

1. Introduction and scope

These guidelines are provided for Audiologists and other trained professionals undertaking behavioural testing of children by a single tester. This is likely to apply to children with an approximate developmental age of 3+ years but may be applicable from age 2 years during Ear, Nose and Throat (ENT) clinics where 2 testers are not available. These guidelines will apply predominantly to children seen during a 3+ clinic and ENT clinic but are also applicable to 1T (T=tester) hearing aid clinic appointments although some adaptations may be applied when testing children with hearing aids (see Paediatric hearing aid guideline document (To be published)).

This guidance is to be used in conjunction with the British Academy of Audiology's (BAA) Quality standards in Paediatric Audiology (2022) document and the British Society of Audiology (BSA) recommended procedures and practice guidance (<https://www.thebsa.org.uk/resources/>) for Pure tone air-conduction and bone conduction threshold audiometry with and without masking (BSA, 2018), and Tympanometry (BSA, 2013).

It is presumed Audiologists using these guidelines are trained and competent in performing the tests described. Details of how to perform the tests are described in more detail in relevant BSA recommended procedures and therefore this guidance is to be used as a supplement to clarify local requirements and highlight local methodology.

Referrals to 3+ clinics will usually have been received from UHL ENT service, Leicester Partnership Trust Community Audiology service or from within UHL Hearing Services. Referrals will have been vetted by a Paediatric Audiologist and coded as appropriate for this clinic. Appointments for new referrals will be offered within 6 weeks of the date that the referral was coded. Referrals will be coded weekly and dated before being passed to the administration team for booking.

3+ clinics will be at Glenfield Hospital or occasionally at LRI.

ENT clinics are held at LRI and multiple outreach clinics

1T hearing aid clinics are held at LRI, Comet Way (Coalville), Hynca Lodge (Hinckley), Glenfield Hospital and 2 Steeples Medical centre (Wigston)

2. Guideline Standards and Procedures

Facilities and preparation

Room Preparation

- Switch equipment on and perform stage A calibration checks as per BSA guidelines (BSA, 2018).
- Ensure toys required for performance testing are available.
- Ensure minimal distractions are present to the child: Toys on display kept to a minimum and that the clinic room is decluttered.
- Ensure suitable seating and table/desk space is available to enable performance testing, as well as the use of the response button for older children.

- Prior to the commencement of testing, ensure there are an adequate supply of speculae, tympanometer/OAE tips, insert foam tips, disinfectant wipes and hand gel.
- Check room for hazards and minimise risk e.g. trailing wires, loose batteries

Test preparation

- Read referral letter, Practice Navigator (PN) notes, previous audiograms and reports to ensure up to date knowledge of the child and their previous history.
- Decide appointment plan to include how to approach child, likely tests and equipment needed plus the order of the test.
- Check interpreter arrived (if relevant).

Patient introduction and preparation

- Check if parents/child are happy with any additional observers being present e.g. students.
- Call child into room, preferably with a maximum of 2 accompanying adults and ideally no other children.
- Seat the child so that their face can be seen, in order to monitor facial expression, and the child's response can be seen clearly. Ensure that the child is unable to see the tester presenting sounds or visual clue from the audiometer. Children may be hesitant to respond and therefore it is important for the Audiologist to be able to clearly see the child's movements during testing.
- If conditioning is needed prior to testing, the child must be close enough for the Audiologist to work directly with the child. If this is not possible due to room layout or use of a booth, the child can either be conditioned using a hand held warbler (preferable) or outside of the booth (This may however, disrupt the flow of the test and is not as preferable as conditioning the child in the test position).
- Introduce all professionals present in the room.
- Identify and document relationship to the child of adults attended on report.
- Check child's demographics and amend as required. Minimum information to be checked is child's home address, the date of birth of the child and their GP surgery.
- Explain why child is in clinic, take appropriate case history (see appendix A) and document on PN notes. If the child is restless then the history can be completed after testing. The history taken should be appropriate for the reason for referral and is taken to help inform the audiologist of the questions to be answered during the test and any information relevant to the test or outcome. Dependent on the child's age, a history from the child can be taken prior to asking the parent to obtain the child's viewpoint without parental bias.
- Briefly explain the test/session plan to the parent and child to obtain implied consent for tests
- Ensure the child is comfortable before beginning testing e.g. remove coat etc

Test types

- Tests required will be dependent on previous test results, history and the questions needing to be answered
- Tests available will be Audiometry, Tympanometry and TeOAE (may not be available in all ENT clinics).
- Tympanometry to show middle ear status should be done for all children unless contraindicated
- TeOAE can be used to validate an audiogram if responses are variable, a non-organic hearing loss is suspected or ear specific testing has not been possible (usually due to age/compliance). A TeOAE pass response would be expected if the hearing thresholds are normal or mild in hearing loss severity, and there are no significant middle ear problems.
- Use of additional tests may be used if needed and if time allows e.g. Speech Discrimination testing. These are not expected to be done routinely and should only be performed if the Audiologist is competent to do so and there is adequate clinic time

Test procedures (general)

- A brief explanation of the test should be given in order to obtain implied consent.
- Ask the parents about previous compliance of the child when examined e.g. otoscopy. If the child is compliant perform Otoscopy (BSA, 2022) and Tympanometry (BSA, 2013) first as this will give useful information to guide the behavioural test. If the child is likely not to be compliant then perform behavioural testing first.
- Decide on the method of response i.e. performance test or button. Dependent on the confidence of the child and their developmental age, 5years + is generally suitable for using the button. Asking the child which they prefer can help engage them in the process.
- Dependent on the age/ability of the child, they should be conditioned prior to the threshold test being performed to ensure that they understand the test procedure and the Audiologist is happy with the responses being clear and fast enough to identify. If using headphones, only condition in situ if prior knowledge of the hearing is known i.e. to avoid conditioning in a hearing impaired ear. If using headphones to condition via soundfield, use 1 or 2KHz at 120dBHL when the opening of the headphone is facing the child. The same stimulus type should be used for conditioning as will be used for testing.
- If the child is seated on parents lap or the parent is 'helping' with the test e.g. holding performance toys, advise parents against prompting the child, and ensure that the parent can be clearly seen to observe unintentional prompts/clues e.g. body tensing, eye movement, movement of performance toy etc
- The aim is to obtain accurate ear specific thresholds at 0.25-8KHz, air conduction (AC) and bone conduction (BC) (If AC is below normal limits) and middle ear status information.
- The Audiologist should be aware of external sounds and dismiss any responses which may have been affected e.g. when testing in a non soundproof room or from parents/siblings present

- Care should be taken to make best use of the test time and child's attention span to obtain as clear a diagnostic picture as possible e.g. obtaining AC and BC results at 2 frequencies is more useful for diagnosis and management than ac only at more frequencies
- Minimum ear specific responses should be obtained at 1 and 4KHz (or 0.5 and 2KHz). Masking should be applied as required via BSA (BSA, 2018) guidelines (see masking section below).
- A sweep test at 'normal' levels (20dBHL ac, 10dBHL bc) can be done if this enables a more accurate diagnostic picture to be obtained during the time span of the child's concentration. Extra caution should be taken by the audiologist to ensure that stimulus presentations are not rhythmic and that longer pauses between presentations are used to identify false positive responses. If a sweep test has been used this should be noted on PN or on the ENT audiogram.
- Transducers and response toys/button used should be cleaned prior to each patient with Distel (or equivalent) wipes

Performance test

- Choose a performance task suited to the child's age, dexterity and fine motor skills.
- Ensure the task chosen allows for the response to be clear. Using clapping, tapping, hand raising etc should be avoided as these responses can become very vague and either be missed (false negative) or a general movement perceived as a response (false positive).
- Demonstrate to the child what you would like them to do at a supra threshold level (suggested 50dBSL). Conditioning may be done via speakers, hand held warbler or via the headphones. If using headphones, only condition in situ if prior knowledge of the hearing is known i.e. to avoid conditioning in a hearing impaired ear. If using headphones to condition via soundfield, use 1 or 2KHz at 120dBHL when the opening of the headphone is facing the child. The same stimulus type should be used for conditioning as will be used for testing.
- Use gesture and facial expressions, rather than a verbal explanation, to demonstrate the task and to make it appear fun for the child.
- Use simple, single command words and gestures throughout the teaching phase e.g. listen, wait.
- Allow the child to do the task independently without any clues from Audiologist or parents and ensure that they are responding clearly and consistently before reducing the stimulus level to begin testing Minimum Response Levels (MRLs). If responses are too vague or inconsistent at this point, do the task with the child as required until they are able to reliably respond independently.
- Praise the child after EVERY correct response (during conditioning phase) and regularly throughout testing. Praising should be non verbal if possible (clapping, thumbs up, facial expression) or short verbal praise e.g. well done. This encourages the child to continue.
- If the child gives a false positive response, remove the man from the boat (or equivalent toy) and remind to 'wait' and 'listen'
- Consider changing the game if the child is getting bored or is losing attention. Reconditioning may be required when the task is changed and there is the risk that changing the game may interrupt the flow of the test and the child's cooperation may be lost. The task should therefore not be changed unless the child demonstrates restless behaviours
- All toys handled by the child must be cleaned as per infection control/toy cleaning guidelines prior to each patient and, must not be mixed with clean toys until this has been done.

Masking

- Rules of masking should be applied dependent upon the reliability of the unmasked responses. See BSA (2018) pure tone audiometry recommended procedures for additional guidance ((nb/ >=55dBHL difference masking rules 1 and 3 for insert transducers)
- Masking techniques should reflect the ability of the child. Block masking at 40dBHL above threshold (30dB if a sweep test has been performed) may be applied if a child is not able to maintain concentration for masking to be completed as per BSA (2018) guidelines. The Audiologist must make it clear when reporting whether masking has been fully, partially or not applied, and the implications of this on the diagnosis.
- If masking bone conduction (BC), the not masked thresholds must be plotted/recorded to ensure that cross masking has not occurred (Particularly when masking bilateral conductive losses).

Discussion

- The Audiologist should be aware of the effect of the known BC calibration issues at 2 and 4KHz and the interpretation of the results should therefore be a reflection of the BC responses across the frequency range in conjunction with tympanometry and 'most likely' audiogram configurations
- Results should be explained clearly to parents and child with the explanation reflecting the reason for referral and parental concerns
- For non ENT patients management options should be discussed briefly and a management plan agreed with parents and child. The detail of the management options should only be discussed in enough detail to enable parents to make an informed choice in terms of follow up procedure
- Management options may include the following;
 - a. Grommets (refer to ENT if not already under them)
 - b. Hearing aids (refer to HSD paed hearing aid service for assessment)
 - c. Discharge from HSD
 - d. Follow up appointment in HSD – add to pending list
 - e. Follow up appointment in Community ('Bank'/Down syndrome children) - refer to Community Audiology

Admin process for 3+ clinic

- Check list for Admin process – Appendix B
- Using PN notes template, information should reflect a summary of the clinic session and include relevant information not recorded as part of the typed report. Summary of concerns, tests performed, options discussed, management plan and review date if applicable, should be clearly recorded
- Add child to PN pending list if a diagnostic follow up in HSD is required. Clinic type should be VRA pending, 3+pending as appropriate. Appointment type should VRA fu, 3+ fu or VR/3+ bank fu as appropriate.
- Report with test results, summary of discussion and management plan to be typed using appropriate PN report template
 1. For non ENT referrals - copies to parents, referrer and GP
 2. For ENT referrals – copy to ENT

3. See 'H drive/paeds/contacts/paediatric report contacts' for report destination addresses and clarification for ENT report destination
- If action is required from another professional e.g. ENT, TOD, Community Audiologist, write a summary of the action required, in bold, at the top of the report making it clear if it's a referral
 - For referrals for hearing aid assessment – Code as 1T or 2T assessment (T=tester), place a copy of the report in the 'new referrals' tray in the Paed Admin Office. If an assessment appointment has already been booked, note this clearly (handwritten is best) on the report.
 - Save report on H drive/paeds/reports yr, as surname, 1st name, date of test
 - Print and send reports
 - Complete medical referral and consultation on PN
 - Ensure patient is attended on PN

Outcomes for 3+ clinic

- Outcome will be dependent on the reason for referral and results obtained
- Outcomes will be decided using the Audiologist's discretion in consultation with parents
- Possible outcomes are as follows and should be discussed and agreed with parents;
 1. Discharge from HSD (with or without onward referral)
 2. Refer for hearing aid assessment (HSD)
 3. Refer to ENT – new ENT referral
 4. Refer back to ENT (already under ENT)
 5. Refer to community audiology for ongoing monitoring of a child with Down Syndrome or a permanent hearing loss who does not want/require hearing aids e.g. unilateral loss, loss at minimal frequencies etc (refer as a 'bank child')
 6. Review in HSD to complete testing, check if hearing changes or as routine surveillance ('bank child') for cCMV/ANSD/CLP (see surveillance guidelines)
- For address/contact details for the referrals above, see 'Hdrive/paeds/contact/paediatric report contacts'. Note new referrals to ENT, reports for children already under ENT and those seen at outreach hospitals are sent to different addresses

Minimum discharge criteria

Inserts/headphones

1KHz and 4KHz at ≤ 20 dBHL bilaterally

OAE pass criteria (Titan TeOAE diagnostic)

Sweeps ≥ 40

SNR ≥ 6 dB at each CR frequency

Minimum Te level ≥ -5 dB SPL at each CR frequency

Overall amplitude of response ≥ 0 dB SPL across the CR frequencies

CR ≥ 3 frequencies bilaterally

Nb/ a '**refer**' (NCR) OAE is when OAE noise level is ≤ -5 dB SPL in the absence of a Te response meeting CR criteria. If the noise level is > -5 dB SPL this should be recorded as an **inconclusive OAE** result as this indicates poor recording conditions (usually due to poor probe fit, incomplete recording or audible noise)

Guideline title: Paediatric 1 Tester diagnostic clinic.

Approved by the MSS board September 2023 Trust Ref:C44/2023

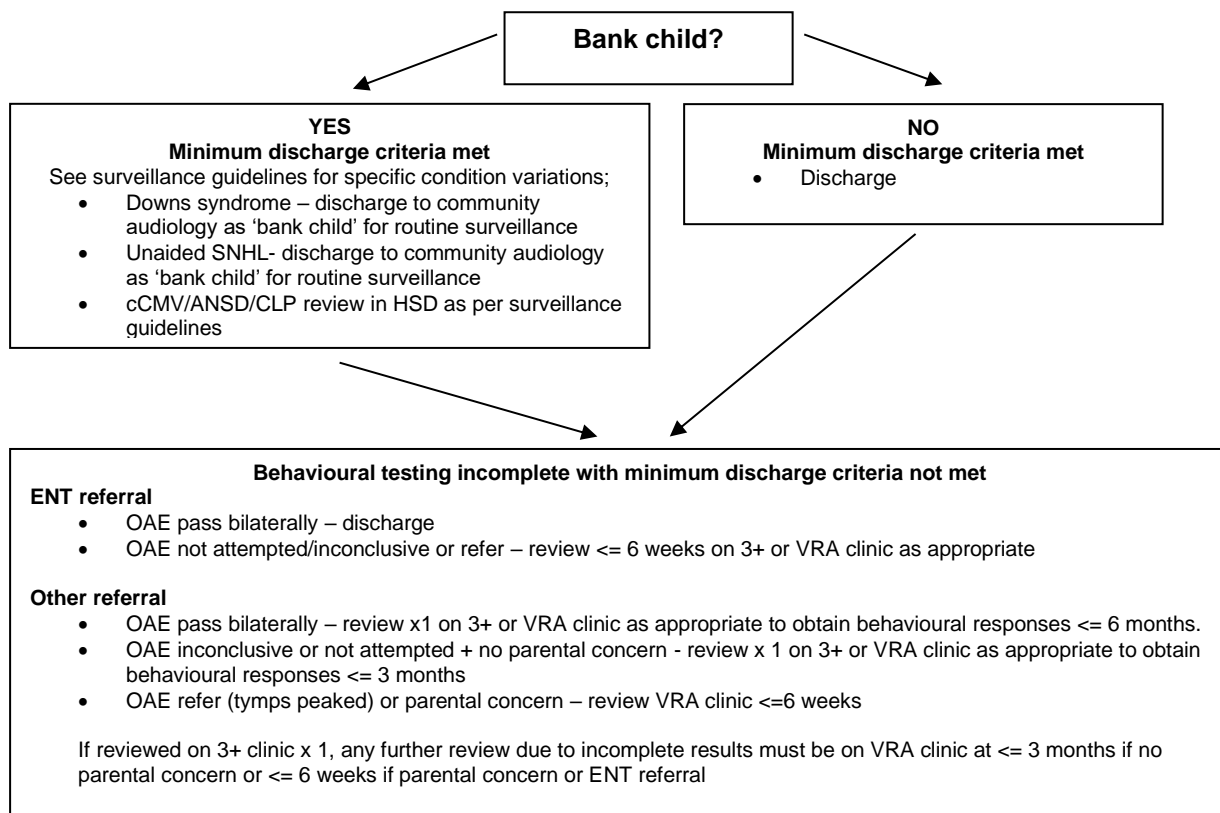
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Next review: August 2026

Outcome guidance flowchart

Glossary

Bank child = child needing ongoing audiological surveillance due to medical condition - unaided child with a known/suspected SNHL, ANSD, cCMV, CLP, Downs syndrome (see surveillance guidelines)



Conductive hearing loss

ENT referral
Discharge (ENT will review results and action management as required)

Other referral

Mild loss, no parental concern – review x 1 in 3-6 months

Mod loss or parental concern – review x 1 in 8-12 weeks

If loss present on review offer;

- ENT referral or
- H-aid + ENT referral

SN/mixed hearing loss

ENT referral
Hearing loss confirmed
Offer h-aid and
Action late diagnosis pathway and
Results to ENT for aetiological investigation as required

Hearing loss needs confirming
Review x 1 <= 6weeks

Other referral
Mild loss, no parental concern or results need confirming – review x 1 <=12 weeks

>= Mod loss or mild loss with parental concern

- Review x 1 <=6 weeks
- Offer h-aid
- Action late diagnosis pathway if hearing loss confirmed

If loss present on review offer;

- ENT referral
- H-aid + ENT referral
- Action late diagnosis pathway

Appendix A

3+ clinic history taking guide

The questions asked will depend on the age of the child, history already available and reason for referral. Questions below are examples and should be expanded on or additional questions asked as appropriate. Questions should be asked to child and parents as appropriate.

What concerns, if any, do you have regarding hearing

- At home?
- At nursery/school?
- Out and about/socially?

What concerns, if any, do you have regarding speech and language development?

- Speech clarity?
- Vocabulary/sentence structure?

Are there any concerns from nursery/school or any other professional?

How is the understanding?

- Will they follow a simple set of instructions? Give an example
- Are they under any other health professionals?

Have they any other medical conditions

- Dyslexia, Dyspraxia
- ASD/ADHD
- Learning difficulties/special needs

What concerns, if any, do you have regarding behaviour? At home and nursery/school

- How do they socialise / play with other children?
- Do they respond when spoken to if interested in the subject?

Did they have clear responses on their new born hearing screen?

- If you are unable to check this via S4H – document as ‘parents report that....’

Have they had any other hearing assessments?

- Where / when and are you aware of the results obtained?

Is there any family history of permanent hearing loss from a young age?

- Birth mum / biological dad / siblings.

Were there any problems with pregnancy or at birth?

- Prematurity
- Time in NICU
- Jaundice- with blood transfusions.

Have they spent any time in hospital and received treatment for any significant illnesses i.e. bacterial meningitis / cancer

- If so when and what treatment did they receive?
- Did they have any follow up hearing assessments?

Do they suffer with ear infections?

- When was their last one?
- Do they get discharge from their ear(s)?
- Which side is primarily affected?
- Have they ever seen an ENT Dr regarding this?

Do they suffer a lot with colds / coughs / upper respiratory infections?

Have they ever been seen by an ENT Team?

- Who did they see? Where did they see them?

How are they today?

- Have they been poorly recently?
- Have they had a recent cold?

3. Education and Training

No training is required for current staff.

New staff to the department or to the paediatric team will require a period of supervision dependent on their experience and skill level. The peer review process will be undertaken before they are able to work unsupervised.

2. Monitoring Compliance

What will be measured to monitor compliance	How will compliance be monitored	Monitoring Lead	Frequency	Reporting arrangements
Room prepared appropriately and plan for appointment	Peer review process	Head of Paediatric Audiology	New starter after initial supervisory period. All applicable paediatric staff every 2 years	Required actions to be given to audiologist by the peer reviewer and recorded on peer review document
Introduction of adults present and demographic details checked as appropriate	Peer review process	Head of Paediatric Audiology	As above	Required actions to be given to audiologist by the peer reviewer and recorded on peer review document
Appropriate level of history taking	Peer review process	Head of Paediatric Audiology	As above	Required actions to be given to audiologist by the peer reviewer and recorded on peer review document
Appropriate diagnostic tests undertaken with appropriate technique, security of responses and interpretation of results	Peer review process	Head of Paediatric Audiology	As above	Required actions to be given to audiologist by the peer reviewer and recorded on peer review document
Appropriate explanation of results for the family/child and related to their concerns as identified in the history	Peer review process	Head of Paediatric Audiology	As above	Required actions to be given to audiologist by the peer reviewer and recorded on peer review document
Appropriate explanation of management/follow up options and action plan agreed with family/child	Peer review process	Head of Paediatric Audiology	As above	Required actions to be given to audiologist by the peer reviewer and recorded on peer review document
Documentation complete	Peer review process	Head of Paediatric Audiology	As above	Required actions to be given to audiologist by the peer reviewer and recorded on peer review document

5. Supporting References

British Academy of Audiology (2022) Quality Standards in Paediatric Audiology.

British Society of Audiology (2022) Recommended procedure. Ear Examination.

British Society of Audiology (2018) Recommended procedure. Pure-tone air-conduction and bone-conduction threshold audiometry with and without masking.

British Society of Audiology (2014) Recommended procedure. Tympanometry.

6. Key Words

Paediatric testing; hearing tests; behavioural tests; 3 plus

CONTACT AND REVIEW DETAILS	
Guideline Lead (Name and Title) Sheena Hartland – Head of Paediatric Audiology	Executive Lead Hazel Busby-Earle - Consultant
Details of Changes made during review: Minor changes to procedures and additional guidance on outcome and management procedures for clarification version 2 Appendix added regarding PVP shunt n/a; Version 1.1	

Title of P&G Document Being Reviewed: Insert Details Below:		Yes / No / Unsure	Comments
1.	Title and Format		
	Is the title clear and unambiguous?		
	Does the document follow UHL template format? <i>If no document will be returned to author</i>		
2.	Consultation and Endorsement		
	Complete the consultation section below		
3.	Dissemination and Implementation		
	Complete the dissemination plan below		
	Have all implementation issues been addressed?		
4.	Process to Monitor Compliance		
	Ensure that the Monitoring Table has been properly completed.		
5.	Document Control, Archiving and Review		
	Ensure that the review date and P/G Leads identified.		
6.	Overall Responsibility for the Document		
	Ensure that the Board Director Lead is identified		

1. OVERVIEW

2. EQUALITY IMPACT ASSESSMENT

		Comments	
1.	What is the purpose of the proposal/ Policy	To standardise practice between clinicians and provide guidelines for practice.	
2.	Could the proposal be of public concern?	No	
3.	Who is intended to benefit from the proposal and in what way?	Audiologists, as this document provides guidance for the diagnostic testing of children and patients/family as it provides standardisation of practice	
4.	What outcomes are wanted for the proposal?	Standardised diagnostic testing practice, outcome decisions and documentation	
		Yes/No	Comments
5.	Is there a possibility that the outcomes may affect one group less or more favourably than another on the basis of:		
	Race	No	
	Ethnic origins (including gypsies and travellers)	No	

		Comments	
	Nationality	No	
	Gender	No	
	Culture	No	
	Religion or belief	No	
	Sexual orientation including lesbian, gay and transsexual people	No	
	Age	No	
	Disability - learning disabilities, physical disability, sensory impairment and mental health problems	No	
6.	Is there any evidence that some groups are affected differently?	No	
7.	If you have identified that some groups may be affected differently is the impact justified E.g. by Legislation: National guidelines that require the Trust to have a policy, or to change its practice.	n/a	
8.	Is the impact of the proposal / policy likely to be negative?	No	
9.	If so can the impact be avoided?	n/a	
10.	What alternatives are there to achieving the proposal/ policy without the impact?	n/a	
11.	Can we reduce the impact by taking different action?	n/a	

If you have identified a potential discriminatory impact; please ensure that you do a Full Impact Assessment.

If you require further advice please contact Service Equality Manager on 0116 2584382.

3. CONSULTATION SECTION

(To be completed and attached to Policy and Guidance documents when submitted to the UHL Policy & Guidelines Committee)

Elements of the Policy or Guidance Document to be considered (this could be at either CMG/Directorate or corporate level or both)	Implications (Yes/No)	Local or Corporate	Consulted (Yes/No)	Agree with P/G content (Yes/No)	Any Issues (Yes / No)	Comments / Plans to Address
Education (ie training implications)	No					
Corporate & Legal	No					

IM&T (ie IT requirements)	No					
Clinical Effectiveness	No					
Patient Safety	No					
Human Resources	No					
Operations (ie operational implications)	No					
Facilities (ie environmental implications)	No					
Finance (ie cost implications)	No					
Staff Side/ (where applicable)	No					
Any others	No					

Committee or Group (eg CMG/Directorate Board) that has formally reviewed the Policy or Guidance document	Date reviewed	Outcome / Decision
MSS	15/09/23	Authorised pending inclusion of Glossary

Lead Officer(s) (Name and Job Title)	Contact Details
Hazel Busby-Earle (Consultant)	hazel.busby-earle@uhl-tr.nhs.uk

Please advise of other policies or guidelines that cover the same topic area:

Title of Policy or Guideline:
See references.

4. IMPLEMENTATION AND REVIEW

Please advise how any implications around implementation have been addressed:	
Financial	N/a
Training	N/a
REVIEW OF PREVIOUS P&G DOCUMENT	
Previous P&G already being used? Yes	Trust Ref No:

If yes, Title: Paediatric 1 tester diagnostic clinic. Clinical guideline v1		n/a
Changes made to P&G? Yes	If yes, are these explicit Yes If no, is P&G still 'fit for purpose? Yes	
Supporting Evidence Reviewed? Yes	Supporting Evidence still current? Yes	

5. DISSEMINATION PLAN

DISSEMINATION PLAN			
Date Finalised:	Dissemination Lead (Name and contact details) Sheena Hartland, Head of Paediatric Audiology		
To be disseminated to:	How will be disseminated, who will do and when?	Paper or Electronic?	Comments
HSD Paed Team	Via staff meeting – HSD shared drive	Electronic	

CATEGORY 'C' POLICIES OR GUIDELINES ONLY	
CMG/Directorate Approval Process:	
CMG Approval Committee:	MSS
Date of Approval:	
Copy of Approval Committee Minute to be submitted with request to upload into Policy and Guideline Library	

GLOSSARY

ABR	-	Auditory Brainstem Response
AC	-	Air Conduction
ASD	-	Autism Spectrum Disorders
ANSD	-	Auditory
BAA	-	British Academy of Audiology
BC	-	Bone Conduction
BSA	-	British Society of Audiology
cCMV	-	Congenital cytomegalovirus
CLP	-	Cleft lip & palate
ENT	-	Ear Nose & Throat
F2F	-	Face to face
FU	-	Follow-up
GP	-	General Practitioner
MRL	-	Minimum Response Levels
NBN	-	Narrow Band Noise
OAE	-	Otoacoustic Emissions
PN	-	Practice Navigator
T1	-	Tester 1
T2	-	Tester 2
TeOAE		Transient evoked Otoacoustic Emission
TOD	-	Teacher of the Deaf
Tymp	-	Tympanometry/Tympanometer
VRA	-	Visual Reinforcement Audiology