



# Hearing Loss and Cognitive Decline

NZAS POSITION STATEMENT  
AUGUST 2024

## Introduction

This position statement outlines the current understanding of NZAS with respect to the association of age-related hearing loss and cognitive decline in adults. In recent years there has been a significant growth in research findings pertaining to this association. This position statement summarises current understanding within peer-reviewed published literature. In summary,

- NZAS advocates that the public be accurately informed of the value of good ear and hearing health as part of aging well and participating in their community. Individuals with hearing loss should be encouraged to address their hearing loss to minimise the effects of sensory deprivation.
- Research supports an association of hearing loss and cognitive decline, but there is insufficient evidence to make conclusions regarding causality and there is extensive ongoing research into the many other personal factors that alter an individual's risk of dementia. NZAS encourages members to be mindful of how they communicate the impacts of untreated hearing loss, ensuring they do not unduly emphasise the negative implications of untreated hearing loss for the purpose of hearing aid sales.
- Hearing loss is one of many potentially modifiable risk factors for dementia. The population attributable risk, which is commonly reported, is for the population being researched, and cannot be used to quantify an individual's risk or infer causality.
- NZAS recommends that audiologists and audiometrists engage in continuing education to ensure they are providing up-to-date valid and reliable information, as part of providing person-centred care in accordance with the NZAS Code of Ethics.

## Background

When considering the literature, the reader should be mindful of the clinical definitions used to define the groups of individuals under consideration. Definitions may vary across research groups, so it is important to consider the parameters within which the analyses were undertaken. Cognition can be assessed using different tools and means of evaluation; an association may be found with results using one assessment, but not found with the results of another assessment.

- Cognitive decline – can be defined as “a noticeable and measurable loss or abnormality in attention functions, memory functions or higher level cognitive functions (including attention, language and reasoning)” (page 9, World Health Organization, 2019).
- Mild Cognitive Impairment (MCI) - refers to a disorder “characterized by impairment of memory, learning difficulties and reduced ability to concentrate on a task for more than brief periods, beyond

what is expected in normal ageing... marked feeling of mental fatigue when mental tasks are attempted...None of these symptoms is so severe that a diagnosis of dementia can be made” (page 8, World Health Organization, 2019). The International Classification of Diseases (ICD) - a global standard for recording health information and statistics – instead refers to this pattern of symptoms as Mild Neurocognitive Disorder (MiND), “characterized by mild impairment in one or more cognitive domains relative to that expected given the individual’s age and general premorbid level of cognitive function, which represents a decline from the individual’s previous level of functioning...Cognitive impairment is not severe enough to significantly interfere with an individual’s ability to perform activities” (World Health Organisation, 6D71 Mild neurocognitive disorder, 2024). Given that individuals diagnosed with MCI or MiND are at greater risk of developing dementia, such individuals are often included in studies that are wishing to elucidate any benefit of an intervention in slowing cognitive decline.

- Dementia is a group of symptoms (alternatively known as a syndrome), which arises from different diseases and injuries that affect the brain (the most common being Alzheimers disease) and is characterised by a decline in cognitive abilities (including memory and at least one other cognitive function, ie. attention, language, social cognition) that impacts a person’s ability to perform everyday activities. (For more information regarding dementia see <https://www.nzdementia.org/>). Given that Alzheimers disease (AD) is the most common form of dementia, it is worth audiologists and audiometrists being aware that “onset is insidious with memory impairment typically reported as the initial presenting complaint. The characteristic course is a slow but steady decline ...may be accompanied by mental and behavioural symptoms such as depressed mood and apathy in the initial stages of the disease and may be accompanied by psychotic symptoms, irritability, aggression, confusion, abnormalities of gait and mobility, and seizures at later stages” (World Health Organisation, 2024).

Dementia causes significant disability for the affected individual and those with whom they interact. Given there are nearly 10 million new cases of dementia every year and no curative treatment for dementia, the focus is on proactively managing the condition via modifiable risk factors that can slow or delay the progression or onset of dementia (World Health Organization, 2019). Hearing loss has been suggested to be one of those modifiable risk factors (Livingston, et al., 2017).

Hearing loss has significant implications for an individual’s social, vocational, educational and functional ability, and their quality of life. Hearing loss can differ with respect to its aetiology, severity, progression and age of onset. With respect to this position statement, research specifically encompassing ‘age-related hearing loss’ (ARHL) has been included.

## Association Research to Date

The association of hearing loss and cognition (encompassing cognitive performance, cognitive decline and dementia) has been discussed for some time, but a seminal article published in *The Lancet*, in 2017, drew attention to this association and resulted in subsequent publications suggesting that hearing intervention can reduce cognitive decline.

When reviewing the literature, it is important to acknowledge that the majority of published studies utilise observational data within population samples. This has two relevant consequences:

- It is not possible to confirm causation, and so it remains an association. Some research has inferred that hearing loss has a causal impact on cognition (either directly or indirectly), and other research has suggested that cognitive decline impacts hearing, while other research has suggested they are associated due to common cause(s) affecting both hearing and cognition (for some recent narrative reviews of these hypotheses, see Bisogno, et al., 2021; Tarawneh, Jayakody, Sohrabi, Martins, & Mulders, 2022; Powell, Oh, Reed, Lin, & Deal, 2022; Dawes & Munro, 2024).<sup>1</sup>
- Population differences - with respect to demographics and health factors – need to be accounted for statistically, and when this occurs the remaining association is relatively small. In other words, there are other variables at play in the association (ie. educational level, average income, etc.), which when accounted for results in a lower strength of association between hearing loss and cognition. The relative importance of hearing loss relative to other risk factors for dementia is commonly quantified as the ‘population attributable fraction’ (Pichora-Fuller & Mick, 2024). For the reasons given above, each population attributable fraction is only applicable to the population being researched and will tend to differ between populations. The population attributable fraction is for the population and cannot be used to quantify an individual’s risk (Pichora-Fuller & Mick, 2024).

Large long-term prospective randomised-controlled studies are needed in order to define causality. However, it is unethical to withhold an intervention (especially for a long-term study) which has proven benefits for hearing loss. Consequently, there is a reliance on observational studies.

For ease of understanding, a synopsis of the seminal published articles is provided here.

- A study of 639 individuals (aged 36 – 90 years) who were followed from 1990 to 2008 concluded that people with more severe hearing loss were more likely to develop dementia over time – after

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<sup>1</sup> There are many published articles discussing hearing loss (presentation, diagnosis and epidemiology) and current theories for the aetiology of the hearing-dementia association. For recent open-access review articles, see Powell et al. (2022) or Azeem et al. (2024).



adjustment for gender, age, ethnicity, education, diabetes, smoking and hypertension (Lin, et al., 2011). Note, the analyses included the degree of hearing loss at baseline; the trajectory of hearing loss was not accounted for in the study.

- A Lancet Commission on dementia prevention, intervention and care in 2017 reported hearing loss as being one of the largest modifiable risk factors for dementia - if hearing loss was to be completely eliminated, there would be a 9% reduction in new cases of dementia within a population (referred to as the 'population attributable fraction') (Livingston, et al., 2017). This result was based on a systematic review and meta-analysis of three studies who had each followed a cohort of cognitively healthy people for at least five years, with an objective measure of peripheral hearing loss (pure-tone audiometry) and the outcome measure of incident dementia.
- A systematic review and meta-analysis in 2018 found small but replicable associations between age-related hearing loss and measures of cognitive impairment and dementia, across 40 studies from 12 countries (Loughrey, Kelly, Kelley, Brennan, & Lawlor, 2018). The authors called for more research, in particular randomised clinical trials, to elucidate the causal mechanisms of the association.
- In 2020, Livingston et al. revised their finding of 2017, reducing the population attributable fraction for hearing loss from 9% to 8%, in another Lancet Commission Report which included three other modifiable risk factors (excessive alcohol consumption, head injury and air pollution). This report still supported an association of hearing loss with dementia, and the strength of the finding was the incorporation of studies with large sample sizes and variable methodology, ie. some were cross-sectional and others were longitudinal; but it was not a systematic review and as such could be weighted in favour of an association. As with the preceding studies, causation was not tested (given the nature of the data) and the strength of hearing loss as a risk factor is reported for the population (not the individual) and so is biased by the prevalence of hearing loss, compared to other risk factors, within predominantly high-income countries.
- Within the same 2020 Lancet review, research was discussed that found hearing aid use was associated with less cognitive decline (Livingston, et al., 2020).
- Yet in 2023, a review of studies that analysed cognitive outcomes after provision of a hearing aid found equivocal results (Dawes & Volter, 2023).
- Also in 2023, Lin and colleagues published results from a randomised control trial of 977 adults who were randomised to hearing intervention (including free hearing aid and assistive listening devices, as well as regular audiological counselling) or a control condition (including health education and chronic disease prevention). This study (referred to as ACHIEVE) found no difference in global cognition between the intervention group and control group, after three years. Although, additional analyses suggested an association within a subgroup of the sample (those at risk of atherosclerosis). This secondary finding received a lot of publicity, but other researchers questioned the validity of

the finding and its generalisability given that typically an adult hearing aid service does not (and cannot feasibly) provide the intensity of intervention that was offered as part of the ACHIEVE study (Dawes & Munro, 2024).

- Another Lancet article, published in 2023, which suggested that dementia could be prevented with hearing loss intervention based on data from the UK Biobank (Jiang, et al., 2023) has been subsequently retracted, due to a coding error which “render their findings and conclusions false and misleading” (The Lancet Public Health Editors, 2023).
- A recent prospective longitudinal observational study in Australia, referred to as the Evaluation of Hearing Aids and Cognitive Effects (ENHANCE) study, suggested that hearing intervention was associated with cognitive stability, based on 54 first-time hearing aid wearers and 18 control participants (without intervention) tested at 3 years post-fitting using a standardised visually-presented cognitive assessment battery (Sarant, Busby, Schembri, Fowler, & Harris, 2024). The authors called for more studies with longer follow-up, larger sample sizes at follow-up, and encompassing other measures of cognition, hearing and intervention.
- The 2024 update of the Lancet Commission on dementia summarised new research since the 2020 Lancet report, showing further support for hearing loss as a risk factor for dementia (Livingston, et al., 2024). With the inclusion of 2 new modifiable risk factors - untreated vision loss and high cholesterol – in addition to the other 12 previously-identified risk factors, the population attributable fraction for hearing loss was reduced to 7%. This Lancet Commission also briefly summarised the observational evidence, from two recent studies, which supports hearing aid use for reducing dementia risk.

As the forementioned studies demonstrate, there is a significant amount of research being undertaken, each with limitations. For a review of the challenges of research – such as, age of exposure, population differences, research study mode (ie. observational versus randomised-controlled trial) – refer to Livingston et al. (2024). NZAS recommends that audiologists and audiometrists engage in professional development opportunities to stay abreast of current relevant research and critically evaluate the implications of the research for their clients.

## Guidelines

International and New Zealand based reports, recommendations and guidelines pertaining to the association of hearing loss with cognitive decline or dementia recommend the following:

- The World Health Organisation in 2019 as part of their ‘Risk reduction of cognitive decline and dementia’ guidelines undertook systematic reviews (of adults with normal cognition or MCI) and

provided recommendations based on “the balance of benefit and harm of each intervention; values and preferences; costs and resource use; and other relevant practical issues for providers in LMIC [low-and middle-income countries]” (page xi, World Health Organization, 2019). They concluded:

- There is insufficient evidence to recommend the use of hearing aids to reduce the risk of cognitive decline and/or dementia.
- Screening followed by provision of hearing aids should be offered to older people for timely identification and management of hearing loss as recommended in the WHO ICOPE [Integrated Care for Older People] guidelines.
- In accordance with the WHO ICOPE guidelines, the National Institute for Health and Care Excellence (NICE) guidelines for ‘Hearing loss in adults: assessment and management (2023)’ recommended that health practitioners “consider referring adults with diagnosed dementia or mild cognitive impairment to an audiology service for a hearing assessment because hearing loss may be a comorbid condition”, and specifically recommended referral for a “hearing assessment every 2 years if they have not previously been diagnosed with hearing loss” (page 24, National Institute for Health and Care Excellence, 2023). These guidelines also recommend that as part of an audiological assessment for adults, a full history should include cognitive ability. NICE guidelines are based on careful review of the published literature and in this instance, it was concluded that “there is no good evidence to show that hearing loss causes dementia or that hearing aids delay the onset or reduce the incidence of dementia. Hearing aids do, however, have the potential to improve functioning and quality of life, and this could delay the progress of dementia or improve its management” (page 23).
- Audiology Australia (March 2023) acknowledged the growing body of evidence but cautioned that stronger evidence is needed to clearly indicate that either hearing loss causes dementia, or that hearing interventions such as hearing aids can delay cognitive decline and dementia. As such, Audiology Australia “does not currently advise audiologists to use or to be seen to use the potential association of untreated hearing loss and cognitive decline and dementia to encourage the sale and fitting of hearing aids or other amplification devices until there is stronger evidence available” (page 3).
- The ‘Improving Dementia Mate Wareware Services in Aotearoa New Zealand Action Plan’ ([Dementia Mate Wareware Action Plan - Alzheimers New Zealand](#)) advocates to improve service delivery, address inequity in access, and acknowledge the major role of dementia in disability and the wider health system. The four objectives of the action plan do not explicitly mention ‘hearing’, ‘hearing loss’ or ‘hearing intervention’, and as such highlights the need for increased awareness across New Zealand regarding the interplay of hearing and dementia. Within this action plan, the authors hypothesise that the higher estimated dementia mate wareware risk in New Zealand, compared to other countries, is due to the high prevalence of untreated hearing loss and obesity amongst Māori and Pasifika people.

- A recent report from the New Zealand Aged Care Commissioner listed 20 recommendations, one of which is relevant to this position statement: “Preventative actions to reduce dementia mātāwareware include increasing hearing-aid subsidies and public health interventions fostering social connection and age-friendly environments” (page 7, Aged Care Commissioner, 2024). The report primarily cited Jiang et al.’s (2023) Lancet article which has subsequently been retracted, but in explaining this recommendation the Commissioner discussed the relevance of hearing loss and hearing aids to social isolation and loneliness.
- The 2024 Lancet Commission for dementia prevention called for national and international government policy that incorporates specific actions to address the 14 risk factors for dementia (Livingston, et al., 2024). Relevant to this position statement is the recommendation that hearing aids should be accessible for people with hearing loss, and risk of harmful noise exposure should be decreased to reduce hearing loss.

## NZAS Actions

While research continues to be undertaken investigating hearing loss and hearing intervention as modifiable risk factors for cognitive decline, NZAS wishes to advocate for the following actions to be undertaken. Some actions are recommended for the individual audiologist and audiometrist – related to their clinical practice and professional development - while others are for NZAS as a Society. At all times, NZAS members need to practice in accordance with the NZAS Code of Ethics, by ensuring accurate information (Principle of Ethics 3) and upholding the rights, needs and dignity of the people they serve professionally (Principle of Ethics 1).

- **Advocacy for Healthy Ageing:** Individuals and organisations across the hearing sector – encompassing clinical, research, educational, consumer and retail - are called to advocate for hearing as an important component of healthy ageing. As recommended by the WHO Guidelines on Integrated Care for Older People (2019), health care professionals should be encouraged to screen older adults for hearing loss by periodically questioning them about their hearing. Regular monitoring and early detection can minimise the impact of hearing difficulties for an individual and their community.
- **Client-centred Care:** NZAS clinical guidelines, standards and competencies expect that each audiologist and audiometrist will provide client-centred care. In providing such care, each audiologist and audiometrist should be led by the values and needs of the person accessing the service. In doing so, it is important to respond to the concerns of the person in a manner which is relevant and understandable for them. Highlighting the benefits of improved communication using hearing aids may be in accordance with the person’s needs, more so than describing the negative



risks of untreated hearing loss such as possible cognitive decline – which could lend itself to increased fear, stigma, denial, and disinterest in hearing care.

- **Continuing Education:** NZAS advocates that each audiologist and audiometrist engage in continuing education to enhance their knowledge, and clinical and decision-making skills. It is expected that members of NZAS will critically review literature with respect to the integrity, reliability and applicability of published research to clinical practice. Each person within New Zealand should be able to choose to access audiological care on the basis of accurate information and, where required, provide informed consent based on current, valid and reliable information.
- **Informed Consent:** NZAS guidelines, standards and Code of Ethics, and the New Zealand Code of Health and Disability Services Consumers' Rights<sup>2</sup>, require that an audiologist or audiometrist provides each client with sufficient information to make an informed decision about their health care. In order to have the capacity to make such a decision, a client should be able to: understand the information, remember the information long enough to make a decision, and evaluate the information and communicate a decision (Audiology Australia, March 2023). Audiologists and audiometrists seeking to develop their skills for supporting decision making with cognitively impaired clients, could refer to the New Zealand Dementia Foundation - <https://www.nzdementia.org/>.
- **Dementia Friendly:** Given that hearing loss and dementia are age-associated, it is not uncommon for them to co-occur. The presence of hearing loss can exacerbate dementia symptoms, and similarly dementia symptoms can cause complications for hearing loss assessment and treatment. NZAS encourages members to improve their understanding of dementia, so that each audiologist or audiometrist can appropriately recognise when a patient has dementia and can provide suitable client-centred care for a person living with dementia. Similarly, NZAS will advocate for the inclusion of a hearing check as part of a dementia diagnosis to ensure that hearing loss is not confounding the individual's difficulties. For an overview of the ways in which behavioural hearing tests can be adapted by audiologists and audiometrists to support the needs of people with dementia, please see Dawes et al. (2022).

## Summary

Given an ageing population and that hearing loss is a contributor to global burden of disease, it is imperative that individuals and organisations across the hearing care sector work together to improve awareness of

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<sup>2</sup> Health and Disability Commissioner (Code of Health and Disability Services Consumers' Rights) Regulations 1996 - <https://www.hdc.org.nz/your-rights/about-the-code/code-of-health-and-disability-services-consumers-rights/>

the prevalence, impact and possible interventions for hearing difficulties. By focusing on the positive aspects of hearing and hearing interventions, it is hoped that hearing will be recognised as a significant part of an individual's communication, connectedness to their community, and quality of life. NZAS encourages each member to undertake regular professional development to stay abreast of published literature, in order to provide accurate information for each client/patient in a manner that is relevant and understandable for them. In doing so, clinicians and businesses are recommended to avoid focusing on the negative implications of untreated hearing loss for the purpose of hearing aid sales.

NZAS encourages each audiologist and audiometrist to recognise the role they play in ensuring that a client is accurately and sufficiently informed of their ear and hearing health in order to fully participate in their community.

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