British Academy of Audiology and British Society of Audiology Joint Document

Paediatric Audiology Minimum Discharge Criteria

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Contents

1 Introduction

Defining clear audiological criteria for safe discharge of children and young people from has been identified as an essential requirement for audiology services.

The UKAS Improving Quality in Physiological Services (IQIPS), the British Academy of Audiology and Home Nation's Paediatric Quality Standards have statements within their standards making reference to defining discharge criteria from the audiology service.

From the BAA Paediatric Quality Standards:

"1a.16. Discharge from the service follows strict criteria which are documented in policies and through national or local guidance."

Ideally, audiological certainty of hearing thresholds within normal limits for *both* ears separately should be achieved for safe discharge of a child from audiology services. However, it is acknowledged that this is not always possible or necessary depending on the particular reasons for the assessment.

Thus, this document recommends the **minimum acceptable hearing assessments and criteria for discharge** for children aged 6 months and over for use for paediatric audiology diagnostic hearing assessments for patients seen in both hospital and community settings. However, each Trust or Health Board are ultimately responsible for the outcomes of each of their patients in their care.

This document has been created as a consensus document between the BAA and the British Society of Audiology (BSA) with the aim to support good practice and patient's safe discharge for all Paediatric Audiology services.

It is essential to keep detailed records of the assessment, including tests performed, results, discussions with parents/carers, care options provided, and reason for review or discharge. As a minimum, these records should be shared with parents/ carers and the referrer.

2 Process for defining Minimum Discharge Criteria

This document describes the process and criteria to allow safe discharge of a child or young person. Pass criteria are described for different tests and a battery approach is recommended. Where available these criteria have been set using information from national procedures from the British Society of Audiology (BSA). A full list of BSA documents used can be found in the references.

There are exceptions where there is alternative guidance for children with specific conditions where discharge may be recommended even where the children does not have normal hearing e.g. Unilateral glue ear as per NICE guidance are outside of scope.

To ensure safe and effective discharge of a child following their hearing assessment, all assessments must be developmentally appropriate. Hearing assessments should be carried out according to BSA procedures or, in their absence, following the local Trust / Health Board approved audiological assessment procedure. Any deviations from this local/BSA procedures must always be documented in the clinical notes with appropriate justification. Providers that routinely deviate from these criteria are encouraged to document and justify their reasons for doing so in their local procedures or policies. As stated above, providers are responsible for the outcomes of children and young people in their care, which may include litigation through medical negligence.

3 Test Battery Approach

A test battery approach provides detailed information, prevents conclusions from a single diagnostic test, allows the identification of multiple pathologies, and provides a comprehensive foundation for observing a child's auditory behaviours (Madell et al.,2019, pp 65).

Audiologists should always attempt to examine the ear visually with otoscopy and obtain reliable behavioural thresholds. Where possible and indicated, tympanometry should be performed according to guidance (BSA 2024) to provide information about middle ear function.

Ideally tests should then be selected from the test battery available to allow cross-checking or triangulation of behavioural and electrophysiological tests. Triangulation combines testing methods to increase the credibility and validity of the clinical findings. It is also possible to meet the minimum discharge criteria from a multitude of different tests.

Where time and capacity permits, testing beyond the minimum is encouraged, for example, performing OAEs and speech testing. In most cases it should be possible to perform more behavioural testing than the minimum requirements described below.

Audiologists should carefully consider contradictory findings, for example, normal air conduction (AC) thresholds with normal tympanometry and absent OAEs and whether to run more tests or review patients more urgently than routine practice would suggest – See appendix 2.

At all stages of the patient pathway the clinicians must make decisions in line with their professional registration, keeping the best interest and care of the patient as the focus, along with providing informed parental/carer choice to facilitate discussion and shared decision making.

4 Where minimal testing is not possible

Where the minimal testing is not possible- for example if a child with complex needs cannot be tested using the available behavioural techniques- then this must be clearly explained to the parent/carer and the discussions clearly recorded.

It is acknowledged that in some exceptional instances it is not always possible to obtain all the required information. When deviating from these criteria the audiologist must give the parent/carer information of what hearing assessment information has been obtained and what information hasn't been, making joint informed patient management decisions with the child's parents/carers. (NDCS 2023).

5 Ongoing monitoring and Time scales for review

For some children, although their hearing assessment may meet the minimum discharge criteria, continued monitoring of hearing at regular intervals in their childhood may be recommended e.g. due to being at higher risk of developing hearing problems related to some medical conditions. Although full discussion of this is beyond the scope and purpose of this document a suggested list of conditions that should have regular audiological monitoring can be found in the Appendix 1.

Although it is beyond the intended scope and purpose of this document to define suggested timescale for planned reviews for managing patients who don't meet the minimum discharge criteria, Appendix 2 does suggest timescales to facilitate shared decision making when planning reviews.

Audiology services are encouraged to develop their own *local* guidelines for conditions requiring regular hearing monitoring and for timescales for planned reviews and onward management/referrals for patients who do not meet the discharge criteria, in discussion with other local professionals (BAA Paediatric quality standard 3a.2).

6. Minimum Acceptable Hearing Assessment Discharge Criteria

These levels recommended for safe discharge are those believed to allow children sufficient access to sounds to access spoken language, but do not mean that a child's hearing thresholds have been proven to be absolutely within normal limits at all frequencies.

6.1 Objective Hearing Assessments for children referred from pathways other than the newborn hearing screen (NHSP)

This does not include assessments referred from the NHSP pathway for diagnostic follow-up for the detail of this pathway please see specific NHSP pathway documents from the BSA Early Assessment Guidance (2022)

6.1.1 Auditory Brainstem Response (ABR)

- For children without any risk factors for hearing loss:
    - **ABR threshold of ≤30 dBeHL bilaterally at 4kHz air conduction**

- For children tested following ***bacterial*** meningitis :
    - **ABR threshold of ≤20 dBeHL at 1 kHz *and* 4 kHz air conduction**

Please note children with specific conditions such as congenital CMV will require more long term monitoring and should not be discharged.

6.1.2 Auditory Steady State Response (ASSR)

ASSR threshold of <= 30dBeHL bilaterally at 4kHz air conduction in the presence of a normal morphology ABR (BSA 2023)

6.1.3 Otoacoustic Emissions (OAE)

A "*Clear Response"* (CR) for a transient evoked OAE (TEOAE) is currently considered to be when the following is met:

- **≥6dB SNR for 2 bands**, from the half octave bands centred at 1.5 kHz, 2 kHz, 3 kHz, 4 kHz with a minimum response 0 dB rms SPL

However, OAEs should be considered within the battery of tests undertaken. Discharge on the basis of a TEOAE test alone should not occur.

A TEOAE may be used as part of a test battery for discharge using the above pass criteria to support behavioural hearing assessments for:

- Well babies referred from NHSP requiring targeted follow up, as long as no previous tests indicate the presence of possible Auditory Neuropathy Spectrum Disorder(ANSD) (e.g. OAE Clear Response, AABR Refer at screening) ***and*** there is no parental concern about hearing ***and*** behavioural responses to soundfield stimuli have been obtained meeting the minimal required levels as defined below.

- Children with ***no*** risk factors for hearing loss ***and where*** soundfield results have been obtained at minimal levels within the last 3 months, ***and*** there is no reason to suspect a change.

TEOAE results are also acceptable to be used for discharge when there are risk factors requiring ear specific information, but behavioural responses have only been obtained for soundfield stimuli if they meet the above criteria.

Note: For children who require ear specific hearing assessment following bacterial meningitis and/or meningococcal septicaemia, a diagnostic TEOAE test CR is ***not*** sufficient for discharge, but can be useful when determining follow up timelines. Further assessment for ABR or ear specific behavioural testing should always be performed.

DPOAEs

Although DPOAEs can be useful for monitoring changes in cochlea function e.g. ototoxicity monitoring it is not recommended to be used solely for discharge decision making.

7. Behavioural Hearing Assessments

7.1 Ear Specific Testing

Ideally, ear specific behavioural thresholds meeting the below criteria should be obtained prior to discharge. Soundfield behavioural responses which meets criteria with Clear Response OAE's in both ears are defined as ear specific.

It is, however, accepted that this is not always possible to achieve and sound field assessment may be satisfactory depending on the diagnostic clinical need / development of the patient, provided the limitations to this are clearly explained and documented with the family.

However, ear specific information must be obtained prior to discharge when:

- Family history of childhood permanent hearing loss in siblings or parents
- Parental/professional concern regarding unilateral hearing loss e.g. poor ability to localise
- History of head trauma e.g. skull fracture
- History of vertigo
- Bacterial meningitis and/or meningococcal septicaemia (only via ABR or behavioural assessment, cannot discharge on TEOAE only)
- Children referred due to aminoglycoside levels exceeding therapeutic range
- Any child who did not undergo newborn hearing screening (e.g. the child was not brought to the appointment, declined,, declined or withdrew consent or moved into the country)

- Babies referred from the NHSP if there are risk factors as per Surveillance-and-audiological-referral-guidelines

7.1.1 Distraction Test

In accordance with the BSA practice guidance: Assessment Guidelines for the Distraction Test (DT) for Hearing (2018):

The distraction test does not measures absolute thresholds of hearing, and there are known pitfalls in using this method, and therefore the DT is ***not*** recommended for routine clinical use, or to be used solely for assessing hearing. **DT should not be used as a tool on which to discharge paediatric patients.**

However, it is acknowledged that for a subset of young children who respond differently to behavioural testing, it may be the sole way to demonstrate their ability to respond to some sound stimuli and can sometimes facilitate diagnosis within a battery of tests and can be useful to demonstrate behavioural responsiveness to parents./ carers.

7.1.2 Visual Reinforcement Audiometry (VRA)

Responses should be obtained as defined in current practice guidance (BSA, 2024) to specific calibrated stimuli. At the time of writing, there is insufficient evidence regarding the safe use of frequency filtered sounds for discharge. (BSA 2024)

7.1.2.1 Sound-field VRA

≤25 dBHL at least 3 frequencies which must include 4kHz from: 500 Hz, 1 kHz, 2 kHz & 4kHz

7.1.2.2 Insert VRA

Where Soundfield VRA has been performed at 500Hz:

≤20 dBHL bilaterally at a minimum of 2 frequencies (1 kHz & 4 kHz)

Where Soundfield VRA has not been performed at 500Hz:

≤20 dBHL bilaterally of at least 3 frequencies which must include 4kHz (500Hz, 1kHz, 2kHz & 4kHz)

7.1.3 Sound-field Performance

Ideally fixed speaker sound-field performance methods should be used where possible as the first choice performance test method. This is to mitigate against variables and risks of using hand-held warblers. However, there are circumstances where justified use of handheld devices e.g. equipment and/or number of testers available, and the child's

compliance with the test. If testing with a hand held warbler is the most appropriate option, a sound level meter must be available and used to measure stimulus levels.

- **Stimuli presented via Sound-field speakers:**
  - ≤25 dBHL in at least 3 frequencies must be obtained which must include 4kHz from: 500 Hz, 1 kHz, 2 kHz & 4 kHz

- **Stimuli presented via Handheld Warbler:**
  - ≤30 dB(a) in at least 3 frequencies must be obtained which must include 4kHz from: 500 Hz or 1 kHz, 2 kHz & 4 kHz

7.1.4 Play Audiometry and Pure Tone Audiometry

- Headphones or inserts:
  - ≤20 dBHL in at least 3 frequencies bilaterally must be obtained which must include 4kHz from: 500 Hz or 1 kHz, 2 kHz & 4 kHz

8. Tympanometry

Tympanometry is not an assessment of hearing, and no child shall be discharged on tympanometry alone. However, it should be performed where indicated to provide a full audiological profile, particularly where there are risks for persistent middle ear effusion and/or parental concern regarding fluctuating hearing.

It is however acceptable to discharge without tympanometry being completed, when the test is not indicated, the child cannot tolerate the procedure and/or consent is not obtained, but the hearing assessments meet the above specified criteria.

9 Moving to ABR testing if behavioural tests are inconclusive

- If two or more attempts at obtaining audiological uncertainty via behavioural testing have been unsuccessful, and reliable behavioural thresholds are unlikely to be obtained by other adapted test methods performed by expert audiologists, there should be a discussion with the parent/carer about carrying out ABR to obtain objective hearing assessment.

- In cases where there are significant risk factors, a need to obtain audiological certainty as quickly as possible (eg following bacterial meningitis), or there is significant parental or professional concern, this may be offered after one behavioural test attempt if it is believed unlikely behavioural testing will be successful.

- ABR should be considered under natural sleep if possible, (even on older children if discussion with the parents suggests this is possible) but if it is indicated that testing may need to be performed under sedation or general anaesthetic as per local pathways, this will need to be discussed with the parent/carer and the risks of these balanced with the risks of an unidentified hearing loss, so that an informed decision can be made.

- If parents/carers do not consent to ABR or ABR under sedation or GA, then another behavioural appointment should be offered and all reasonable efforts to obtain a hearing assessment must be made.

- If the parents/carers decline any further testing then the risks of not knowing a child's hearing status should be explained clearly, with appropriate information given, and a management plan agreed. **Care must be taken to acknowledge that it is access to *language* that is important from an early age and that this can include spoken language, sign language or a mixture of both.** Thus one of the main risks of not identifying deafness early is a delay in supporting a child to access a rich language environment.

- As previously, it is essential to document information given, discussion and joint decision making in the clinical records, and share decisions with other professionals involved in the child's care. An emphasis must be placed on informed choice and revisiting decisions regularly.

10. References

Improving Quality in Physiological Services (IQIPS)

https://www.ukas.com/accreditation/standards/iqips/

BAA Paediatric Quality Standards

https://www.baaudiology.org/professional-information/baa-paediatric-support/

Public Health England, 2019, Guidelines for Surveillance and audiological referral for infants and children following newborn hearing screen

https://www.gov.uk/government/publications/surveillance-and-audiological-referral-guidelines/guidelines-for-surveillance-and-audiological-referral-for-infants-and-children-following-newborn-hearing-screen

British Academy of Audiology Independent Review into the Paediatric Audiology Service at NHS Lothian

https://www.baaudiology.org/nhs-lothian-full-baa-statement-and-reports/

BSA Hearing Assessment documents:

- Practice Guidance: Guidelines for the Early Audiological Assessment and Management of Babies Referred from the Newborn Hearing Screening Programme, Date: December 2021, Due for review: December 2026

  https://www.thebsa.org.uk/wp-content/uploads/2022/01/OD104-98-BSA-Practice-Guidance-Early-Assessment-Management-1.pdf

- Recommended Procedure: Auditory Brainstem Response (ABR) Testing in Babies, Date: February 2019, Due for review: February 2024

  https://www.thebsa.org.uk/wp-content/uploads/2019/06/OD104-81-Recommended-Procedure-for-ABR-Testing-in-Babies.pdf

- Recommended Procedure: Auditory Brainstem Response (ABR) testing for Post-newborn and Adult, Date: September 2019 Due for review: September 2024

  https://www.thebsa.org.uk/wp-content/uploads/2020/03/OD104-84-FINAL-RP-ABR-post-newborn-and-Adult-Nov2019b.pdf

- Recommended Procedure: Clinical Application of Otoacoustic Emissions (OAEs) in Children and Adults, Date: September 2022, Review date: September 2027

  https://www.thebsa.org.uk/wp-content/uploads/2022/09/OD104-120-Recommended-Procedure-Clinical-Application-of-Otoacoustic-Emissions-OAEs.pdf

- Practice Guidance: Assessment Guidelines for the Distraction Test of Hearing, Date: August 2018, Due for review: August 2023

  https://www.thebsa.org.uk/wp-content/uploads/2018/12/OD104-86-Practice-Guidance-Distraction-Test-for-Hearing-Final-copy-August-2018.pdf

- Recommended Procedure: Visual Reinforcement Audiometry for infants, Date: January 2024, Date for review: January 2029

  https://www.thebsa.org.uk/wp-content/uploads/2014/06/OD104-37-Recommended-Procedure-Visual-Reinforcement-Audiometry-2014-1.pdf

- Practice Guidance: The Acoustics of Sound Field Audiometry in Clinical Audiological Applications, Date: March 2019, Due for review: March 2024

  https://www.thebsa.org.uk/wp-content/uploads/2022/02/OD104-79-BSA-Practice-Guidance-Acoustics-of-Sound-Field-Audiometry-March-2019_.pdf

- Recommended Procedure: Pure-tone air-conduction and bone-conduction threshold audiometry with and without masking, Date: August 2018, Due for review: 2023

  https://www.thebsa.org.uk/wp-content/uploads/2018/11/OD104-32-Recommended-Procedure-Pure-Tone-Audiometry-August-2018-FINAL.pdf

Appendix 1: Conditions requiring regular audiological monitoring

Services should have clear individual guidance on how often and until what age they follow up these conditions. This list is not exhaustive and comprises the most common conditions.

- Microtia and external ear canal atresia
- Confirmed congenital cytomegalovirus (cCMV)
- Syndromes associated with hearing loss (including Down's syndrome, Ushers Syndrome, Noonan Syndrome, Turners syndrome, Alport syndrome etc)
- Cranio-facial abnormalities, including cleft palate and submucous cleft palate
- Osteogenesis imperfecta
- Congenital rubella infection
- Congenital toxoplasmosis
- Neurofibromatosis type 1 and 2
- Fragile X/ Martin–Bell Syndrome
- Achondroplasia
- Exposure to ototoxic medication under instruction from the medical team e.g. oncology use of platinum-based chemotherapy, use of aminoglycosides e.g. gentamicin that have reached certain blood levels
- Any child that is suspected or known to have the A1555G mitochondrial mutation and has received aminoglycosides (irrespective of whether blood levels are within the therapeutic range) should be seen for audiological monitoring
- Family history of unknown or genetic progressive sensorineural hearing loss in childhood/early adulthood
- Other genetic abnormalities, immune or metabolic disorders where ongoing hearing monitoring is requested
- Confirmed permanent childhood hearing impairment not being actively managed with hearing aids

Appendix 2: Suggested patient management for patients not meeting minimum discharge criteria

- Review next available appointment and within 4 weeks:
  - Suspected PCHI
  - Unable to perform behavioural testing, but objective results obtained may indicate a hearing loss i.e. peaked tymps and no OAE.
  - Hearing assessment post bacterial meningitis and/or meningococcal septicaemia

- Review within 6 weeks:
  - Unable to perform behavioural testing but of a developmental stage where this should be possible, with either risk factors for hearing loss or parental/professional concerns

- 3-month review:
  - Suspected temporary conductive hearing loss (services are encouraged to review as per NICE guidance on glue ear)
  - Not developmentally ready for testing but no parental/professional hearing concerns e.g. Child which passed NHSP, tried behavioural a couple times/some developmental concerns, no risk factors for hearing loss, needs more time to mature (a decision on this should be made on a case-by-case basis and taking account of parental views and it may be appropriate at this stage to an ABR pathway)
  - Test incomplete but results to date suggests normal hearing

- 6-month review:
  - Passed test but needs audiological review as per Surveillance-and-audiological-referral-guidelines

- 12-month review:
  - Passed test with risk factors as per Surveillance-and-audiological-referral-guidelines and Appendix 1
  - Normal hearing but parental/professional concern/request (Possible Patient Initiated Follow Up (PIFU)

- Referral to ENT for those meeting locally agreed ENT referral criteria

- Referral for a hearing aid for those meeting local criteria for provision of a hearing aid

- Referral to an appropriate clinic for a newly identified child with a permanent hearing loss.