

## **1. Introduction**

This guideline details acceptance and rejection criteria (including patient age and referral source) for referrals received by the Audiology section of the Electrodiagnostics Service (EDS). It is a key element of the testing pathway to assess the urgency of need and the nature of the diagnostic testing required to ensure the best, most appropriate care is given. Further details are provided for re-direction of referrals where appropriate.

## **2. Scope**

This guideline applies to any patient referral received by EDS. This guideline is for Clinicians and Health Professionals within UHL who are considering a referral to the Audiology section of the Electrodiagnostics Service (EDS).

## **3. Recommendations, Standards and Procedural Statements**

- All referrals from the Newborn Hearing Screening Programme (NHSP) should be made by a Newborn Hearing Screener directly on the Patient/Clinic Management System, Tiara
- For all patients (excluding those referred from NHSP), a written referral is required – letter or e-mail.
- All referrals (excl. NHSP) should be triaged, according to the EDS local triage process, by either a Senior Audiologist or the Lead Audiologist before appointment bookings are made
- Referrals should be accepted or rejected based on the criteria in Table 1 and Table 2 below
- If referrals are rejected the sender should be notified in writing as to the reasons why.
- All decisions regarding acceptance or rejection of a referral shall be documented on the Patient/Clinic Management System, Tiara.

**Table 1 Referral acceptance and rejection criteria for tests performed in EDS**

Test	Nature of Test	Test Age Range	Accept in EDS (Y/N)	Other criteria to consider for acceptance / rejection of referral	Referrals Accepted from (e.g. healthcare professionals, parents...)	Responsible for making the appointment	When referral rejected, who is notified and, if applicable, where is the referral redirected to?
<b>ABR under natural sleep</b> <sup>2,3</sup>	<p>- Electrophysiological test</p> <p>-Correction factors used to estimate psycho-acoustic thresholds</p>	<p><u>Newborn referrals:</u> Usually Birth to 52 weeks gestational age (GA)</p> <p>Older if <b>urgent*</b></p>	Y	<p>Baby should be close to 40 weeks GA (typically over 38 weeks GA) and less than 52 weeks GA.</p> <p>If patient is older (aged 3-8 months), EDS to discuss with referrer to determine if alternative options available.</p> <ul style="list-style-type: none"> <li>If a referral is <u>accepted</u> for older child the family should be made aware of the reduced likelihood of acquiring a result.</li> <li>If referral is <u>rejected</u> for older child determine if redirection of referral (to Hearing Services) is appropriate</li> </ul> <p>Referrals <u>accepted</u> for Screen Contra-indications:</p> <ul style="list-style-type: none"> <li><b>Known or suspected neonatal bacterial meningitis or meningococcal septicaemia*</b></li> <li>Programmable Ventriculo-Peritoneal (PVP) shunts</li> <li><b>Congenital Cytomegalovirus (cCMV)*</b></li> <li>Atresia/microtia</li> </ul>	<p>NHSP screeners</p> <p>Other health professionals (e.g. Paediatric / Neonatal Consultant) if screen contra-indicated</p>	<p>Newborn Hearing Screening team (via Tiara)</p> <p>Or</p> <p>EDS clinic co-ordinator (or nominated individual in their absence).</p>	<p>N/A for NHSP referrals</p> <p>Notify referrer of rejection by EDS and reason why</p> <p>Forward to Hearing Services for age-appropriate testing</p>

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<b>ABR under natural sleep</b> <sup>2,3</sup>	-Electrophysiological test  -Correction factors used to estimate psycho-acoustic thresholds	<u>Babies with later identified risk:</u>  Birth to 52 weeks corrected gestational age (GA) for newborns.  Older if <b>urgent</b> *	Y	<p><b>*Accepted URGENT Referral Reasons:</b></p> <ul style="list-style-type: none"> <li>Known or suspected Bacterial meningitis</li> <li>meningococcal septicaemia</li> <li>congenital Cytomegalovirus (cCMV)</li> <li>severe unconjugated hyperbilirubinemia</li> <li>temporal bone fracture</li> </ul> <p>These should be booked for assessment:</p> <ul style="list-style-type: none"> <li>within 4 weeks of the date of referral or</li> <li>by 44weeks gestational age</li> <li>cCMV babies should be seen sooner, if possible, to allow for early antiviral treatment (before 4 weeks of birth) to start if needed</li> </ul> <p><u>Accepted non-urgent referrals:</u></p> <ul style="list-style-type: none"> <li>Any Parental / professional concern</li> </ul> <p>These should be booked for assessment following routine diagnostic wait pathway recommendations<sup>8</sup></p> <p><u>Rejected referrals</u></p> <ul style="list-style-type: none"> <li>Confirmed viral meningitis</li> <li>acquired CMV</li> <li>patient &gt;3 months (52 weeks GA) *</li> </ul> <p>These referrals should be <u>rejected</u>, and babies have newborn screen in the usual way if there are no other causes for concern.</p>	<p>Healthcare professional (GP, HV<sup>†</sup>, consultant) who has identified the risk or to whom a parental concern was raised</p> <p><sup>†</sup>Health visitor referrals for children &lt;6months of age should be addressed to Hearing Services who will then triage to Electrodiagnostics Service if appropriate to do so.</p>	EDS clinic administrator (or nominated individual in their absence)	<p>Notify referrer of rejection and reason why.</p> <p>Where appropriate:</p> <ul style="list-style-type: none"> <li>Forward to Hearing Services for age-appropriate testing</li> <li>Refer to NHSP team to perform screen</li> </ul>

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				* An <b>urgent</b> patient can be seen after 52 weeks GA but the family's expectations need to be managed as less likely to sleep / acquire a result.			
<b>ABR under natural sleep</b> <sup>2,3</sup>	-Electrophysiological test  -Correction factors used to estimate psycho-acoustic thresholds	<u>Babies &lt;3 months – ototoxic drugs</u>	Y	<p>Does baby have known A1555G mitochondrial mutation?</p> <ul style="list-style-type: none"> <li>No: <ul style="list-style-type: none"> <li>These referrals should be <u>rejected</u> and babies have newborn screen in the usual way</li> </ul> </li> <li>Yes: <ul style="list-style-type: none"> <li>All babies with known mitochondrial mutation A1555G who have received aminoglycosides (regardless of blood levels) should be referred for immediate audiological assessment:</li> <li>EDS should <u>accept</u> referrals if the child is younger than 3 months corrected age</li> <li>EDS should <u>reject</u> referrals if the child is older. Re-direct referral to Hearing Services</li> </ul> </li> </ul> <p>Otherwise, referral following treatment with ototoxic drugs is at the discretion of the</p>	Paediatrician	EDS clinic administrator (or nominated individual in their absence)	<p>Notify referrer of rejection and reason why.</p> <p>Where appropriate:</p> <ul style="list-style-type: none"> <li>Forward to Hearing Services for age-appropriate testing</li> <li>Refer to NHSP team to perform screen</li> </ul>

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				<p>paediatrician. EDS to discuss with referrer if acceptance of referral in EDS would be appropriate.</p> <ul style="list-style-type: none"> <li>Consider if a referral to Hearing Services at 8 months of age would be more appropriate</li> <li>Consider if there is a specific reason for a more urgent assessment.</li> </ul>			
<b>ABR under natural sleep</b> <sup>2,3</sup>	<p>Electrophysiological test</p> <p>-Correction factors used to estimate psycho-acoustic thresholds</p>	<p><u>Teens / Adults</u></p> <p><u>Compliant Children (but the family's expectations need to be managed as less likely to sleep / acquire a result.)</u></p>	Y	<ul style="list-style-type: none"> <li>For awake late teens/ adults CERA testing should be attempted first.</li> </ul> <p><u>Accepted Referrals</u> Late teens to Adult Children – ANSD checks / non organics</p> <p><u>Rejected Referrals</u> When referring due to concerns that the patient is not providing accurate thresholds re-direct referral to Hearing Services in the first instance</p>	ENT Consultant or audiologist	EDS clinic administrator (or nominated individual in their absence)	<p>Notify referrer of rejection and reason why</p> <p>Where appropriate:</p> <ul style="list-style-type: none"> <li>Forward to Hearing Services</li> </ul>
<b>ABR under sedation/ GA</b>	<p>-Electrophysiological test</p> <p>-Correction factors used to estimate psycho-acoustic thresholds</p>	12 weeks plus (corrected age) until able to perform a behavioural assessment or undertake a cortical test (CERA)	Y	<p>If the child is around 8 months or older:</p> <ul style="list-style-type: none"> <li>Determine if behavioural testing already attempted <ul style="list-style-type: none"> <li>If not, <u>reject</u> referral and refer to Hearing Services for developmentally appropriate behavioural testing first.</li> <li>If already established that behavioural testing not viable then referrals to EDS <u>accepted</u>.</li> </ul> </li> </ul>	Paediatric / ENT Consultants.	<p>EDS Audiologist</p> <p>or</p> <p>EDS clinic administrator under audiologist guidance</p>	<p>Notify referrer of rejection and reason why</p> <p>Where appropriate:</p> <ul style="list-style-type: none"> <li>Forward to Hearing Services for age-</li> </ul>

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				If the child is 12 weeks-8 months: <u>accept</u> referral			appropriate testing
<b>Oto-acoustic Emissions (OAE)<sup>4</sup></b>	<p>-Outer hair cell function</p> <p>-Patients with OAEs unlikely to have considerable hearing loss</p> <p>-Does not exclude a retro-cochlear problem (ANSD)</p>	Birth onwards	Y	<p><u>Accepted referrals</u> referrals to EDS for children younger than 3 months corrected age</p> <p><u>Rejected Referrals</u> referrals for children &gt;3 months corrected age</p> <ul style="list-style-type: none"> <li>Re-direct referral to Hearing Services</li> </ul> <p>(NOTE: Test may also be used in older children and adults but only as a guide to hearing ability when results from other age-appropriate tests are not obtainable or if reliability is questioned.)</p>	NHSP screeners	Newborn Hearing Screening team (via tiara)	<p>N/A for NHSP referrals</p> <p>Notify other referrers of rejection and reason why</p> <p>Where appropriate:</p> <ul style="list-style-type: none"> <li>Forward to Hearing Services for age-appropriate testing</li> </ul>
<b>Pure tone audiometry (PTA)</b>	<p>-Headphone test (ear specific) and Bone conduction (BC)</p> <p>-Can be masked Threshold measurement</p>	At least 5 years (developmental age) - adult	Y	<p><u>*Accepted referrals</u></p> <ul style="list-style-type: none"> <li>medico-legal referrals</li> </ul> <p>or</p> <ul style="list-style-type: none"> <li>in conjunction with other Electrophysiological testing.</li> </ul> <p><u>Rejected referrals</u> Referrals for PTA as a standalone test should be re-directed to hearing services.</p>	<p>Medico-legal agents / solicitors.</p> <p>(Or as part of a CERA assessment – see below)</p>	EDS clinic administrator (or nominated individual in their absence).	<p>Where appropriate:</p> <ul style="list-style-type: none"> <li>Forward to Hearing Services for age-appropriate testing</li> </ul>

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<b>Cortical Evoked Response Audiometry (CERA)<sup>6</sup></b>	-Electrophysiological test  -Used to estimate hearing thresholds in patients unable or unwilling to provide accurate audiometric thresholds	Late teens and over	Y	<u>Accepted Referrals</u> Late teens to Adult  <u>Rejected Referrals</u> Babies and children/early teens	Typically an ENT Consultant, audiologist or solicitor.	EDS clinic administrator (or nominated individual in their absence).	Notify referrer of rejection and reason why  Where appropriate: Forward to Hearing Services
<b>Auditory Steady State Response (ASSR)<sup>7</sup></b>	-Electrophysiological test  -Used to estimate hearing threshold.	Birth to 52 weeks corrected gestational age (GA) for newborns	Y	Test only used to provide extra information in addition to, or as an alternative to, ABR and CERA if these prove ineffective.  Baby should be close to 40 weeks GA (typically over 38 weeks GA) and less than 52 weeks GA. EDS to discuss with referrer if patient is older. <ul style="list-style-type: none"> <li>If a referral is <u>accepted</u> for older child the family should be made aware of the reduced likelihood of acquiring a result.</li> <li>If referral is <u>rejected</u> for older child determine if redirection of referral (to Hearing Services) is appropriate</li> </ul> For awake adults CERA testing should be attempted first.	Typically an ENT Consultant or audiologist	EDS clinic administrator (or nominated individual in their absence).	Notify referrer of rejection and reason why  Where appropriate: <ul style="list-style-type: none"> <li>Forward to Hearing Services for age-appropriate testing</li> </ul>

**Table 2 Acceptance and rejection criteria for tests not performed in EDS**

Test	Nature of Test	Test Age Range	Accept in EDS (Y/N)	Other criteria to consider for acceptance/rejection of referral	Referrals accepted from (e.g. parents, health visitors, GP, ENT,...)	Responsible for making the appointment	When referral rejected, who is notified and if applicable, where is the referral redirected to?
<b>Visual reinforcement audiometry (VRA)</b>	-Soundfield, insert phones and unmasked bone conduction (BC) -Ear specific with insert phones but no masking -Minimum response levels	8 months – 23 months (developmental age)	N	<u>Accepted Referrals</u> None  <u>Rejected referrals</u> All referrals for these tests should be rejected by EDS. Re-direct these referrals to the paediatric audiologist at Hearing Services to arrange an appropriate assessment.	Any professional who has identified the risk	N/A	Notify referrer of rejection and reason why  Forward to Hearing Services for age-appropriate testing
<b>Performance test / play audiometry</b>	-Soundfield/ headphones and BC -Minimum response levels/ thresholds						

#### **4. Education and Training**

No further training is required to implement this guideline

#### **5. Monitoring and Audit Criteria**

Key Performance Indicator	Method of Assessment	Frequency	Lead
Inappropriate referrals should account for less than 10% of total referrals received	Local audit of referrals accepted and rejected	Six monthly	EDS Lead Audiologist

#### **6. Legal Liability Guideline Statement**

See section 6.4 of the UHL Policy for Policies for details of the Trust Legal Liability statement for Guidance documents

#### **7. Supporting Documents and Key References**

1. EDS Audiology Local Triage Process
2. BRITISH SOCIETY OF AUDIOLOGY (2019), Recommended Procedure Auditory Brainstem Response (ABR) Testing in Babies. [Online]. Available from: [web link](#). [Accessed 24/01/2024]
3. BRITISH SOCIETY OF AUDIOLOGY (2019), Recommended Procedure Auditory Brainstem Response (ABR) testing for Post-newborn and Adult [Online]. Available from: [web link](#) [Accessed 24/01/2024]
4. BRITISH SOCIETY OF AUDIOLOGY (2023), Recommended Procedure Clinical Application of Otoacoustic Emissions (OAEs) in Children and Adults [Online]. Available from: [web link](#) [Accessed 24/01/2024]
5. BRITISH SOCIETY OF AUDIOLOGY (2018), Recommended Procedure Pure-tone air-conduction and bone-conduction threshold audiometry with and without masking [Online]. Available from [web link](#) [Accessed 24/01/2024]
6. BRITISH SOCIETY OF AUDIOLOGY (2022), Recommended Procedure Cortical Auditory Evoked Potential (CAEP) Testing [Online]. Available from [web link](#) [Accessed 24/01/2024]
7. BRITISH SOCIETY OF AUDIOLOGY (2023), Auditory Steady State Response (ASSR) Testing. Available at: [web link](#) [Accessed 24/01/2024]
8. UHL Elective Care Access Policy B3/2004

#### **8. Key Words**

Electrodiagnostics, Medical Physics, EDS, ABR, CERA, ASSR, PTA, OAE, hearing test, paediatric, audiology, audiometry

#### **9. Glossary**

- ABR Auditory Brainstem Response
- ANSD Auditory Neuropathy Spectrum Disorder
- ASSR Auditory Steady State Response
- BC Bone Conductor
- cCMV Congenital Cytomegalovirus
- CERA Cortical Evoked Response Audiometry
- EDS Electrodiagnostics Service

- ENT Ear, Nose, and Throat
- GA Gestational Age
- GA (in sedation/GA) General Anaesthetic
- GP General Practitioner
- HV Health Visitor
- NHSP Newborn Hearing Screening Programme
- OAE Otoacoustic Emissions
- PTA Pure tone audiometry
- PVP Programmable Ventriculo-Peritoneal
- VRA Visual Reinforcement Audiometry

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This table is used to track the development and approval and dissemination of the document and any changes made on revised / reviewed versions

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