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BRITISH ACADEMY
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British Society of Audiology, British Academy of Audiology and The British Society of Hearing Aid Audiologists Joint Document

Position Statement and Practice Guidance

The link between adult-onset hearing loss and dementia

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General foreword

This document presents a joint position statement by the British Society of Audiology (BSA), British Academy of Audiology (BAA) and British Society of Hearing Aid Audiologists (BSHAA). To the best knowledge of BSA, BAA and BSHAA, the position statement represents the evidence-base for the association between adult-onset hearing loss and dementia.

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Comments on this document are welcomed and should be sent to:

British Society of Audiology
Blackburn House,
Redhouse Road,
Seafield,
Bathgate,
EH47 7AQ.
Tel: +44 (0)118 9660622

bsa@thebsa.org.uk
www.thebsa.org.uk

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Authors & Acknowledgments

Produced by: BSA Professional Guidance Group

Key Authors:

Name	Organisation
Kevin J Munro	University of Manchester; Manchester NHS Foundation Trust, England.
Claire Benton	Vice President, British Academy of Audiology; Audiologists, Skipton, England.
Jan Blustein	New York University, New York, NY, USA
Piers Dawes	University of Queensland, Australia.
Helen Henshaw	Chair, Cognition in Hearing Special Interest Group, British Society of Audiology, NIHR Nottingham Biomedical Research Centre; University of Nottingham, England.
Shahad Howe	Co-Chair Adult Rehabilitation Interest Group, British Society of Audiology; North East Hearing and Balance, Darlington, England; Consumer Engagement Manager, Advanced Bionics, UK.
Linor Jones	Co-Chair, Professional Guidance Group, British Society of Audiology; Betsi Cadwaladr University Health Board, Wales.
Ted Leverton	Service users and volunteer for RNID; Bere Alston, Devon, England.
Laura Turton	Board Director, British Academy of Audiology; NHS Tayside, Scotland.
Aparna Mordekar	Sheffield Health and Social Care NHS Foundation Trust, England.
Michael Marchant	Vice President, British Society of Hearing Aid Audiologists.
Richard Windle	Vice Chair, British Society of Audiology; Kingston and Richmond NHS Foundation Trust, England.
Tracy Pinkerton	Northern Health and Social Care Trust, Northern Ireland.

The authors represent professionals in in the field of hearing loss (including the UK Devolved Administrations) and old age psychiatry, service users and BSA, BAA and BSHAA.

Declarations of interests

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1. Introduction and Aims

While some areas of cognition improve with age (e.g. knowledge), everyone experiences age-related declines in other aspects of cognition throughout adulthood. Areas of decline include aspects of short-term memory, our speed of processing and our ability to process one set of information over another (i.e., inhibition). These changes will affect an individual's ability to understand speech in challenging environments, e.g. speech in noise, and this is a normal part of ageing. Just because someone experiences age-related cognitive change, and associated auditory deficits, does not mean that they will go on to develop dementia.

Dementia is a group of symptoms that can affect memory, problem-solving, language, and behaviour making it hard for the individual to do everyday activities by themselves. Alzheimer's disease is the most common type of dementia. Dementia is a major global challenge: the incidence may be decreasing in some high-income countries (Wu et al, 2017), but the number of people living with dementia is growing because of increasing life expectancy. The topic of dementia raises considerable fear and alarm because of the potential devastating consequences for individuals, with a significant impact on families and carers as well as the health and care system.

The well-documented association between adult-onset hearing loss and cognitive decline / dementia (shortened to hearing loss and dementia for ease of reading) is sometimes interpreted as evidence that hearing loss causes dementia, and that treating hearing loss will reduce the risk of dementia. However, there is currently no good evidence to support (or refute) either of these claims. Excessive attention to association and causality may detract from the need for timely clinical research on identification and treatment of people who live with both hearing loss and dementia, and ensuring audiology becomes a dementia-friendly profession.

Clear communication about the hearing loss-dementia link can support realistic expectations and informed decisions. Misleading messages can promote a sense of alarm and stigma around hearing loss and may also discourage help-seeking (Blustein et al, 2023a, 2023b; Dawes and Munro, 2024). There is a need for positive and clear messaging, and this document provides suggestions for the busy practitioner who knows that adult-onset hearing loss can be managed successfully with hearing aids and / or other support. Hearing aids have proven benefits for improving communication with spoken language (Ferguson et al, 2017) and this helps to keep the user cognitively and socially active (Holman et al, 2021, Wells et al, 2020). Therefore, managing adult-onset hearing loss facilitates an active, engaged, independent, and healthy older age (National Academies of Sciences, Engineering and medicine, 2016).

<p>Hearing better can help you to live better; however, it is misleading to imply there is evidence that hearing loss causes dementia, and that treating hearing loss will reduce the risk of dementia.</p>

The aim of this position statement is to present a balanced view on the nature of the association between adult-onset hearing loss and dementia. The objectives are to provide:

1. An evidence-based summary on what is known about the nature of the association between hearing loss and dementia as well as the benefit of hearing intervention, with an assessment of the quality of the evidence and its presentation to the public (Section 2).
2. Guidance for clinicians, including how to describe the relationship between dementia and hearing loss, including acceptable statements (Sections 3 and 4).
3. More detailed definitions of the relevant terminology (Section 5).

Those who prefer to receive their information via video, or are less familiar with the relevant terminology, may wish to supplement their reading by viewing a presentation tailored for hearing care professionals by Blustein (2024). This video explains how to communicate clearly and ethically about the link between hearing loss and dementia.

This document is specific to adult-onset hearing loss. As previously highlighted by Blustein (2023), the discussion does not apply to people who identify as being Deaf and are members of a vibrant community that uses sign language to communicate.

2. Summary of evidence

Hearing loss is the most prevalent sensory deficit (Mathers, 2000) and the third leading cause of disability in the world (World Health Organization, 2021). Untreated adult-onset hearing loss can result in communication difficulties for spoken language that can lead to social isolation and withdrawal, depression and reduced quality of life (Davis, 2007). Hearing aids with appropriate support are the primary intervention for adults with hearing loss. Hearing aids are effective at improving hearing-specific health-related quality of life, general health-related quality of life and listening ability in adults with acquired hearing loss who communicate by speech (Ferguson et al, 2017). The Lancet standing commission on dementia prevention, intervention, and care was published by Livingston *et al* in 2017 and updated in 2020 and again in 2024. Since prevention is better than cure, the updated report highlights 14 modifiable, and **potentially** modifiable, risk factors throughout the life course (up from nine in 2017 and 12 in 2020). Hearing loss in mid-life has been identified as a **potentially** modifiable risk factor for dementia. The updated report also highlights advances in preventative interventions and treatments. The report represents an enormous amount of work and has received widespread attention. However, in its desire to be ambitious about dementia prevention and intervention, identifying hearing loss as a possible modifiable mid-life risk factor has resulted in misunderstandings and misinterpretations on the relationship between hearing loss and dementia. In order to address this, Munro and Dawes (2024) published a commentary on the Lancet commissions specific to the topic of hearing loss. Dawes and Munro (2024) provided a general review of the evidence on the association between hearing loss and dementia, and the benefit of hearing interventions (see Dawes and Munro, 2024). These two articles form the basis of this position statement.

Association between hearing loss and dementia

There is consistent evidence of an association between hearing loss and cognitive decline in adults with acquired hearing loss, dating back almost 150 years (Galton, 1883). Around 30 years ago, Lindenberger and Bates (1994, 1997) reported that age-related declines in hearing (and vision) closely followed declines in cognition. Interest in the connection between sensory function and cognition was given a further boost when Lin *et al* (2011) reported that baseline levels of hearing loss were associated with incident dementia i.e., new cases of dementia.

Observational studies have shown that people with greater adult-onset hearing loss are likely to have greater cognitive decline. However, association is not causation. For example, the sales of ice cream and sunglasses show a positive correlation (i.e., as the sales of ice cream increase so does the sales of sunglasses) but this is likely due to a common cause (i.e., the arrival of summer weather). This is not to deny the possibility that adult-onset hearing loss may cause dementia. This could occur due to reduced auditory input or lack of social stimulation (direct or indirect causes, respectively), but this has not been proven. Even if adult-onset hearing loss precedes cognitive decline, this does not rule out a common cause. For example, hearing loss could be a marker of dementia because they both share the same underlying cause e.g., vascular disease. Also, hearing loss may be an early manifestation of dementia rather than hearing loss accelerating dementia (Abidin et al, 2021). There is currently a lack of good quality evidence to settle this question.

Association is not causation. It is a mistake to think that if two things co-occur, one must have caused the other.

Do hearing interventions reduce dementia risk?

The possibility of reducing cognitive decline and mitigating dementia risk has been examined in several observational studies, which compared cognitive outcomes for hearing aid users and non-users. Dawes and Völter (2023) reviewed the evidence for both cochlear implants (CI) and acoustic hearing aids. The CI studies report positive outcomes for cognitive improvements, although design limitations of the CI studies make it impossible to attribute these positive outcomes to CIs (rather than to practice effects with repeated cognitive testing, for example). For acoustic hearing aids, the balance of evidence is equivocal: eight studies report positive benefits of using hearing aids and eight did not. More recently, two large-scale observational studies have been published. One showed no association between hearing aid use and cognitive impairment (Grenier *et al*, 2024). The other, by Jiang *et al* (2023), was retracted when an error in the analysis was discovered (Retraction Watch, 2024): the codes for hearing aid users and nonusers was reversed suggesting risk of dementia was higher (not lower, as originally reported) in hearing aid users compared to nonusers.

A challenge for observational studies is the lack of randomisation to intervention and control groups, which means the results may be biased. For example, typical hearing aid users are better educated than non-users (Sawyer *et al*, 2019). Education is a factor which reduces the risk of cognitive decline and dementia (Livingston et al, 2024) irrespective of any potential benefit from hearing aids. This makes it difficult to rule out alternative explanations for the potential positive cognitive outcomes associated with hearing aid use. Because of such problems, randomised controlled trials (RCTs) are considered the gold standard in terms of evidence. RCTs involve randomly allocating people to treatment (i.e. hearing aid) or a control group so they avoid any problems with pre-existing differences between users and non-users. Although dementia prevention is the primary interest, having dementia as the main outcome would require an unfeasibly large and long running trial. For practical reasons, trials tend to focus on cognitive change as the primary outcome of interest.

The Aging and Cognitive Health Evaluation in Elders (ACHIEVE) RCT investigated use of hearing aids as part of a comprehensive hearing intervention programme, on cognitive decline among a group of people with adult-onset hearing loss (Lin *et al*, 2023). The main finding of ACHIEVE was negative; i.e., after three years of using hearing aids there was no slowing of cognitive decline. Rates of cognitive decline were the same

in the control group of non-hearing aid users as in the intervention group. As such, there is no convincing

There is no convincing evidence that hearing interventions reduce the risk of dementia in the general population.

evidence that hearing interventions reduce the risk of dementia in the general population. A secondary analysis of ACHIEVE reported a benefit of hearing aids in reducing cognitive decline among a subgroup of people characterised as ‘high-risk’ group, but because this was a secondary finding where study-wise error rate was not controlled, this apparent benefit for a subgroup may not be reliable. Further, the benefit reported for the high-risk group was very small and may not be clinically meaningful to the individual (Dawes and Munro, 2024).

3. Guidance on statements

Examples of suggested statements, and some statements to avoid, when assessing and managing hearing loss in adults, are provided in Table 1.

Table 1. Statements suggested for communicating with adults with hearing loss.

ADULT-ONSET HEARING LOSS	HEARING AIDS
Suggested statements	
<ul style="list-style-type: none"> ✓ Reduces your ability to communicate with ease. ✓ Means your brain may need to work harder to understand what is being said. ✓ Can limit your social interactions and lead to frustration, fatigue, isolation, feelings of loneliness, anxiety and depression. 	<ul style="list-style-type: none"> ✓ Make spoken communication easier and will improve your quality of life. ✓ Keep you socially engaged, and this will help you live better. ✓ Make listening less effortful.
Statements to avoid	
<ul style="list-style-type: none"> ✗ Is known to cause dementia. ✗ Has been shown to be the leading cause of dementia. ✗ Means you will get dementia. 	<ul style="list-style-type: none"> ✗ Are known to prevent dementia. ✗ Have been shown to reduce cognitive decline or risk of dementia.

Based on the available evidence, it is our view that:

- Clinicians should fairly represent any association between dementia and hearing loss, based on the available evidence.
- Clinicians must take care not to cause any unnecessary fear or anxiety for their service users due to concerns about hearing loss and dementia.
- Clinicians must never use any association between hearing loss and dementia to encourage or cajole patients to use or acquire hearing aids but should discuss the benefits and problems of hearing aids in a balanced manner. This should be regarded as an issue of professional ethics.
- Marketing materials for hearing devices and hearing services must not indicate any causative association between hearing loss and dementia and must not promote hearing aids as a prevention for dementia.

- Educators and trainers, in academia and in clinical practice, should highlight the evidence base and promote professional values to students and trainees.

4. Frequently asked questions

Suggested responses to Frequently Asked Questions (FAQs) are provided in Table 2.

Table 2. Frequently asked questions and suggested answers.

1. Does hearing loss cause dementia?
There is currently <i>no</i> good quality evidence that hearing loss causes dementia, only evidence to show that there is an association between them.
2. If there is no evidence of causality, why do people say hearing loss causes dementia?
This is most likely a misunderstanding of the evidence. There are several health conditions that are associated with increased risk of dementia including depression, high cholesterol, high blood pressure and diabetes. Further down the list is hearing loss. But this <i>does not</i> mean that hearing loss causes dementia.
3. But my chances of dementia are higher if I have a hearing loss?
It is not exceptionally high, but adults with hearing loss <i>do</i> have a slightly higher chance of dementia. To give you an example, if 10 people in every 1000 with no hearing loss are at risk of dementia, the equivalent number will be 14 people out of every 1000 who have a hearing loss. In this example, that’s an extra four people in every 1000 at risk of dementia.
4. If hearing loss hasn’t been proven to cause dementia, why do people say hearing loss is a risk for dementia?
When using risk to discuss health issues, it doesn’t necessarily have the same meaning as everyday language. Here we use risk to mean that hearing loss is <i>associated</i> with dementia. It does <i>not</i> mean an adult with hearing loss will definitely get dementia, <i>nor</i> does it mean that hearing loss causes dementia. Sometimes one thing causes the other (we all know that a poor diet can cause health issues) but sometimes the association is due to something else: for example, we know that sales of sunglasses and ice cream increase in the summer, but the common cause is the warmer weather. Hearing loss could indicate a risk of dementia because hearing loss and dementia share common causes (e.g. genetic risks, age-related physiological changes).
5. But I have heard that hearing loss is the number one risk factor for dementia.
People have estimated the proportion of new cases that can be avoided if hearing loss can be completely eliminated. They have <i>assumed</i> that hearing loss causes dementia, and that hearing loss can be fully treated. These assumptions are <i>not</i> supported by the evidence.
6. Will wearing hearing aids reduce the chances of me getting dementia?
There are well known benefits of using hearing aids (see table above). However, there is <i>no</i> good quality evidence proving that hearing aids will reduce your chances of dementia.

7. But I heard that research has shown that hearing aids reduce the risk of dementia?

There is not much high-quality research to answer this question. The best study investigated if hearing aids could slow down cognitive decline (the sort of brain changes that occur to most of us as we get older). There was no difference between people in the general population who wore hearing aids during the study and those who were not given hearing aids. The study suggested that hearing aids *may* slow cognitive decline in people at high risk of dementia (meaning that they have other health conditions such as diabetes) but we *do not* know if this finding is reliable or if the benefit is large enough to be meaningful.

8. So, wearing hearing aids won't help my brain?

We *do not* know if hearing aids will reduce your risk of dementia because we *do not* know if hearing loss causes dementia. But we *do* know that hearing better can help you live better. Listening and trying to communicate with others when you have a hearing loss can be a challenge. If hearing aids help you to hear more easily, this means your brain probably doesn't have to work so hard. That could free up your brain to do other things, and that could be good for people with or without dementia.

5. Relevant Terminology

Risk factor: In everyday language, risk is frequently used synonymously with cause. For example, “the heavy rain is a risk factor for flooding” is interpreted as heavy rain will cause flooding if it doesn't stop. However, in epidemiological studies, risk means an association (or probability), not necessarily a cause. This is an important distinction. Some risk factors are known to modify the chances of disease. It is not appropriate to refer to hearing loss as a “modifiable risk factor” for dementia because it has not been proven that hearing loss causes dementia.

Based on current evidence, we can say that hearing loss is associated with an increased risk of developing dementia. The additional risk is small. However, there is no good evidence that hearing loss causes dementia.

Relative risk (RR): Personal risk to an individual is usually reported as a relative risk. This is the probability of someone with hearing loss developing dementia compared to someone without hearing loss. For example, a RR of 1.4 means the risk of dementia to the individual with the risk factor is 40% higher than someone without the risk factor. For example, if 10 in 1000 people are at risk of dementia, this increases to 14 in 1000 for people with the risk factor. **Hearing loss is not the leading personal risk factor for dementia.** This is an important point that has frequently been misunderstood. According to the 2024 Lancet report on dementia prevention, intervention and care, the top six personal risk factors for dementia are: depression (RR = 2.2), traumatic brain injury (RR = 1.7), diabetes (RR = 1.7), less education (RR = 1.6), social isolation (RR = 1.6) and untreated vision loss (RR = 1.5). The personal risk of dementia associated with hearing loss is similar to the risk associated with obesity, high levels of low-density lipoprotein (LDL) cholesterol (i.e., the bad cholesterol that can build up in your arteries), and smoking (RR = 1.3-1.4).

Although hearing loss is associated with increased risk of dementia at a population level, it is not a leading risk factor for dementia at an individual level.

Population attributable fraction (PAF): The maximum proportion of new cases of dementia in the population that can theoretically be avoided if the cause can be completely eliminated. PAF is highest for high LDL cholesterol and hearing loss, each 7%. The proportion is high for hearing loss because it is a common condition, despite a relatively low RR. PAF may vary over time and may be different in sub-groups within the population; minority and lower socioeconomic groups often have a higher burden of modifiable risk factors. PAF is concerned with whole populations and is not the same as the personal risk to an individual with hearing loss developing dementia.

The estimated prevalence increased from 31.7% reported in the 2017 and 2020 Lancet commission reports to 59% in the 2024 report. The report did not provide an explanation for the increase in the prevalence estimate. Irrespective of the calculation of PAF, its use remains problematic for the interpretation of dementia risk associated with hearing loss because it assumes, incorrectly, that hearing loss has been proven to cause dementia and that all cases of hearing loss can be completely avoided or entirely mitigated with hearing intervention. The latter is improbable because only a subgroup of people with hearing loss use hearing interventions, even then, hearing aids or cochlear implants do not restore hearing to normal. Finally, some risk factors may co-occur, or lead to a different outcome.

Public facing documents and websites that use the Population Attributable Fraction (PAF) as the basis for claiming that hearing loss is the single greatest risk factor for dementia can be misleading. This is because the public generally assume: (i) this is the personal risk, and (ii) risk means cause.

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