

Research Briefing prepared by Brian Lamb. If you have any suggestions for papers or research for future research summaries, please let me know at ([brian@ciicanet.org](mailto:brian@ciicanet.org)).

## **Barriers for CI take up.**

**Jonathan D. Neukam, AuD et al. "Barriers to Cochlear Implant Uptake in Adults: A Scoping Review." medRxiv (2024).**

The authors note that a large amount of literature has been recently published on barriers to adult CI uptake. The authors conducted a scoping review which aimed to summarize the existing literature and provide a guide to understanding barriers to adult CI uptake.

They examined peer-reviewed articles involving adults, written in English, and accessible with a university library subscription. A cutoff of 20 years was used to limit the search, 68 articles met inclusion criteria.

They divided the barriers into different areas. Race, ethnicity, and reimbursement were seen as policy and structural barriers. Public awareness and education were identified as societal barriers. Referral and geographical challenges as organizational barriers. Living context and professional support are interpersonal barriers.

At the individual level they concluded that "sound quality, uncertainty of outcome, surgery, loss of residual hearing, and irreversibility are all barriers to CI uptake." By organizing barriers into a framework, they argue that it is easier to develop targeted interventions which can be used to overcome these barriers.

## **Implications for Advocates.**

Understanding these barriers is critical to improving access and use of CIs, and identifying the different factors driving this and what the continuing barriers to uptake are is crucial for advocates in shaping strategies. It may not be possible to tackle all the different factors influencing uptake in one particular location or health system but by being clear about which barriers locally are most significant advocates can use this analysis to help refine their approach.

**Tang D, Tran Y, Lo C, Lee JN, Turner J, McAlpine D, McMahon C, Gopinath B. The Benefits of Cochlear Implantation for Adults: A Systematic Umbrella Review. Ear Hear. 2024 Jul-Aug 01;45(4):801-807. doi: 10.1097/AUD.0000000000001473. Epub 2024 Jan 18. PMID: 38233980.**

The authors note that the uptake of cochlear implants among adults who could benefit (based on pure-tone audiometry) in developed countries is estimated to be less than 10%. Reasons for non-take up included concerns about potential surgical complications, fear of losing residual hearing, and limited awareness about the benefits of this intervention contribute to the low adoption rate. They therefore argue that it is essential to have a clear understanding of their benefits if the uptake is going to change and so that patients have better information.

They conducted a review of other systematic reviews, meta-analyses and scoping reviews to identify key benefits. The authors concluded that “Cochlear implants are associated with improvements in speech perception and recognition as well as improved quality of life and cognition. These benefits are observed in a significant proportion of adults undergoing the procedure, highlighting its effectiveness as a viable intervention for individuals with severe to profound hearing loss.”

On the basis of this they recommended that; “The potential benefits of cochlear implantation appear to outweigh the risks and complications associated with the procedure. It is recommended that adults with severe to profound hearing loss in particular, engage in informed discussions with healthcare professionals to consider cochlear implantation as a viable treatment option.”

Amongst the benefits they note the potential improvements in cognition. “Although not as comprehensively studied as QoL, there are preliminary indications of maintained or improved cognition among CI users after 1 year (Claes et al. 2018; Kay-Rivest et al. 2022). This evidence is encouraging given the association between untreated hearing loss and the development of dementia (Livingston et al. 2020). However, more robust studies are needed to determine the impact on cognition of cochlear implantation”

### **Implications for Advocacy**

While the benefits of Cochlear Implants are well established this review of other reviews provides significant weight to the arguments around the benefits due the very large scale of studies included. It points to the importance of further education both with clinicians and patients about ensuring that the benefits of CI are well known and proven in helping them make decisions about their hearing care. Advocates need to ensure that this information is being widely disseminated to clinicians serving people with hearing loss and to potential users of CI.

### **Impact of deafness on Earnings**

**Jørgensen, Astrid Ytrehus; Engdahl, Bo; Bratsberg, Bernt; Mehlum, Ingrid Sivesind; Hoffman, Howard J.; Aarhus, Lisa. Hearing Loss and Annual Earnings Over a 20-Year Period: The HUNT Cohort Study. Ear & Hearing ( ):10.1097/AUD.0000000000001554, August 14, 2024. | DOI: 10.1097/AUD.0000000000001554**

**Access article here;** [https://journals.lww.com/ear-hearing/fulltext/9900/hearing\\_loss\\_and\\_annual\\_earnings\\_over\\_a\\_20\\_year.331.aspx](https://journals.lww.com/ear-hearing/fulltext/9900/hearing_loss_and_annual_earnings_over_a_20_year.331.aspx)

The authors note that the association between hearing loss and income has only been examined in cross-sectional studies. They aimed to establish the annual increase in earnings over 20 years, comparing people with and without hearing loss.

They data from a population-based hearing study in Norway. Hearing loss was defined as the pure-tone average threshold of 0.5 to 4 kHz in the better hearing ear  $\geq 20$  dB HL (n = 230). Annual earnings were assessed from 1997 to 2017.

They found that people without hearing loss at baseline (before age 40) had a greater annual increase in earnings over a 20-year follow-up period compared with people with hearing loss. For people with normal hearing, annual earnings over 20 years increased by 453 Euro or 13.2% more per year than for people with hearing loss, adjusted for age and sex. When including adjustment for

education in the model, in addition to age and sex, the difference in annual earnings over 20 years between persons with and without hearing loss was reduced (337 EUR).

They concluded that “people with hearing loss experience lower long-term earnings growth compared with people with normal hearing. The findings highlight the need for increased interventions in the workplace for people with hearing loss.”

**Implications for Advocacy.** This study shows that overtime people with hearing loss lose out in the workplace through lower earning overtime. This provides powerful evidence to ensure that people with hearing loss are properly supported within the work environment, that legislation in place to protect people with hearing loss from overt or structural discrimination and that reasonable adjustments are in place to ensure that they can thrive in the workplace.

### Hearing Loss and Dementia

**Adult-onset hearing loss and incident cognitive impairment and dementia – A systematic review and meta-analysis of cohort studies.** Ching Yu <sup>a</sup>, Danielle Proctor <sup>b</sup>, et al., *Ageing Research Reviews*. Vol 98, July 2024.

<https://www.sciencedirect.com/science/article/pii/S1568163724001648#bib37>

This study is the most comprehensive meta-analysis of the cohort study data to date. The authors summarized the cohort evidence to date on adult-onset hearing loss as risk factor for incident cognitive impairment and dementia, and examined the evidence for dose-response, risk for various dementia subtypes, and other moderators. Previous meta-analyses were less comprehensive. They “included cohort studies with participants without dementia and with hearing assessments at baseline, minimum 2 years follow-up and incident cognitive outcomes.”

The analysis reflects fifty different cohorts reporting on a total sample of 1,548,754 participants. They “found that hearing loss as a yes-no variable was consistently associated to increase risk for a range of clinically relevant cognitive outcomes, including dementia, MCI and Alzheimer’s disease, whilst the association with vascular dementia was not statistically significant.”

They summarised the findings as providing “support to the possibility of a causal relationship between adult-onset hearing loss and dementia.”

They also found “evidence of a dose-response relationship. Both mild hearing loss and moderate-severe hearing loss were associated with increasing dementia risk” with a “statistically significant association between every 10 dB decrease in hearing ability and increased dementia risks. Taken together, these findings are consistent with a dose response between degree of hearing loss and dementia risk.”

Their analysis also “supported an appropriate temporal sequence between hearing loss and dementia by excluding studies with participants who already had dementia at baseline, and excluding studies with less than two-year follow-up between hearing loss and subsequent dementia.

They note that this is consistent with other findings including “A meta-analysis on the effects of hearing aids and cochlear implants on the risk of future dementia found that hearing aid use was associated with 19% reduction in long-term incidence of cognitive decline relatively to uncorrected hearing (Yeo et al., 2023).” They also cite the recent Achieve study as providing further evidence of

the potential protective effect of hearing aid use but not that further RCTs are need to fully demonstrate this.

They concluded that “this meta-analysis of cohort studies provided compelling evidence across diverse study settings and designs of adult-onset hearing loss being a robust and consistent independent risk factor for dementia. Adult-onset hearing loss is also potentially treatable, most often with hearing aids. Our findings suggest that this treatment may also reduce dementia risk.”

### **Implications for Advocacy**

This comprehensive meta-analysis provides further evidence of the strong link between hearing loss and dementia and as the authors conclude that their analysis supports the possibility of a causal relationship and a dose effect between the severity of hearing loss and dementia. They do also not the need for RCTs on this area.

As noted in previous research briefs however there does need to be some caution both about what is claimed and also sensitivity about how public communications promote the link both to prevent stigma and potentially put people off taking action. The Lancet study is clear that hearing loss is a potentially modifiable risk and that the particular level of that risk at individual level has been modified downwards as this study notes. Nevertheless, at the policy level it is legitimate to stress that there is an association between hearing loss and dementia and that cohort studies consistently stress the potential benefits of mitigating cognitive decline by using hearing aids.