁴⁰ Another recent program, Brain Bootcamp, aims to promote healthy brain ageing and reduce dementia risk in older community-dwelling adults by further applying four behaviour change principles of goal-setting, education awareness, consequence of behaviour and physical prompts tailored to each individual to reduce brain health risk among older adults.⁴¹ Although this trial is ongoing and only in the preliminary data stages, publicly available feedback about the program shows promise.

Other Australian dementia risk reduction initiatives currently underway include the implementation of an automated, online screening dementia risk reduction tool for use in primary care software to produce personalised risk profiles for adults 60–70 years of age to support self-management.⁴² If effective, findings could be a great avenue for the delivery of dementia risk reduction programs remotely and thus able to increase the scope of public health interventions to hard-to-reach populations.⁴³

However, altering behaviour and sustaining new behaviours is difficult and often individualised.³⁰ Emerging evidence suggests that utilising behaviour change taxonomy⁴⁴ to understand the mechanisms of individual behaviour change is an effective route to understanding motivational factors, which when incorporated within public health approaches may be successful at reducing dementia risk in the long-term.³⁰ Limitations of current programs are that they are resource intensive, require significant financial investment and personnel and thus can only be generalised to metropolitan populations. Several issues arise when implementing these interventions in rural and remote communities including cultural irrelevance, practical (i.e. funding) and capacity restrictions and lack of community support and partnerships.⁴⁵ Addressing and overcoming these barriers is critical to

implementing a population-based multidomain approach in rural and remote populations to fill a considerable gap in dementia prevention activities.

3 | SOLUTIONS AND FUTURE DIRECTIONS

Research on dementia prevention in rural and remote contexts is lacking. Studies that focus on associated factors with cognitive decline, and barriers and facilitators to dementia awareness and risk reduction are available,^{16,19,46} yet there is limited investigation of the implementation, feasibility and acceptability of interventions in these populations.⁴⁷

Due to the unique health challenges faced by rural and remote older adults, supporting these communities to reduce dementia risk requires united changes within ground-up and top-down approaches.⁴⁸ Figure 1 summarises the discussion below in both short-term and long-term actions. We propose that in order to create

substantial, sustainable change, partnerships with local stakeholders and health-care services and involvement of community champions, political agreement and significant financial investment are required.^{46,48}

Utilising primary health services (GPs and nurses) to deliver appropriate information and referrals is recommended. Successful health promotion and early prevention strategies for dementia should focus on methods that least disrupt work practices. For instance, having support from the Australian General Practice Network; explicit funded roles for nurses targeting intervention activities;⁴⁹ small group interactive education meetings within individual health-care providers, and streamlining simple dementia risk reduction clinical practice guidelines into existing primary care operations that enable quick and easy routine prescribing (e.g. prompts, reminders and computerised decision support for physicians) would be valuable.^{49–51}

Yet, delivering interventions aimed at improving dementia risk factors within rural primary care can be difficult,⁴⁹ with few health professionals broaching the topic

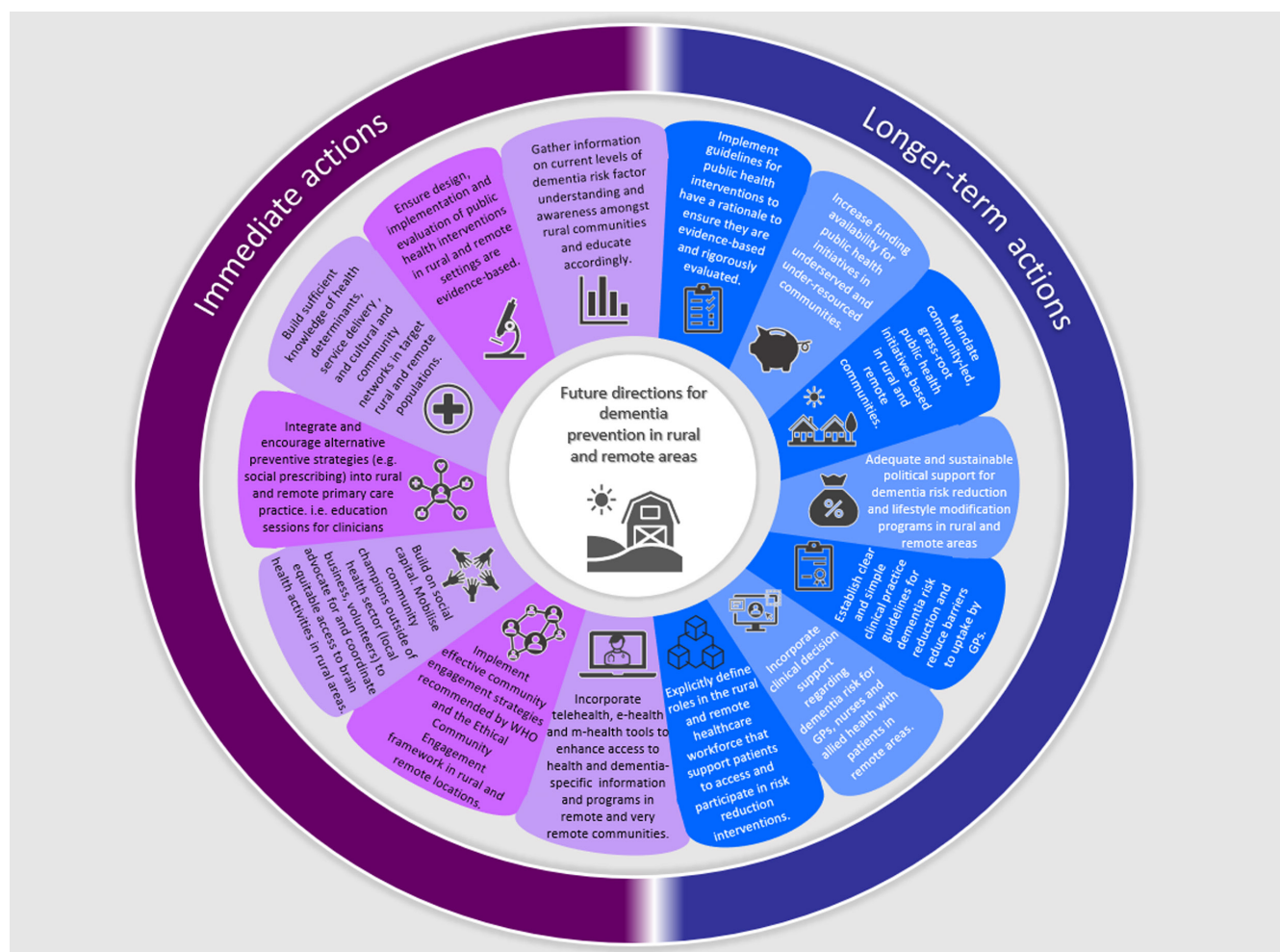


FIGURE 1 Recommended strategies for public health initiatives targeting brain health in rural and remote areas

of dementia with their patients, despite patients reporting memory problems and displaying receptivity to risk reduction methods.^{49,52} GPs often report excessive work responsibilities, poor knowledge, lack of consensus on current guidelines, and perceptions of low effectiveness of programs as key barriers.^{19,51} Thus, rural and remote communities remain unexposed to health promotion strategies, and often delay screening, diagnosis and treatment of chronic health conditions.⁵³

Improving intervention access and delivery within regional primary care is possible. Using theoretical frameworks (e.g. participatory action research approach,⁵⁴ PRECEDE-PROCEED model⁵³) can support the design, development, implementation and evaluation of locally relevant interventions to ensure uptake.⁵³ Interventions adopting these frameworks have guided multidomain health initiatives in rural and remote settings including a nurse-led hypertension program implemented within rural health centres,⁵⁵ a diabetes and cardiometabolic risk reduction program in remote workplaces⁵³ and an ear health promotion program within rural pharmacies,⁵⁶ all of which have seen improvements in their respective health outcomes. Thus, comprehensive understanding of each targeted regional setting and how needs differ based on their geographic location (i.e. rural or remote), and social environment (i.e. the health-care provider, clinicians and workplace culture) is required to ensure intervention success.

The underlying mechanisms within multidomain interventions that influence their uptake and adherence remain unknown.³⁸ Although evidence suggests that a multi-factorial intervention targeting multiple risk factors may delay cognitive decline,^{30,31,48,57} the preceding conditions that lead to certain behaviours are complex, and making the assumption that they are linear and only connected to primary care activities is ill-advised.^{30,39} Initial actions should unpack existing health promotion interventions in rural and remote communities to identify appropriate strategies that reduce the prevalence of single lifestyle risk factors. For example, the DASHing towards Health clinical trial identified a promising distance-delivery method using web or post to address hypertension amongst rural women.⁵⁸ A weight loss intervention combining weekly phone support and provision of prepackaged meals was also effective in increasing physical activity and weight loss in rural cancer survivors.⁵⁹ Combining the techniques used in these programs into a multi-factorial intervention with meaningful and standardised measures of cognition over time may be a favourable mechanism to target and improve brain health.

Learning from existing evidence-based approaches to inform dementia prevention innovations and building the capacity of rural and remote communities and primary

care is a valuable step. Adequate resourcing (e.g. social workers, residential aged care providers, Multi-Purpose Services [MPS] and pharmacies) and education should help to build clinician confidence in social prescribing (e.g. lifestyle interventions, social clubs, community group activities and dementia risk reduction kits) and also enable access for geographically dispersed individuals to make lifestyle changes that are beneficial for their brain and overall health.^{19,39,48,51}

Another critical component in preventing dementia is a strong political commitment and a consensus that promoting brain health throughout the life course is worth the investment.^{60,61} Key national and international bodies including the World Health Organization,⁶² Alzheimer's Disease International,⁶³ World Dementia Council,⁶¹ the International Research Network on Dementia Prevention,³⁸ the Worldwide FINGERS network³⁹ and the Australian Institute of Health and Welfare⁶ support this multipronged approach and have all made dementia risk reduction a priority action area.³⁸ However, to translate and implement report recommendations, active engagement from local, state and national governments is essential. Public health initiatives are underfunded, as they require various small efforts from numerous individuals and have long-term advantages for population health that are not immediately actualised.⁶⁰ Due to the unique challenges and health status of rural communities, significant long-term financial investment and political backing is required to ensure the needs of rural and remote communities are not misrepresented or overlooked when designing and implementing public health campaigns.^{48,60,64}

Finally, creating supportive environments and community capacity-building are pillars that underpin health promotion.⁶⁵ According to the WHO and the framework for Ethical Community Engagement (ECE), effective strategies require an understanding of the health promotion capabilities of the community (e.g. existing healthy settings, people's past experiences, conditions that facilitate trust and authentic relationships and principles that are useful in overcoming barriers to community engagement).⁶⁵ Indeed, social capital is a strength in many rural and remote communities,²⁷ and this close-knit and cohesive environment would be an advantage for population-based interventions to influence long-term change and promote community participation. Thus, successful and innovative strategies should involve influential champion hubs within and distinct from the health sector.

In rural areas, which have slightly more access to essential services compared to remote communities, a potential strategy to reduce dementia risk is through optimising existing user-friendly community health services (e.g. pharmacies). Pharmacies are the driving force of many public health activities including smoking cessation programs,

screening for disease, provision of preventive medication and vaccination services and are suitable for delivering risk reduction programs in rural communities.⁶⁶ They are often smaller, and independent and are ideal for creating an ageing- and dementia-friendly culture suited to providing access to dementia risk reduction interventions.

Health programs delivered outside of the clinical health domain also have potential. For example, a pilot project operating out of rural public libraries over a 20-month period provided older adults with free pedometers and online health assessments for their physical activity, eating, alcohol use, tobacco use and weight.⁶⁷ The program required minimal investment, received substantial positive feedback from older adult library patrons and found improved health outcomes. Subsequently, older adults treated their library as a central contact for health information and inspired further community engagement with some libraries facilitating qualified community members to teach yoga or tai chi classes.⁶⁷

In remote and very remote settings, overcoming the issue of access and transport through the adoption of sustainable telehealth, e-health and m-health tools may be suitable.⁶⁸ Barriers to the uptake of such technology in rural and remote areas are well documented.⁶⁹ However, the adoption of telehealth is growing as is research into the factors that facilitate the success and sustainability of telehealth models within rural and remote areas like adaptability and efficiency.^{68,69} Thus, with appropriate funding models and a more intentional approach to implementation, telehealth, e-health and m-health tools offer substantial promise. Indeed, a recent systematic review of telemedicine suggests that it is an appropriate replacement for usual care, especially for the management of chronic disease.⁷⁰ Health promotion and primary prevention programs have often utilised e-health and m-health tools to reach older adults (e.g. physical activity, weight loss and diabetes).^{70,71} Characteristics of these online programs that are most conducive to behaviour change include computer tailored lifestyle interventions with tools that provide ongoing support and feedback on progress towards goals, and rewards.⁷⁰ However, community involvement is critical to the intervention uptake. Therefore, engaging volunteers to assist in developing programs and sustaining motivation and commitment,⁷² combined with support from telehealth trained health professionals to achieve set goals⁷³ may be advantageous.

4 | CONCLUSIONS

Preventing dementia in rural and remote areas is complex and requires a fundamental evidence base and understanding of rural and remote health systems, policy, relevant

stakeholders and communities. However, Australian rural and remote communities are unique in that despite the environmental, systemic and societal challenges, they are equipped with intimate social networks and informal associations which if mobilised effectively can bring about real change in dementia risk. Future brain health interventions should include rural and remote communities to identify underlying mechanisms of change, as well as focus on harvesting the strengths of rural communities, including their close-knit community spirit, prosocial behaviours and resilience.

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CONFLICTS OF INTEREST

The authors declare that Joyce Siette is Associate Editor for the Australasian Journal of Ageing. All authors declare no other relationships, including financial or professional, which may pose a competing interest.

DATA AVAILABILITY STATEMENT

Data sharing not applicable to this article as no datasets were generated or analysed during the current study.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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