



# HEARING ASSESSMENTS FOR CHILDREN

Alder Hey Children's Hospital

Liverpool



Your child has been referred for a hearing assessment. This leaflet explains what will happen at your child's appointment. The information in this leaflet does not replace any discussion you have with your child's care team.

## The appointment:

The appointment will last approximately 30 mins up to an hour.

Your child will be seen by a paediatric audiologist or an audio-vestibular physician. The type of hearing test we complete will depend on your child's developmental age, their history/symptoms.

In this leaflet we have discussed some of the potential tests that we might complete during your child's appointment. It is important to note that in some cases other tests might need to be performed but you will be made aware of this, and everything will be explained in detail to you.

**Please let us know if you or your child require an interpreter or any other assistance for this appointment.**



## BEHAVIOURAL ASSESSMENTS

As a child develops, their audiologist will assess their hearing using behavioural tests. These tests use rewards, toys and play as part of the assessment and involve your child listening for different sounds as part of a game. Behavioural testing varies for different age groups, visual reinforcement audiology being used at the youngest age groups and a pure tone audiometry test being used for the older age groups.

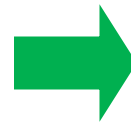
Behavioural hearing assessments use test techniques where the audiologist records the child's response to sound. This might be a look or head turn, the completion of an action or a direct response to the sound.

As every child is an individual, it can sometimes not be clear which test is most appropriate initially and we may need to alter which test we use during your appointment.



**It can sometimes be difficult to obtain a full picture of a child's hearing in a single appointment. Assessment success can vary dependent on a child's behaviour, understanding, shyness, tiredness, or other diagnoses. This means it can sometimes take several appointments to complete a full hearing assessment.**

Types of behavioural assessments are described on the next page.



## Visual Reinforcement Audiometry

This assessment technique is used for babies and children who are developmentally aged between 6-30 months. The test technique takes advantage of children's early development of sound localisation.

- The child is seated on a parent's knee, in their pram or on a chair in between 2 speakers and 2 TV monitors.
- The audiologist will initially condition the child to the game to ensure that they can complete the test. This is done by the audiologist playing a sound from one of the speakers and at the same time they will present a cartoon character on the TV monitors.
- This is performed several times until the child has been trained to turn towards the TV monitors when just a sound is played.
- The sound is then reduced in volume and if the child turns to the sound they are presented with a visual reward.
- This continues until a minimal response level is obtained. This will then be repeated at different pitches which are important for speech understanding.

We sometimes use headphones, earphones or a band to present the sound to enable us to try and obtain information from each ear individually.

We use cartoon characters like Peppa Pig, Hey Duggee, Cocomelon and Mr. Tumble as visual rewards. If there are any favourite TV shows/books/characters your child likes, tell the audiologist as we may be able to use these during the test.



## Performance/Play Audiometry

This assessment technique is used for children who are developmentally aged 30 months to 4 years. The test technique allows your child to interact with the tester and makes the assessment into a game.

- The child will be presented with a sound and asked to complete a task in response to that sound, such as placing a man in a boat or posting a letter in a box.
- The audiologist will initially condition the child to the game to ensure they are able to wait for the sound.
- The volume of the sound is then varied to determine a minimal response level that the child responds to, at different pitches which are important for speech understanding.
- The sound will be presented through speakers, handheld speaker, headphones, earphones and/or on a headband. The tester will determine how the test will proceed depending on the age of your child.



### How to prepare your child?

You can prepare your child for this test by introducing 'Ready, Steady, Go!' games at home. Using the same principle, as a parent/guardian you can say "Ready, Steady, Go!" and on 'Go!' encourage your child to complete a task, such as throwing a block into a box. This introduces your child to the concept of waiting for a sound before completing a task. Praising your child for getting it right reinforces and encourages the response and makes it fun. It is also helpful if your child is familiar to wearing headphones in order to test the hearing in each ear individually, but we understand that sometimes this is not always possible for some children.

## Pure Tone Audiometry

This test is used for children and young adults from the age of 4 up to the age of 18.

Headphones or insert earphones are used to present sounds of different loudness and pitch and the child or young adult must bang some blocks together or press a button every time they hear a sound. The audiologist will look to find the minimal levels that the child can hear at different pitches.

### How to prepare your child?

To prepare your child for these appointments it is helpful if they are comfortable wearing headphones as this gives the audiologist the ability to test each ear individually and therefore further assess the hearing, but we understand that this is not always possible for some children.



## OBJECTIVE HEARING ASSESSMENTS

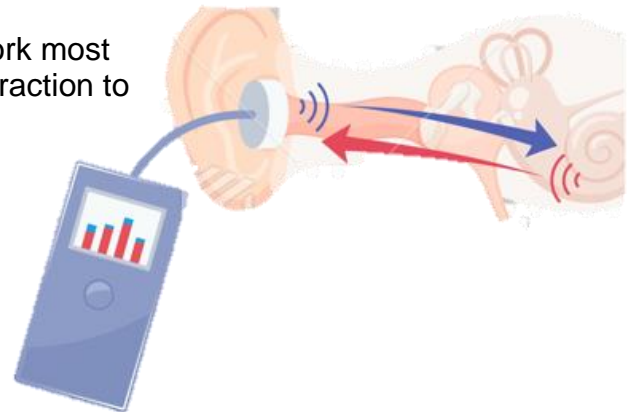
In the hearing assessment you will find that we may perform a different type of hearing assessment. This type of audiological testing is completely involuntary and does not involve an action or response from your child. The most common objective assessment which we would use in a hearing assessment appointment would be otoacoustic emissions.

### Otoacoustic emissions

Otoacoustic emissions are automatic responses produced by the cochlear (inner ear organ) as a direct response to sound. The presence of the emissions are a useful indication of healthy cochlear function and we can use this information to help build our understanding of a child's hearing.

This test is performed by presenting a sound via a little earphone in the ear. This sound travels through the outer ear and middle ear to the inner ear stimulating the hair cells and causes them to twitch in response producing a signal which then passes back through to the outer ear where a microphone in the earphone can pick this up. This response will then be plotted on a graph.

Due to the minimal size of these responses, this test will work most effectively when the child is still and quiet. We may use distraction to help with this.



### Auditory Brainstem Response (ABR)

This type of test measures the brain activity in response to sounds. The patient must be fully asleep for this test to work. This is not a test that is routinely used. If your child requires this test, we will inform you and provide you with all the necessary information.

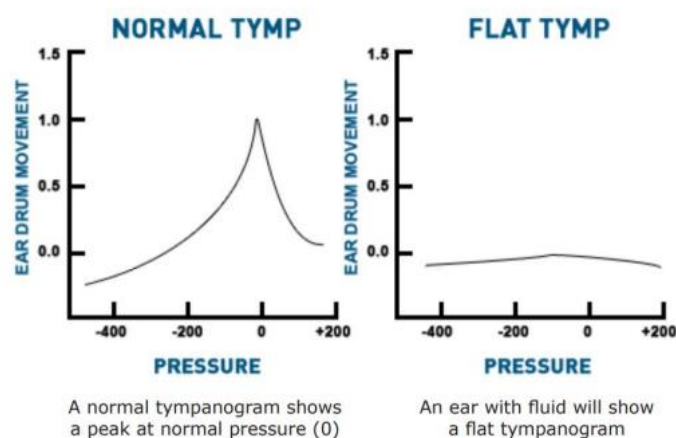
## MIDDLE EAR TESTS

The function of the middle ear is vitally important to consider when measuring a child's hearing levels. This function of the middle ear can have a major impact on a child's hearing. Otitis media with effusion (middle ear congestion) is the most common cause of temporary hearing loss in children with around 80% of children experiencing this at a stage in their childhood. We will look to assess the function of the middle ear in the hearing assessment appointment.

### Tympanometry

Tympanometry is used to measure the function of the middle ear. This is measured by presenting a change of pressure in the ear to measure the compliance of the ear drum (how easily it can move).

This is done by a probe with a soft tip being placed in the outer ear for a few seconds and your child may hear a soft humming sound. This will then present us with a trace measuring the ear drum compliance, middle ear pressure and the ear canal volume.



If a child has middle ear congestion, the ear drum compliance is reduced, and this may affect the sound passing through the ear sometimes resulting in a hearing loss.

### Stapedial Reflex Response

A stapedial reflex is an automatic contraction of the stapedial muscle in the ear in response to a loud sound. This will in turn tighten the ear drum and bones connected to it and help to protect the ear and reduce our sensitivity to these sounds.

We measure the presence of this response by presenting a variety of loud tones and directly measuring for the presence of this reflex. We usually perform this at the same time as performing tympanometry and place a probe with a soft tip in the outer ear for about a minute and your child will hear a soft humming and then some beeps. The presence of this response indicates a healthy pathway through the ear, up to the brain and back to the stapedial muscle. These results can be used with our other hearing tests to help with diagnosis.



## For more information contact us on:

**Address:** Alder Hey Children's Hospital East Prescot Rd., Liverpool L14 5AB

**Phone:** 01512525943 or 01512284811

**Email:** [AudiologyMail@alderhey.nhs.uk](mailto:AudiologyMail@alderhey.nhs.uk)

**Website:** [www.alderhey.nhs.uk](http://www.alderhey.nhs.uk)

**Twitter:** @AHAudiology

Link to our Audiology department leaflet:



[https://alderhey.nhs.uk/application/files/8216/6195/1087/Childrens\\_Audiology\\_Department\\_PIA\\_G\\_410.pdf](https://alderhey.nhs.uk/application/files/8216/6195/1087/Childrens_Audiology_Department_PIA_G_410.pdf)

This leaflet only gives general information. You must always discuss the individual treatment of your child with the appropriate member of staff. Do not rely on this leaflet alone for information about your child's treatment.

This information can be made available in other languages and formats if requested.

