ANZ Hearing Health Collaborative

ANZ Living Guidelines for Cochlear Implantation in Adults

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ANZ Living Guidelines for Cochlear Implantation (CI) in Adults

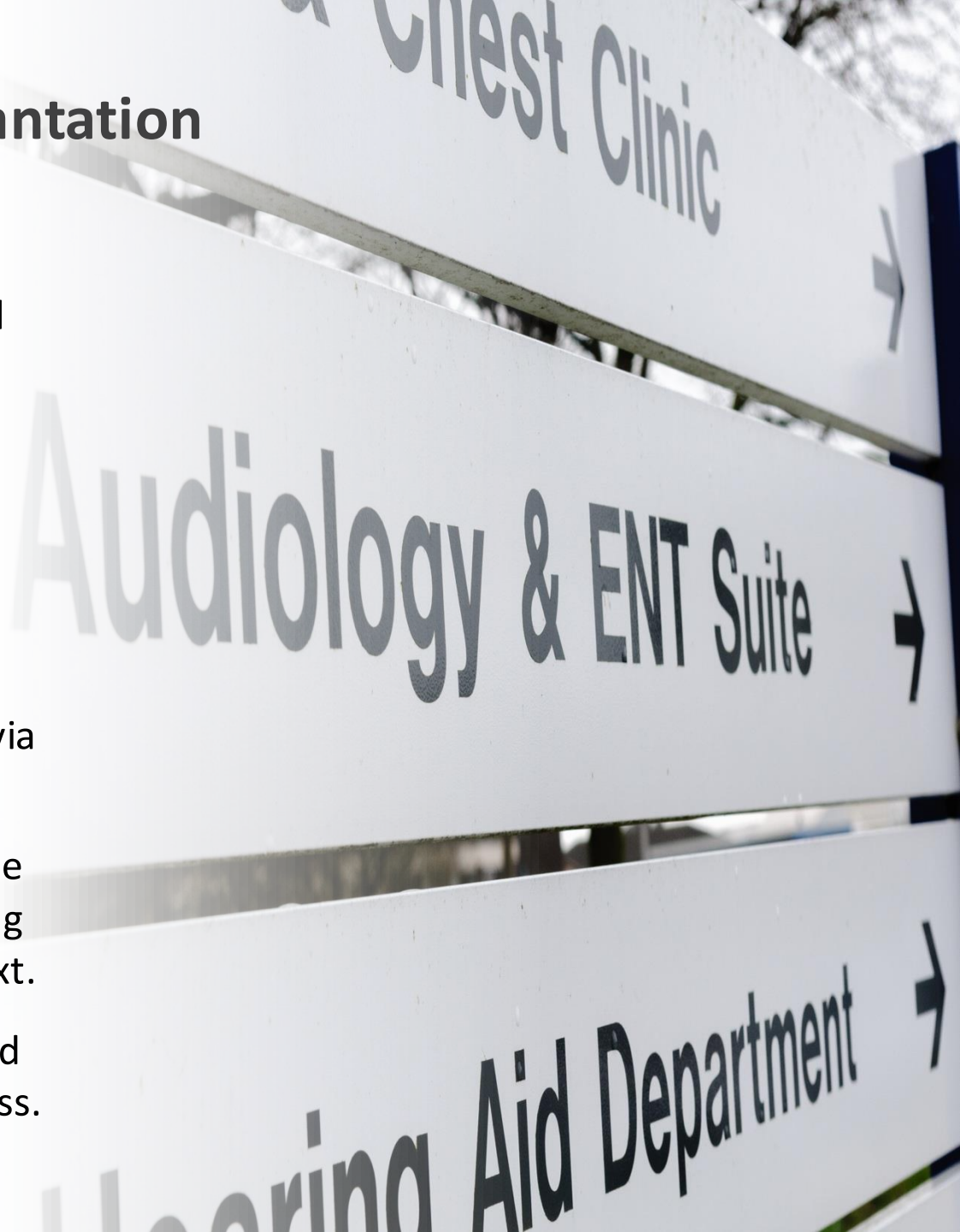
This document summarises the ANZ adaptation of the Global Living Guidelines as they relate to the areas of:

1. **CI referral**
2. **CI evaluation**
3. **CI candidacy recommendation**
4. **CI outcome evaluation**

The Global Living Guidelines were informed via systematic review of evidence, and, where evidence was not available, via the clinical expertise of the Task Force.

The ANZ HHC guidelines working group members adapted the Global Living Guidelines based on clinical expertise and strong agreement on the applicability of evidence to the ANZ context.

This is a subset of work which will subsequently be completed on broader guideline development for adults with hearing loss.



Contributing ANZ HHC **Working Group Members**

ANZ Hearing Health Collaborative

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Global Living Guidelines

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The global living guidelines version 3.0; **Standard of care for adults with hearing loss and the role of cochlear implantation** were launched in July 2024 and are available on MagicAPP linked HERE.

This latest version

- Considers the journey throughout the hearing health continuum.
- Considers the most recent evidence as of January 2024.
- Guided by a global Task Force of audiologists, ENT surgeons, hearing health specialists, and people living with hearing interventions and cochlear implants.

Living Guideline Journey Elements

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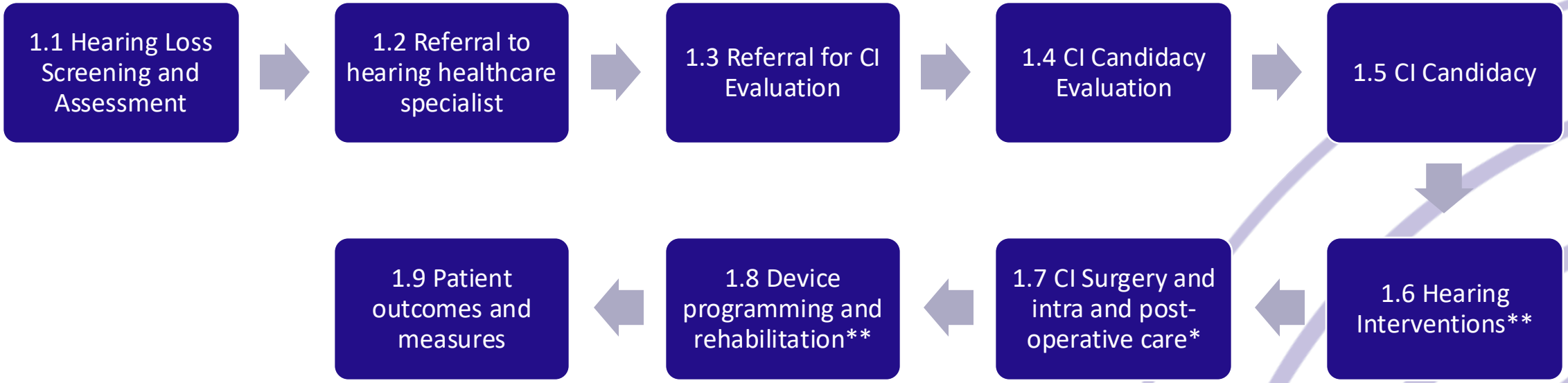
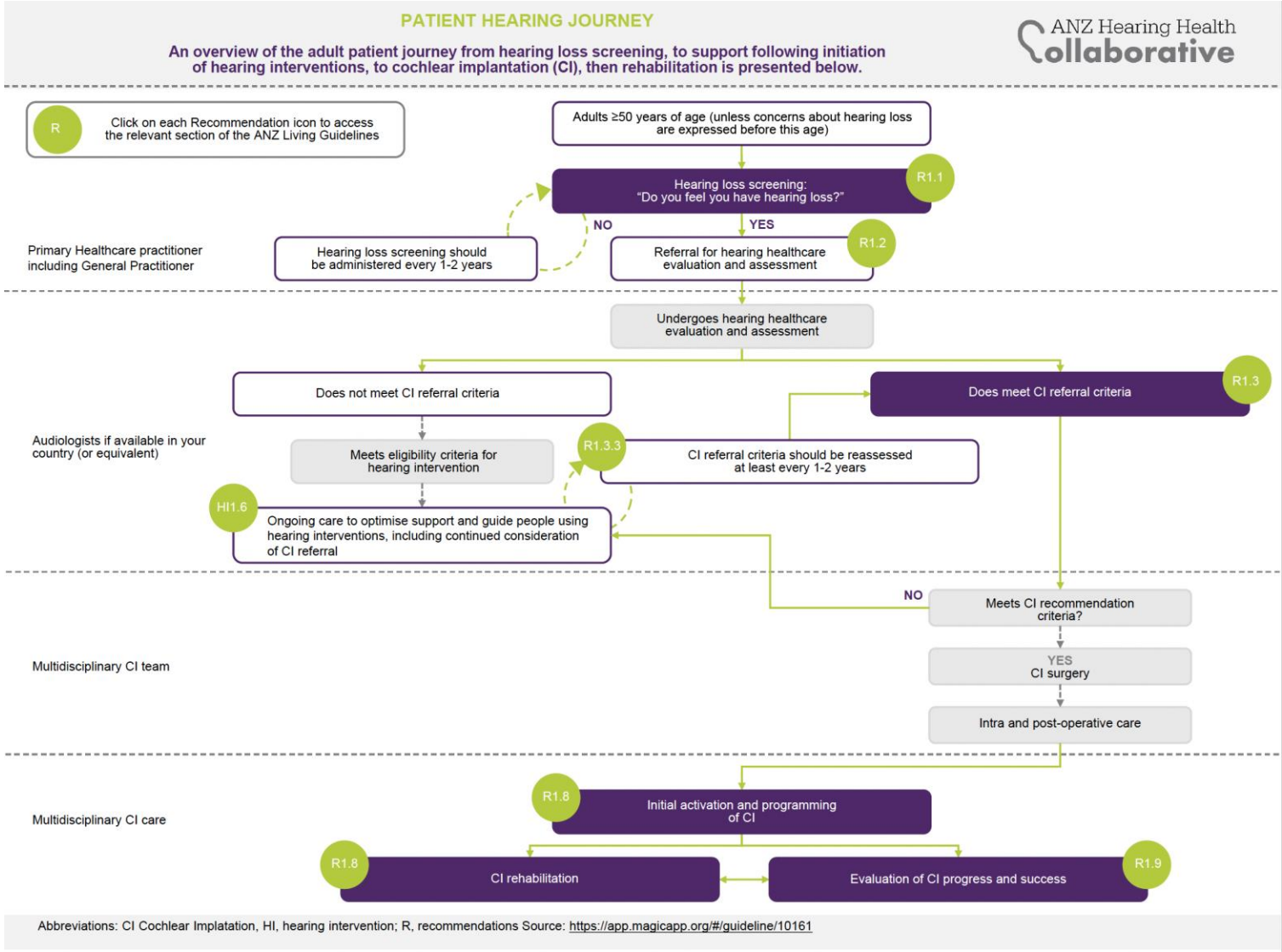
An overview of the elements considered within the ANZ Living Guidelines across a person's journey from hearing loss screening and assessment, to support following initiation of hearing interventions, to cochlear implantation and rehabilitation.



*existing guidelines
**global living guideline recommendations

Patient Hearing Journey

Presents an overview of the patient journey from hearing loss screening, to support following initiation of hearing interventions, to cochlear implantation, then rehabilitation.



ANZ CI Living Guideline recommendations summary

For full access to the ANZ Living Guidelines, including Good Practice Statements, click here to visit MagicAPP.

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Hearing loss screening and assessment

Hearing loss screening and assessment

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Hearing loss screening should be offered to adults from the age of 50 years (unless concerns about hearing loss are expressed before this age) using the single question:

- “Do you feel you have hearing loss?”
- If a person answers “yes”, the next steps should be informed as per the loss referral recommendations of these Living Guidelines.
- Hearing Hearing loss screening should be administered at the frequency of 1–2 years.

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Referral to hearing healthcare specialist

Consensus Recommendation

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For an adult who presents for the first time with any level of hearing loss, or in whom hearing difficulties are suspected, the primary healthcare professional should:

- Check for impacting factors such as impacted wax and acute infections (e.g. otitis externa, otitis media and otitis media with effusion), and
- Arrange a referral to a hearing healthcare specialist for a full audiological assessment, and
- If sudden or rapid onset hearing loss is suspected or hearing loss is not explained by acute external or middle ear causes, additional immediate referral to an ENT specialist or an emergency department is warranted.

Good Practice Statement

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- If an adult is diagnosed with impacted wax or acute infections, please follow your local guidelines for the management of these.
- If a full audiological assessment is required, refer to an audiologist if available in your country (or equivalent) and/or to an ENT specialist.

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Referral for CI evaluation

Referral guidelines for CI evaluation

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Guideline for adults and their significant others

If you or someone you know has permanent hearing loss and experiences any of the following challenges, you should consider a referral to a hearing healthcare professional for a thorough evaluation and preoperative assessment.

- Not getting enough benefit from hearing aids.
- Missing half or more of what is being said in conversation
- Having difficulty hearing on the mobile or landline phone.
- Relying on looking at people to understand what they are saying.
- Motivated to learn more about the next possible steps with support and guidance.

Ongoing monitoring and re-evaluation

Guideline for adults and their significant others

If you have discussed a referral for a cochlear implant evaluation with a GP, Audiologist, Audiometrist or Speech Language Pathologist/Therapist and were not recommended to proceed, you should consider this again if you experience deterioration in your hearing or communication.

Referral guidelines for CI evaluation

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Guideline for Healthcare Professionals

Any adult can be referred for cochlear implant evaluation if they are experiencing moderately severe or worse hearing loss in either ear, and:

- The individual (and/or a significant other) expresses difficulties understanding speech in their everyday environment despite using hearing aids. This may include:
  - Not getting enough benefit from hearing aids
  - Missing half or more of what is being said in conversation
  - Having difficulty hearing on the mobile or landline phone
  - Relying on looking at people to understand what they are saying
- The individual (and/or a significant other) is motivated to learn more about the next possible steps with support and guidance

Adults meeting the above criteria can benefit from referral to a cochlear implant specialist for a comprehensive, multidisciplinary cochlear implant evaluation and preoperative assessment.

Ongoing monitoring and re-evaluation

Guideline for Healthcare Professionals

Many adults will require multiple discussions with a hearing health professional before considering referral for CI evaluation. Healthcare professionals are encouraged to explore the reasons an individual is hesitant to consider referral and provide further information and support

If an individual has been evaluated for a CI and was not recommended to proceed, re-referral and assessment should be considered if they experience deterioration in hearing or communication.

Referral guidelines for CI evaluation

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Guideline for Healthcare Professionals

Any adult with sensorineural or mixed hearing loss[1] should be offered referral for cochlear implant evaluation if they meet the following criteria:

- The individual (and/or significant other) expresses difficulties and/or dissatisfaction understanding speech in everyday communication despite optimised hearing aids. [2]

- Three-frequency (500, 1000, 2000 Hz) unaided pure tone average (PTA) in any ear equal to or greater than 60 dB HL (decibels hearing level) AND, aided monosyllabic [3] phoneme score of less than 60% OR unaided phoneme score (on AB words) of 70% or less in any ear.

Adults meeting the above criteria should be offered referral to a cochlear implant specialist for a comprehensive, multidisciplinary cochlear implant evaluation and preoperative assessment.

1. Mixed hearing loss warrants further otological evaluation to exclude middle ear pathology
2. Monosyllabic words at maximum presentation level
3. Hearing aids are considered optimised when the fitting has been appropriately verified and adjusted to meet the individual wearer's needs and manufacturers' specifications.

Ongoing monitoring and re-evaluation

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Guideline for Hearing Healthcare Professionals

Many adults will require multiple discussions with a hearing health professional before considering referral for CI evaluation. Hearing Healthcare professionals are encouraged to explore the reasons an individual is hesitant to consider referral and provide further information and support.

If an individual has been evaluated for a CI and was not recommended to proceed, re-referral and assessment should be considered every 1-2 years or sooner. This is recommended as there may have been a deterioration in the individuals hearing ability or functional performance.

Refer the individual to recognised communities or organisations that support people with hearing loss for personal, family, and social support as needed.

Re-referral may also be indicated due to evolving CI referral criteria and/or expansion of population who may benefit from a CI.

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CI Candidacy Evaluation

CI Candidacy Evaluation

Guideline for Healthcare Professionals

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Audiological evaluation will include:

1. A detailed audiological case history focusing on the individual's current description and experience of communication, hearing goals, expectations, social participation and connection, social support systems, onset, progression and duration of hearing loss and history of hearing aid use.
2. Evaluation of motivation and readiness to take action to improve communication.
3. Assessment of hearing and communication.
    - Patient-reported hearing related quality of life.
        - Measure(s) to quantify socio-emotional impact of hearing loss.
    - Type and degree of hearing loss.
    - Individual ear air and bone conduction audiometry at octave frequencies (including masking as required)
    - Tympanometry, and acoustic reflexes (when indicated).
    - Aided speech perception.
    - Conducted with optimised hearing aids.
    - Assessed audition alone in quiet and (if client is capable) background noise.
    - Assessed in monaural and binaural conditions.

4. Vestibular function
    - Patient should undergo vestibular assessment if there is an active or prior history of balance disorders, in the elderly, or if otherwise deemed appropriate by their treating specialists.

CI Candidacy Evaluation

Guideline for Healthcare Professionals in **Australia**

ANZ Hearing Health Collaborative

Medical/ENT evaluation will include

1. Assessment of anatomy and health of ears.
    - Imaging
        - MRI scan which includes imaging of the cochleae, auditory nerves and internal acoustic canals.
        - If MRI is unavailable or contraindicated, then CT brain with contrast is an alternative.
        - CT petrous temporal bone may be considered for surgical planning or where there is concern about the health of the middle ear or mastoid.

    - Otologic health
        - Examination of skin of the planned implantation site, external ear canals and middle ears by an ENT to exclude dermatitis, infection, cholesteatoma or other active middle ear disease.

CI Candidacy Evaluation

Guideline for Healthcare Professionals in **New Zealand**

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Medical/ENT evaluation will include

1. Assessment of anatomy and health of ears

    - Imaging
        - CT petrous temporal bone +/-brain with contrast
        - MRI scan, which includes imaging of the cochleae, auditory nerves and internal acoustic canals if clinically indicated

    - Otologic health
        - Examination of skin of the planned implantation site, external ear canals and middle ears by an ENT to exclude dermatitis, infection, cholesteatoma or other active middle ear disease

CI Candidacy Evaluation

Guideline for Healthcare Professionals **ANZ**

General health

- General medical, comorbidities and/or neurocognitive issues reviewed and considered
- Cognitive function considered, and refer for assessment when indicated
- Fitness for anaesthesia
- Vaccination status and recommendation in accordance with current national immunisation guidelines for cochlear implant recipients [5]

5 Immunisation for people with medical risk conditions | Australian Government Department of Health and Aged Care

CI Candidacy Evaluation

Guideline for Healthcare Professionals **ANZ**

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Additional considerations that may apply for CI candidacy evaluation:

- For adults with prelingual onset of hearing loss, spoken language development and speech intelligibility can assist in determining history of functional use of hearing during early childhood.
- History of hearing aid use.
- Application of closed set testing for individuals unable to complete open set testing.
- Application of audition alone (AA) vs auditory-visual (AV) testing for individuals with minimal open set speech perception.
- Measure of spatial hearing (e.g. SSQ spatial domain subtest and/or localization and/or spatially separated speech perception) for those with SSD/AHL.
- Trial of less invasive technology such as CROS aid and/or bone conduction device (on headband) for those with SSD/AHL.
- Presence and severity of tinnitus and individual's desire for tinnitus suppression as motivator for considering CI.
- Presence of features consistent with Auditory Neuropathy.
- Application of cognitive screen or testing suitable for those with hearing loss (such as the MOCA-HI or MMSE) to determine if further investigation is warranted.
- When present, investigate causes of mixed hearing loss to determine alternative approach to remediation.
- Medical management of active middle ear infection (implantation may be possible after medical treatment).
- Presences of co-existing disabilities such as blindness may increase the urgency of hearing rehabilitation.
- [4] In the instance that any ear is unaidable due to intolerance and/or degree of hearing loss, an attempt should be made to assess unaided speech perception for that ear e.g. monosyllabic words unaided at maximum presentation level under head phones.

5 Immunisation for people with medical risk conditions | Australian Government Department of Health and Aged Care

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CI Candidacy

CI Candidacy

Guideline for Hearing Healthcare Professionals in **Australia**

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CI evaluation results should be considered by a multidisciplinary team

Audiological candidacy:

- For those with post-lingual onset of hearing loss, it is widely accepted, and evidence suggests that cochlear implantation can be confidently recommended when:
  - The ear being considered for implantation presents with a moderate-to-severe or greater three-frequency average sensorineural hearing loss, and
  - Aided monosyllabic phoneme score (e.g. CNC) ≤63% and/or word score ≤34% in the ear being considered for implantation (presented in the free field at 65dBSPL) [6,7]
- For those with pre-lingual onset of hearing loss, it is widely accepted that cochlear implantation can be confidently recommended if:
  - The ear being considered for implantation presents with a moderate-to-severe or greater three-frequency average sensorineural hearing loss, and
  - History of evidence that auditory cues assist communication.

6. These thresholds may change over time with improving technology

7. Speech perception guideline is set at a level where 75% of adult cochlear implant recipients achieve better speech perception scores than the candidate, in the ear being considered for implantation, 12 months after implantation (see Leigh, J. R., Moran, M., Hollow, R., & Dowell, R. C. (2016). Evidence-based guidelines for recommending cochlear implantation for post lingually deafened adults. *International Journal of Audiology*, *55*(sup2), S3-S8. and Birman, C. S., & Sanli, H. (2020). Cochlear implant outcomes in patients with severe compared with profound hearing loss.*Otology & Neurotology*, *41*(4), e458-e463.)

CI Candidacy

Guideline for Hearing Healthcare Professionals in **New Zealand**

Audiological candidacy

- Hearing House
  https://www.hearinghouse.co.nz/referrals
- Southern Cochlear Implant Program
  https://scip.co.nz/what-we-do/refer-patient/

Medical Candidacy

Guideline for Hearing Healthcare Professionals in **ANZ**

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- Evidence that the cochlea and auditory nerve, in the ear to be implanted, is accessible by an implant and the electrode array and package can be placed safely and securely.
- There are no surgical contraindications.
- Evidence that the individual is likely to engage with rehabilitation and device programming and is expected to benefit from and make meaningful use of sound provided by the cochlear implant.
- Multidisciplinary team recommendation presented to the individual in the context of potential benefits and risks of the proceeding with cochlear implant surgery.

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Hearing Interventions

**global guideline recommendations

Hearing Interventions

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For people using hearing interventions, the recommended care to optimise support and guide their journey throughout the hearing health continuum is served by existing local guidelines and guidance.

It is recommended audiologists if available in your country (or equivalent) refer to their local guidelines and guidance. In addition, the following Good Practice Statements should be considered to supplement local guidelines and guidance.

The Hearing Intervention Working Group relayed the following existing guidelines and guidance:

World Health Organization

Hearing aid service delivery approaches for low- and middle-income settings – World Health Organization (WHO) 2023

Australia

Professional Practice Guide – Audiology Australia 2022

United Kingdom

Hearing loss in adults: assessment and management – National Institute for Health and Care Excellence (NICE) 2023

Guidelines for best practice in the audiological management of adults with severe and profound hearing loss - Turton et al. 2020

What works: hearing loss and healthy ageing - NHS England 2017

Practice guidance: common principles of rehabilitation for adults in audiology services - British Society of Audiology (BSA) 2016

Welsh Government Quality standards for adult hearing rehabilitation services - NHS Wales 2016

United States

Clinical Practice Guideline: Age-related Hearing Loss – Tsai Do et al 2024

American speech-language-hearing association clinical practice guideline on aural rehabilitation for adults with hearing loss - Hamlin et al. 2023

Objective and subjective performance

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For people using hearing interventions, assessment of objective and subjective performance should be regularly conducted using validated tools* in the dominant language of the person being assessed.

Each assessment should be considered from the subjective perspective of the person using a hearing intervention alongside the objective verification and validation by an audiologist if available in your country (or equivalent). The perspective of family members and carers may also be considered.

At a minimum, this includes the assessment of:

- Communication ability, including listening and hearing, ease and satisfaction in various listening circumstances
- Benefit and satisfaction of hearing interventions in various listening circumstances.
- Ability to maintain personal and professional relationships in various listening circumstances
- satisfaction with listening and hearing of environmental sounds in various listening circumstances

At a minimum, objective and subjective performance, including cochlear implant referral eligibility, should be assessed: Before a person receives a hearing intervention to establish a person's baseline.

- Again upon provision of the hearing intervention
- 1-3 months after a person receives a hearing intervention and annually thereafter.

Objective and subjective performance should be reassessed if a person using hearing interventions expresses dissatisfaction or the expected therapeutic benefit of the hearing intervention is not observed. In this instance, medical or other audiological treatment alternative(s) could be considered. *Validated tools may include real ear measures (REMs) and aided and non-aided speech tests (words in quiet and sentences in noise).

Goal setting and achievement

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The individual needs of each person using hearing interventions should be prioritised and appropriate support and guidance should be provided according.

Audiologists, should aim to facilitate personalised patient goal setting and achievement. At a minimum, this includes:

- Time devoted to understanding a person's motivations and perceived self-efficacy of hearing health that is regularly re-evaluated.
- Lifelong and ongoing education, support and guidance on the importance of devoting time and effort to communication training.
- If available, lifelong and ongoing assistance with establishing contact with suitable providers of communication training opportunities, including peer support services (individual and/or group).

The perspective of family members and carers may also be considered when facilitating goal setting and achievement.

If a person using hearing interventions expresses dissatisfaction or the expected therapeutic benefit of the hearing intervention is not observed, medical or other audiological treatment alternative(s) should be considered.

Quality of life

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Hearing-related quality of life in people using hearing interventions should be regularly assessed by audiologists if available in your country (or equivalent).

The assessment measure should be validated and administered in the dominant language of the person using hearing interventions.

At a minimum, hearing-related quality of life should be assessed before a person receives a hearing intervention to establish a person's baseline and 1-3 months after a person receives a hearing intervention. Hearing-related quality of life should be reassessed annually after that to measure personal progress.

Audiologists if available in your country (or equivalent) should prioritise using the data gathered to inform hearing intervention counselling and rehabilitation efforts, including monitoring outcomes and eligibility for CI referral criteria.

The perspective of family members and carers may also be considered when considering hearing-related quality of life.

Role of rehabilitation

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People using hearing interventions, should have ongoing access to hearing health rehabilitation. Participation in hearing health rehabilitation should be lifelong. A multidisciplinary, person-centric approach is encouraged.

At a minimum, hearing health rehabilitation should include:

- Personal adjustment counselling, which may include support during the acclimatisation period and establishing hearing and listening expectations.
- Informational counselling, which may include in-depth instruction in handling such as care, maintenance, fault/error detection and troubleshooting.
- Hearing/auditory rehabilitation, which may include providing supportive strategies and tactics to aid listening and hearing in various listening circumstances.
- Social support, which may include establishing contact with peer support services (individual and/or group).

Family members and carers may also be engaged to support rehabilitation in people who are using hearing interventions.

Role of technology

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People using hearing interventions should be informed of the ongoing role of technology throughout the hearing health continuum.

At a minimum, audiologists should discuss the following at the earliest opportunity:

- Hearing aids
- Implantable devices, such as acoustic, bone-conduction, middle ear, and cochlear implants (CIs)
- Other assisted listening devices, including new developments in assisted listening device technology
- Assistive communication technology, including text-to-speech applications, Bluetooth connectivity, alerting systems, and other innovations supporting communication, listening and hearing

Counselling regarding the limitations of technology should also be provided to ensure hearing and listening expectations are established.

Family members and carers may also be informed when discussing the role of technology throughout the hearing health continuum.

Cognitive functioning

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Cognitive functioning of people using hearing interventions should be considered throughout the hearing health continuum. This includes populations living with cognitive decline and populations at increased risk of cognitive decline, such as people with advancing age.

If the audiologist is concerned about the cognitive functioning of the person using the hearing intervention and is adequately trained, screening for cognitive functioning should be conducted. Screening should be done using a validated tool and administered in the dominant language of the person using the hearing intervention. If indicated, the person should be referred to an appropriate specialist.

If the audiologist if available in your country (or equivalent) is concerned about the cognitive functioning of the person using the hearing intervention and is not adequately trained to screen for cognitive functioning, the person should be referred to an appropriate specialist.

The perspective of family members and carers may also be considered when regarding the cognitive functioning of the person using the hearing intervention.

In people living with cognitive decline, the provision of hearing health care should be adapted accordingly and in consultation with an appropriate specialist.

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CI surgery and intra and post-operative care*

*existing guidelines

CI surgery and intra and post-operative care

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This area is well served by existing guidelines. The CI Task Force reviewed the following existing guidelines (all linked).

CI evaluation

Minimum Speech Test Battery for Adult Cochlear Implantation (MSTB-3)

AWMF Guideline S017/71 - S2k Guideline Cochlear Implantation German Society of Oto-Rhino-Laryngology, Head and Neck Surgery, 2020

American Academy of Audiology Clinical Practice guidelines: Cochlear implants

Turton et al. 2020 Guidelines for Best Practice in the Audiological Management of Adults with Severe and Profound Hearing Loss

French Society of ENT Guidelines 2019. Indicatios for cochlear implantation in adults, European Annals of Otorhinolaryngology. Head and Neck Diseases.

CI surgery and intra and post-operative care

German Weißbuch (white paper) guidelines (German version)

German Weißbuch (white paper) guidelines (English version)

AWMF Guideline S017/71 - S2k Guideline Cochlear Implantation German Society of Oto-Rhino-Laryngology, Head and Neck Surgery, 2020

American Academy of Audiology Clinical Practice guidelines: Cochlear implants

Device programming and rehabilitation

Following cochlear implant activation after surgery, the recipient should receive implant programming and rehabilitation sessions to optimise performance.

Cochlear implant programming is necessary for users to hear sounds through the device. Programming focuses on device optimisation, while rehabilitation is an active learning process that helps users make sense of the sounds they perceive. The definition of rehabilitation for cochlear implant users was developed in collaboration with CIICA and based on the WHO's definition. It refers to a set of interventions designed to optimise hearing in cochlear implant users to ensure that the person reaches the best quality of life at a physical, functional, social, emotional and economic level. The process of learning to hear with a cochlear implant is ongoing throughout the user's lifetime and should include assistive devices, accessibility and technical assistance. However, a survey by CIICA found that users may receive a range of rehabilitation or therapy services (from 0 to 12 sessions) in the first year but no longer receive rehabilitation after that time [148]. Good mapping, which changes with progression, was also identified as a crucial component of rehabilitation

Together, programming and rehabilitation help users achieve the best possible hearing outcomes and improve their quality of life

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Patient Measures and Outcomes

Patient Measures and Outcomes

Guideline for Hearing Healthcare Professionals **in ANZ**

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CI outcome evaluation should assess the following, with suggested outcome measures:

1. Patient-reported outcome measures (PROMs).
    - One of the following measures of hearing-related quality of life, including domains of participation, wellbeing, and stigma, and speech perception.
        - CIQoL-35 Profile (35 items, domains communication, emotional, entertainment, environment, listening effort and social); the CIQoL-10 Global measure (10 items; no specific domains).
        - LivCI (22 items, domains: participation, psychosocial and wellbeing, stigma, device aesthetics and management).
        - SSQ-12 (12 items, domains: speech, spatial and qualities of hearing).
        - Other evidence-based measures not listed here or in development that evaluate quality of life changes may be used at some clinics.

Patient Measures and Outcomes

Guideline for Hearing Healthcare Professionals **in ANZ**

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2. Objective measures.
    - Review device hardware function and electrode impedance.

3. Behavioural outcome measures.
    - Sound detection/audibility (confirmation of minimal levels of sound detection across key audiometric frequencies that enable access to soft speech whilst maintaining comfort for loud sounds).
    - Speech Perception [assessed audition alone in quiet and (if suitable for client) background noise using appropriate tests (as per CI candidacy evaluation).

Patient Measures and Outcomes

Guideline for Hearing Healthcare Professionals **in ANZ**

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Additional considerations for CI outcome evaluation:

- PROMs and speech perception tests should be administered before cochlear implantation to establish an individual's baseline and then again at least once 3–12 months after the cochlear implant is activated to measure personal progress.
- Speech perception assessment in CI alone and binaural conditions for bimodal and bilateral device users
  - demonstrates overall functional hearing performance.
  - allows contribution of the hearing aid ear to be monitored in the case of bimodal device users.
- Use of validated speech perception measures
  - in the dominant language of the adult cochlear implant user if possible
  - consisting of words and/or sentences in quiet and noise
  - Should avoid ceiling (meaning the test is too easy for the population being assessed) and floor (meaning the test is too hard for the population being assessed) effects (e.g. adaptive testing).
- Tools used should be validated in the cochlear implant user's dominant language if possible.

Full Guidelines including evidence and references available via MagicAPP

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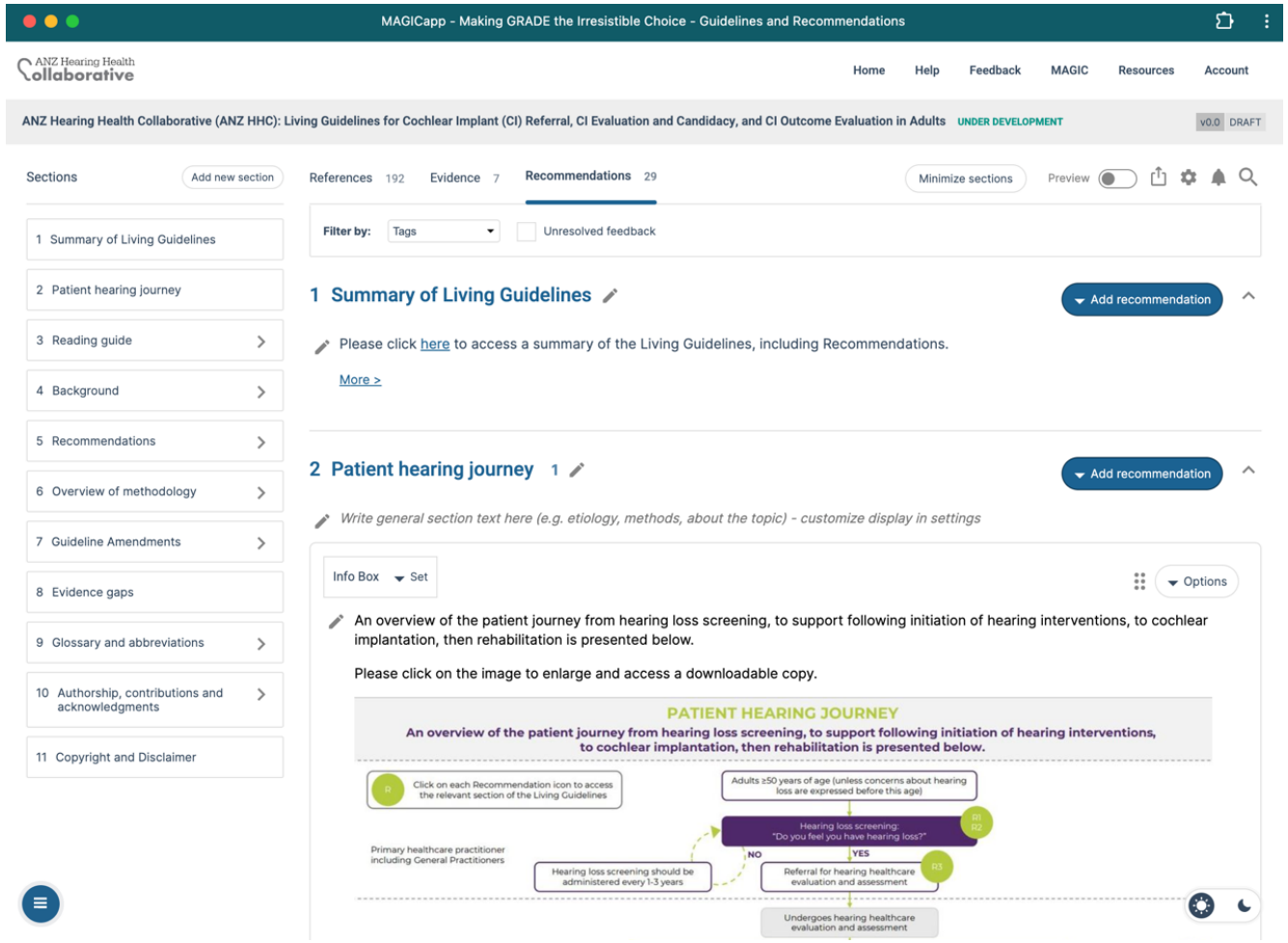

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