

EXECUTIVE SUMMARY

Minimal Outcome Measurements in Adults 65+

Key points¹

- A consensus on a set of minimal outcome measurements is essential to ensure successful clinical and scientific collaboration on cochlear implants and other implantable solutions at an international level.

Background¹

- Candidacy criteria, candidate selection, and postoperative rehabilitation vary across cochlear implant centres and across countries.
- The HEARRING network, a group of leading experts in the field of hearing implants 'are committed to leading the exploration of new avenues of research in hearing implant science, to advancing clinical procedures and to developing and perfecting surgical techniques' (<http://www.hearing.com>). The prime objective of the HEARRING network is to provide the best possible treatment to people with hearing loss. To achieve this, the HEARRING network has formulated this set of standards on minimal outcome measurements for cochlear implantation.

Collection of outcome measurements for Adults 65+

- A Pubmed search on outcome measurements applied in clinical trials including subjects with hearing implants was conducted.
- Experts in the field of hearing implants were asked to provide information on potential outcome measurements.
- Based on the database search and expert opinions, two adult and one children's questionnaire were generated. 32 researchers related to the HEARRING network gave their feedback on minimal outcome measurements.
- The outcomes of the questionnaires were discussed during HEARRING meetings in 2010 and 2011 to reach consensus.

Minimal outcome measurements proposed for Adults aged 65+

- Test intervals: preoperatively, 3/6/12 months after first fitting, from then on a yearly basis¹
- Specified test measurements for older adults in general – see Table 1¹
- Further test measurements for this specific age group may include the change in the total score on the Repeatable Battery for the Assessment of Neuropsychological Status for Hearing-Impaired Individuals (RBANS-H), self-reported changes in sound quality (Hearing Implant Sound Quality Index), self-perceived hearing disability (Speech, Spatial, and Qualities of Hearing Scale), states of anxiety and depression (Hospital Anxiety and Depression Scale), and level of negative affectivity and social inhibition (Type D questionnaire)² as well as scores on the Montreal Cognitive Assessment (MoCA) and on the Mini Mental Status Examination (MMSE) as suggested in a HEARRING survey on older adults in 2023

Conclusion¹

- This set of minimal outcome measurements helps standardize clinical practice and supports monitoring of cochlear implant candidates and users.
- The minimal outcome measurements can also be used as a guideline for data collection and the establishment of a registry.
- Further surveys are needed to specify the minimal outcome measurements for this specific age group.



Unaided tone audiometry

Insert ear phones are recommended for air conduction unaided tone audiometry, e.g. ER3A, ER5A in noise

Pure tones should be tested at 125, 250, 500, 1000, 2000, 4000, and 8000 Hz.

Bone conduction thresholds should be tested at 250, 500, 1000, 2000, and 4000 Hz.

Aided tone audiometry

Aided tone audiometry should be tested in free field at ear level. The sound source should be placed 1 meter from the listener.

Warble tones should be tested at 250, 500, 1000, 2000, 4000 and 8000 Hz

Speech audiometry in quiet

Preoperatively, speech audiometry in quiet should be performed unaided and in the best-aided condition.

Postoperatively, speech audiometry in quiet should be performed with an active hearing implant.

Speech audiometry in quiet should be performed in free-field, with the speaker at ear level, 1 meter from the listener, at 0° azimuth.

When performing speech audiometry in quiet, the minimally required speech testing material are monosyllables, using a fixed speech level.

For languages that do not use monosyllables, bisyllable words is the recommended speech material.

The ideal level of testing is 65 dB SPL.

Sentence testing should also be performed unaided preoperatively and aided postoperatively.

Speech audiometry in noise

Preoperatively, speech audiometry in noise should be performed unaided and in the best-aided condition.

Postoperatively, speech audiometry in noise should be performed with an active hearing implant.

Speech audiometry in noise should be performed in free-field, with the speaker at ear level, 1 meter from the listener, at 0° azimuth.

When performing speech audiometry in noise, the minimally required speech testing material are sentences, using an adaptive speech level.

Where adaptive material is not available in the test language, a fixed procedure should be used.

The adaptive procedure used for speech testing in noise should be with a fixed noise level and adaptive speech level.

Questionnaire

Hearing Implant Sound Quality Index (HISQUI) to determine sound quality

Table 1

Specified

Test Measurements¹



References

1. Kleine Punte, A. & Heyning, P. V. de. Quality standards for minimal outcome measurements in adults and children. Cochlear Implant. Int. 14, S39–S42 (2013).
2. Mertens, G. et al. Cognitive Improvement After Cochlear Implantation in Older Adults With Severe or Profound Hearing Impairment: A Prospective, Longitudinal, Controlled, Multicenter Study. Ear Hear. 42, 606–614 (2021).