HEARING LOSS AND DEMENTIA: What the research shows

Hearing loss is extremely common as we age, and most people accept it as an inevitable part of getting older. But over the past decade, research has consistently found something more significant: people with hearing loss are more likely to develop dementia later in life. This page explains what we currently know, what the numbers actually mean, and why this matters for people with both age-related and conductive hearing conditions.

What do the statistics actually mean?

Before explain the research, it helps to understand how to read the numbers. When researchers report a "relative risk," "hazard ratio," or "odds ratio" above 1.0, it means the group with hearing loss had higher rates of dementia diagnoses compared to people with normal hearing. A figure of 1.5 means roughly 50% higher rates; 2.0 means roughly double.

These figures describe associations across large populations — they do not mean dementia is inevitable for any individual, and they do not, by themselves, prove that hearing loss causes dementia. The most convincing picture comes from combining several types of evidence together.

Age-related hearing loss: a consistent pattern across large studies

Age-related hearing loss — the kind that gradually develops over decades, affecting the ability to understand speech (particularly in background noise) more than simply making things quieter — is the most studied type.

An umbrella review (which is a systematic review of all systematic reviews) that pooled the results of 11 systematic reviews and meta-analyses found:

- People with age-related hearing loss had about a **30% higher relative risk of cognitive impairment** (memory and thinking difficulties that haven't yet reached the threshold for dementia)
- They had about a **59% higher relative risk** of dementia

A large analysis of UK Biobank data, involving nearly 91,000 people followed for an average of nearly 13 years, found a "dose-response" pattern, meaning the worse the hearing loss, the higher the dementia rate:

- **Mild hearing impairment:** hazard ratio of 1.52 — approximately 52% higher rate of dementia
- **Severe hearing impairment:** hazard ratio of 1.80 — approximately 80% higher rate

This dose-response pattern is considered meaningful because it suggests the relationship isn't just coincidental. When something consistently gets worse as the exposure gets worse, it strengthens the case that the two things are genuinely connected.

Does hearing loss actually cause dementia, or do both just come with ageing?

This is the critical question, and researchers have worked hard to address it.

One concern is "reverse causation" — perhaps early, undetected dementia causes hearing difficulties, rather than the other way around. Another concern is "confounding" — perhaps ageing and vascular risk factors independently cause both hearing loss and dementia, making them appear linked without one causing the other.

To get around these limitations, one large multi-method study used a genetic technique called **Mendelian randomization**. This approach uses genetic variants that predict hearing loss (variants people are born with, so they can't be "caused" by dementia) to test whether genetically predicted hearing impairment is associated with dementia risk.

The results were consistent with the observational findings:

- Genetically predicted hearing impairment was associated with an **odds ratio of 1.74 for all-cause dementia** (74% higher relative risk)
- And an **odds ratio of 1.56** for Alzheimer's disease specifically (56% higher relative risk)

These analyses are not perfect, but they reduce some of the major concerns about confounding that affect standard observational research. The same study also looked for evidence of reverse causation — whether dementia genetically predicts hearing loss — and found none, which supports the direction of effect running from hearing loss towards dementia, not the reverse.

Can treating hearing loss make a difference?

This is where the evidence becomes particularly relevant for day-to-day decisions. The most rigorous trial evidence comes from the **ACHIEVE study**, a randomized controlled trial of hearing intervention in older adults.

- In a higher-risk subgroup of participants, the hearing intervention was associated with a **48% reduction in cognitive decline**
- Among those in the highest predicted-risk quartile (the quarter of participants most likely to decline), cognitive decline was about **62% slower** over three years with hearing intervention compared to a control group

The benefit appeared most pronounced in people already at higher baseline risk, which makes biological sense — the more cognitive reserve someone has and the healthier they otherwise are, the longer any effect might take to become detectable. This suggests hearing treatment is not just about hearing: for people at elevated risk of dementia, it may genuinely matter for brain health.

Conductive hearing loss: newer evidence, but striking findings

Conductive hearing loss — where sound cannot travel properly through the outer or middle ear due to a physical problem — has until recently received much less research attention than age-related sensorineural hearing loss. Conditions in this category include:

- **Tympanic membrane (eardrum) perforation** — a hole in the eardrum, often from chronic ear infections
- **Cholesteatoma** — an abnormal growth of skin in the middle ear that destroys surrounding bone and tissue
- **Otosclerosis** — abnormal bone growth in the middle ear

A 2026 study using the US National Institutes of Health "All of Us" dataset — which included data from over 363,000 people — examined whether these specific conditions were associated with dementia diagnoses. After adjusting for age, sex, race, education, and smoking, the results showed:

- **Tympanic membrane perforation: odds ratio of 2.09** — more than double the odds of a dementia diagnosis
- **Cholesteatoma: odds ratio of 1.77** — 77% higher odds of a dementia diagnosis
- **Otosclerosis:** no statistically significant association

Why does this matter particularly?

Unlike age-related sensorineural hearing loss, conductive hearing loss is a mechanical, peripheral problem. It occurs in the ear itself — not in the brain or nervous system. This makes it very unlikely that dementia is causing the eardrum perforation or cholesteatoma in the first place (the reverse causation concern that complicates sensorineural hearing loss research). The researchers argue this provides some of the clearest evidence yet that the pathway runs from hearing loss towards cognitive impairment, not simply the reverse

Does treatment help?

When patients who had received treatment — surgery and/or hearing aids — were analysed separately, the odds of dementia were lower, though still elevated:

- **Cholesteatoma with surgical treatment:** OR dropped from 1.77 to **1.40** (and became non-significant statistically)
- **Eardrum perforation with treatment:** OR dropped from 2.09 to **2.01**

The stronger attenuation with surgical treatment for cholesteatoma is particularly interesting, and aligns logically with the idea that restoring hearing — or eliminating the underlying disease process — may reduce risk. However, because patients who receive treatment may differ from those who don't in other ways (healthier, more health-engaged, better access to care), these treatment comparisons cannot be taken as definitive proof of benefit. They are compatible with benefit, and consistent with the biological hypothesis, but further research is needed.

How might hearing loss affect brain health? The proposed mechanisms

Researchers have proposed several overlapping explanations for why hearing loss might contribute to dementia, none of which are mutually exclusive:

Increased cognitive load. When hearing is impaired, the brain expends far more effort decoding speech. This constant extra mental work may deplete cognitive resources that would otherwise support memory and thinking — effectively accelerating the exhaustion of the brain's reserves.

Reduced social engagement. Difficult conversations lead many people to withdraw from social activities. Social isolation and loneliness are independently associated with dementia risk, and the social consequences of hearing loss may compound its direct effects.

Brain structure changes. Studies have found that hearing loss is associated with reduced grey matter volume in brain regions involved in auditory processing and memory — including areas implicated in Alzheimer's disease pathology.

Shared underlying processes. Ageing and cardiovascular risk factors can damage both the inner ear and the brain simultaneously, contributing to both conditions along parallel pathways.
For conductive hearing loss specifically, additional factors may include the effects of chronic inflammation or infection over time, and the impact of fluctuating hearing levels on the brain's ability to adapt.

Summary: what we know

Age-related hearing loss is consistently associated with higher rates of cognitive impairment and dementia in large, long-term studies across multiple countries and study designs. The association appears dose-dependent — worse hearing correlates with higher risk. Genetic evidence supports a genuine causal contribution. Randomized trial evidence suggests treating hearing loss may slow cognitive decline, particularly in higher-risk older adults.

Conductive hearing conditions — particularly eardrum perforation and cholesteatoma — have now also been associated with higher odds of dementia in large real-world datasets. Because these are peripheral, mechanical conditions unlikely to be caused by dementia, this evidence adds weight to the idea that it is genuinely hearing deprivation, rather than shared neurodegenerative processes, that contributes to cognitive risk. Treatment appears to attenuate the association, though this remains observational.

What these statistics don't mean. A relative risk of 1.6 or an odds ratio of 2.0 does not mean dementia is likely or inevitable for any individual with hearing loss. These are population-level comparisons. They do, however, provide compelling reason to take hearing health seriously — not just for quality of life, but potentially for long-term brain health as well.

Based on: Ying et al. (2023), Frontiers in Aging Neuroscience; Jiang et al. (2024), BMC Medicine; Powell et al. (2026), Otolaryngology–Head and Neck Surgery.
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