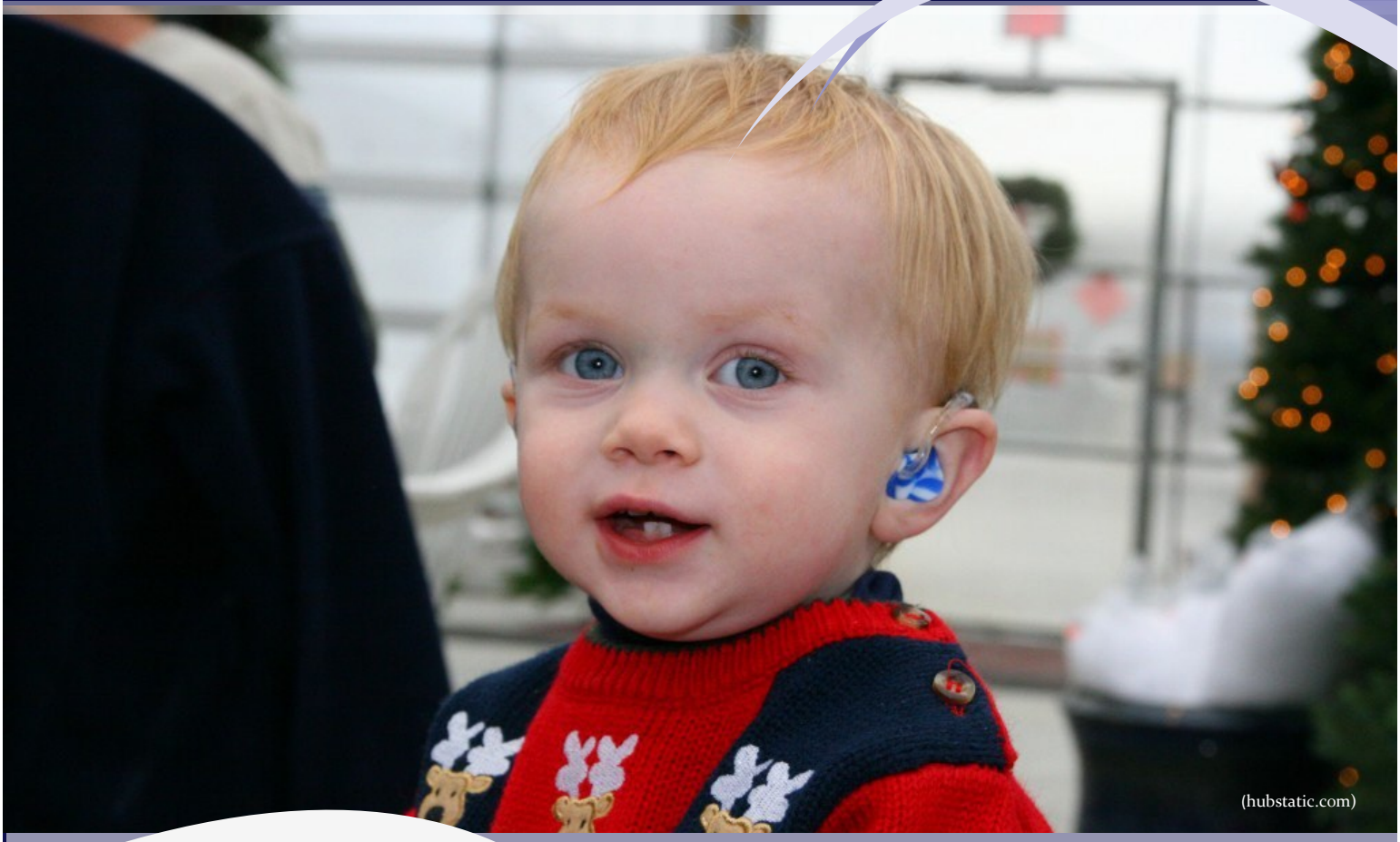
Paediatric Audiology Patient Pathway



Module Code MOD004200

Contents

Introduction

Bringing a life into the world is a special privilege for parents. Helping a child to grow into a happy, healthy and successful adult is a serious responsibility that can be equally rewarding and frustrating. The parental roles are challenging, even with a perfectly healthy child. However when there are health issues involved, the challenges become significantly harder.

With this in mind, the provision of paediatric audiology services takes into account the sensitivity of both parents and the children diagnosed with hearing deficiency. A paediatric patient journey starts from the birth of a child and continues up to the age of twenty-five.

This brochure aims to provide insight into each step of a typical patient journey from birth to the point of handover to adult audiology. It will outline who is included in the multi disciplinary team; examine the role of the audiologist and other team members; outline the diagnostic assessments used; the technology used and the shift in focus along the patient pathway. The united efforts of the multidisciplinary team ensure that the paediatric patients and their families receive the best possible treatment, advice, direction and support.

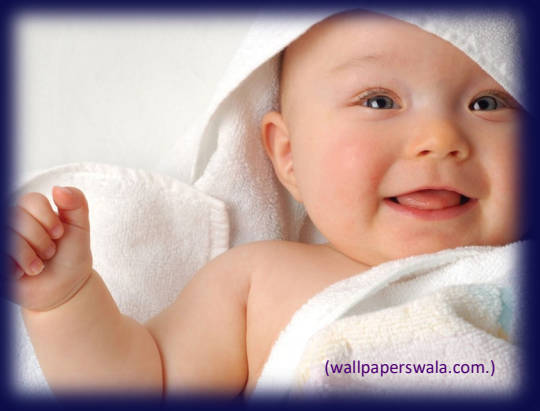
With 840 children born each year in the UK with significant bilateral hearing loss, and 90% of them born to parents with normal hearing, there is every reason to approach the delivery of paediatric services in a supportive and sensitive manner (patient.info).

Multidisciplinary Team

The multidisciplinary team is a versatile and comprehensive support network that includes the following:

Audiologist	Hearing Support Teacher
Ear Nose & Throat Specialist	Speech & Language Therapist
Geneticist	Auditory Verbal Therapist
Neurologist	Opthalmologist
Oncologist	Implant Team
Cardiologist	Nursery / Carers
Paediatrician	Charities
Radiologist	Parents

Figure 1: Multi Disciplinary Paediatric Team



(wallpaperswala.com.)

Paediatric Patient journey: from birth to 1 year

Newborn Screening

(worldpress.com)

Paediatric Audiology Timeline

From birth to 1 year - Hearing Assessment

This is a crucial stage in the child's development. At birth, the baby is given a physical examination, blood test and a hearing screening test. Since one to two babies in a thousand are born with congenital hearing loss, early detection is paramount since undiagnosed hearing loss will hamper the child's development. The hearing screening test consists of automated otoacoustic emissions (AOAE). If there are any contraindication to performing the test, automated auditory brain-stem response (AABR) will be performed (NHS UK). (See *Appendix 1* for AOAE & AABR procedure).

Behavioural Observation Audiometry (6 months +)

The test is performed in a sound field environment while the child is suckling or feeding. Narrow band noise or white noise is presented into the room and the child's reaction to sound is monitored.

Ling 6 Sounds Speech Test (6 months +)

The speech test is based on the child's recognition of speech sounds, 44 phonemes ('mm', 'oo', 'ss', 'sh', 'ah', 'ee'). The child is encouraged to mimic the sounds and the responses can suggest which speech sounds are audible to the child (Ling, 1976).

Role of the Audiologist

The audiologist's role at this early stage is tricky. They will need to assess the patient with information from AOAE and AABR to determine whether intervention is required at this vital stage. The results need to be compared against normative data and collaboration with colleagues within the department and within the MDT occurs to determine the course of action.

With behavioural audiometry and Ling speech texting, experience is needed on the part of the audiologist to determine subtle changes in the child's behaviour to be taken as a 'response'.

Based on the results of the diagnostic assessment the audiologist may need to get the parents to meet with a geneticist to look into suspected congenital loss. This information needs to be delivered sensibly given the sensitive nature of the implication.

Paediatric Patient journey: from birth to 1 year

Birth to 6 months (continued)

Overview of Paediatric Journey Developmental Milestones

Hearing and Understanding	Talking
Age Range:	Birth - 3 Months
Startles when surprised Responds to sounds, smiles, keeps quiet Is comforted by a familiar voice and stops crying Starts or stops sucking in response to sound	Makes sounds of enjoyment (cooing) Develops different cries for different needs Smiles when recognizing familiar faces
	4-6 Months
Eyes follow sounds Responds to tone change in voice Attracted to toys that make sound Responds to music	Immitates speech sounds, forms sounds (m,p,b) Laughs Vocalizes pleasure/annoyance Gurles when playing
	7-12 Months
Can play basic games ('peek-a-boo') Looks in direction of sound source Listens when talked to Associates words to objects (cup, spoon, ball) Understands basic comands (stop, come)	More complex words used (ta ta, bi bi) Non crying sounds used for attention Gestures when communicating Copies speech sounds and tones Uses some small words (mama, dada, dog)

Figure 2: Development milestones birth-12 months (asha.org)

Paediatric Patient journey: 1 to 3 years

(meriahnichols.com)

Patient Journey 1 to 3 years

Rapid development of cognitive function, motor skills, hearing and speech take place during this age range. Although it is still not possible to perform diagnostic audiometry, additional assessments can be performed to help the audiologist estimate the child's thresholds.

Visual Response Audiometry (VRA)

This assessment is performed by two audiologists working together. One audiologist is responsible for tone presentation and the other has an interactive role in focusing the patient's attention. The aim of the assessment is to observe the child's response to turn towards the direction of sound being presented. The number of responses are recorded as well as the free field tone presentation level.

Visual Response Audiometry

(m1.behhance.net)

Paediatric Patient journey:

1 to 3 years

Play Audiometry

(derbyhospital.nhs.uk)

Patient Journey 1 to 3 years (continued)

Estimating threshold can facilitate hearing aid fitting in line with the Newborn Hearing Screening Program Clinical Advisory Group (NHSP) (Feirn, 2014).

Play Audiometry

The child is conditioned to perform an action in response to a tone presentation. The child is congratulated for responding to an instruction such as, 'Put the man in the boat'. Correct responses are recorded as well as the intensity of the sound presentation. This can help to provide an estimate of threshold.

Overview of Paediatric Journey Developmental Milestones

Hearing and Understanding	Talking
Age Range:	1 - 2 years
Can identify body parts when asked to do so.	Increasing vocab every month - new words.
Can followsimple instructions ('Kiss the baby')	Combining words into phrase ('go bye-bye)
Listen to and respond to simple stories.	Uses more consonant sounds at the begin-
Identify pictures in books, point to objects.	ing of words. Better word formantation.
	2 - 3 years
Understands differences (up/down, big/small)	Uses 2-3 word sentences
Follows two requests ('Stand up and walk here')	Formant of sounds k,g,t,f,d,n.
Has a higher consentration span and listens to	Directs attention to objects by name.
stories for longer.	Asks 'Why?' a lot

Figure 3: Development milestones 1-3 years (asha.org)

Role of the Audiologist

The audiologist functions as a part of a team in carrying out the assessments. Experience is needed in interpretation the results and making a basis for estimating threshold for hearing aid fitting. The taking of impressions is a delicate task requiring experience, precision and a delicate touch. In view of the rapid rate of growth, moulds would typically be redone at regular intervals, as often as every two weeks. The audiologist will introduce questionnaires to help the parents to assess their child's development (LittlEars, ELF, Teach & Peach, LIFE/LIFE-R).

Paediatric Patient Journey: 3-5 years

Paediatric Tympanometry

(Derby Hospital NHS)

Patient Journey 3-5 years

The test battery includes: Play audiometry, Tympanometry, McCormick Toy Test and the Manchester Picture Test.

The Role of the Audiologist

The role of the audiologist will be to:

- Determine the best tamper proof product when considering hearing aid fitting and determine what features in the hearing aid to activate/ deactivate (i.e. disable volume control). Hearing aid fitting appointments 1.5 hours to be performed by 2 audiologists (Career Framework 6&7) (BAA, 2014).
- Re-assess estimated hearing thresholds.
- Perform tympanometry to determine the health of the conductive pathway.
- Use feedback from questionnaires to determine that the child's developmental milestones are being achieved.
- Take impressions to ensure moulds are redone to accommodate the change in size of the growth of the pinnae.
- Co-ordinate involvement with MDT (paediatrician, nursery, parents, hearing, speech and language therapist, hearing support teacher).

Overview of Paediatric Journey Developmental Milestones

Hearing and Understanding	Talking
Age Range:	3-4 years
Hear when called from another room. Listen to TV at the same level as the family. Undertand words for colours: gree, blue, red. Understand words for family members: brother grandfather, aunt	Use 4 sentences at a time to describe their day. Answer 'Who?' , 'What?', 'Where', questions. Say rhyming words: cat, mat. Use plurals; 'toys', 'buses' 'birds'. Increased vocabulary.
	4-5 years
Understand words for order: 1st, 2nd, next, last. Understand time words: today, tomorrow Follow longer directions: 'Pick up your bag, take it to your room and put it in the cupboard'. Hear most of what is said at school and home.	Names letters and numbers. Keeps a conversation going. Tells a short story. Responds to,'What did you say?' Uses sentences with more than one action: jump, play, run, walk.

Figure 4: Development milestones 3-5 years (asha.org)

Paediatric Patient Journey:

5-11 years

Hearing Support Teacher
(Successforkidswithhearingloss.com)

Patient journey 5-11 years

Full diagnostic audiometry is now possible. Air conduction (AC) and bone conduction (BC) can be done to confirm the child's hearing thresholds. Additional testing may include The Manchester Picture Test, AB word lists, and tympanometry.

The Role of the Audiologist

The audiologist now has the benefit of working to actual hearing thresholds established through a full diagnostic assessment. This will facilitate hearing aid selection and programming. In view of the child now exposed to a classroom environment, the audiologist will contemplate the use of assistive devices: FM systems, tele coil loop systems and remote microphones. These systems can provide additional assistance with clarity of speech in more challenging listening environments to improve the signal to noise ratio.

The child is likely to be able to comprehend using a volume control and manual programs. The audiologist will determine whether directional microphones will be set to be fully automatic or set up in manual programmes that can be activated when the child needs them.

The additional support members of the MDT will include the parents, teachers, the hearing support teacher, and the speech and language therapist.

Paediatric Patient Journey:

11-16 years

Patient journey 11-16 years

As the child matures, their range of activities will increase. Their social activities will incorporate a wider circle of friends and they will be exposed to more challenging listening environments. Audiometry with AC & BC will be used to monitor their hearing thresholds.

The role of the Audiologist

The audiologist will continue to monitor their hearing needs and ensure the patient has knowledge of manual and automatic functions to get the best use out of their hearing aids. Where appropriate, the audiologist may begin to introduce familiarization of adult audiology services in preparation of the eventual hand over.

Paediatric Patient Journey: 16-25 years

Transition can be defined as a purposeful, planned process that addresses the medical, psychosocial and educational/vocational needs of adolescents and young adults with chronic physical and medical conditions as they move from child-centred to adult oriented health care systems (NDCS, 2012)."

Patient Journey 16—25 years

Diagnostic audiometry with AC & BC will continue to be used to monitor the patients hearing thresholds and this will continue to influence the decision of hearing aid provision and programming requirements.

The Role of the Audiologist

The patient is likely to face a lot of changes in their individual circumstances. Decisions regarding further education and secular employment will need to be made and the hearing needs of the patient will need to be considered. The audiologist will work in conjunction with the parents, speech and language therapist, higher educational body or employer to ensure the hearing needs of the patient are catered for. Access to Work may need to be included to explore hearing aids and assistive devices that would be suitable for the patient.

The audiologist will facilitate handover of the patient to adult audiology and manage the transition of the patient.

Congenital verses Acquired Hearing Loss

How do adults presenting with a congenital history of hearing impairment differ in their requirements of adult audiology services?

Congenital Patient Prior to Transfer to Adult Audiology

As the paediatric timeline suggests, the patient journey from birth to transition at twenty-five years of age, is thoroughly attentive and supportive. Throughout the patient journey, the needs of the patient and the shift of focus of treatment changes however the intensity of support through the multidisciplinary team is consistent. For the patient, as far back as they can remember, all of their needs regarding hearing care have been provided by a well rounded support network.

Managing the transition of a patient from paediatrics to adult audiology is crucial. The patient will need to be aware of the service levels they are likely to expect, the technology they will have access to and who their support network will include.

Transition Management Facts

- Depending on the patients individual needs, transition planning may be introduced at 15 years of age and could involve both paediatric and adult audiology working together.
- Guidelines for transition management are set out by the National Deaf Children Society (NDCS).
- Good quality audiology services for paediatrics and young adults are accredited by The Royal College of Physicians through their Improved Quality of Physiological Services programme (IQIPS). This program includes patient centred transition management protocols (RCP, 2015).
- Transition management should take a holistic approach and be sensitive to the needs of the patient and their family.
- Independence is promoted through close co-operation between agencies and professionals involved in the patients management (NDCS, 2012).

It will be necessary for the patient to set realistic expectations and take ownership and responsibility for managing their hearing loss, equipment and appointment schedule. Imagine the vulnerability of a child with congenital hearing loss being discharged from the paediatric sanctuary in their teens when they are approaching adulthood.

Apart from the physical, mental and emotional obstacles they have overcome with regard to accepting their disability and limitations, they are at a turbulent time of hormonal change. There are the challenges of integrating socially, learning at school/college/university and challenges finding suitable employment.

They are likely to want their own independence yet still need attention and support. In some respects the transition into adulthood can be a terrifying prospect for them without direction and thus providing continued support up to the age of twenty-five is extremely beneficial to them.

Throughout the patient journey, the audiologist is the nucleus of the MDT. The constant evaluation involves determining which other members of the MDT are necessary to get involved to provide the patient with a support network catering for their individual needs.

The transition management is fundamental to the outcome of handover to adult audiology and should commence at an appropriate time during the paediatric patient journey, sometimes as early as 15 years old.

Congenital Hearing Loss Patient in Adult Audiology

Once transferred into adult audiology, management of change by a patient with congenital hearing loss can influence several factors of their further rehabilitation.

- Expectation of Support: The patient may not respond favorably to a new audiologist, smaller less diverse multi disciplinary team and new waiting room surrounded by new faces perhaps significantly older than what they were exposed to in paediatrics. If the patient has a negative view of their support network and feel uncared for, appointment integrity will be poor.

- Technology: Adult audiology may wish to introduce new prescription fitting formulae (NAL NL-1, NAL-NL2 as opposed to DSL), technology and assistive devices. There may be a new approach to ear molds with the audiologist endeavoring to maximize the acoustic seal and sound quality. However, the patient may be 'set in their ways' and feel their current technology and fitting work sufficiently as it is. The patient will have quite an high knowledge of existing technology being used but have a reluctance to change and accept anything different.

Patients with Acquired Hearing Loss in Adult Audiology

The most common cause of acquired hearing loss in elderly adults is presbycusis. More than 70% of adults over seventy have hearing loss however it takes on average ten years before help-seeking behavior is demonstrated (AOHL, 2016).

With the deterioration in hearing taking place over a long period of time, it can be difficult to accept that a hearing difficulty is emerging. Patients can remain in a state of denial for quite some time once a hearing loss has developed.

Some of the factors influencing their delay in help-seeking include: the stigma of wearing a hearing aid; a reluctance to be associated with the hard of hearing; bad experiences of other aid uses; poor advice from their GP or other trusted health care provider; dexterity; management of other chronic health conditions and perceived benefit (Clements, 2015).

In view of this, the role of the audiologist in dealing with elderly patients with acquired hearing loss involves far more than diagnosing the degree of loss. The audiologist needs to break down prejudice, determine the degree of disability and the handicap, assess the patients lifestyle and areas of difficulty and incorporate the patients family and significant other along the rehabilitation journey.

Given the late onset of post-lingual hearing loss, their speech and language abilities have been developed and thus differ from a congenital hearing loss patient.

Without prior exposure to audiology services an elderly patient with acquired hearing loss will have not know what to expect in terms of treatment other than shared personal experiences of other friends and family. They would have little to no knowledge of what technology is available or how to use it. It is important for the audiologist to establish a trusted relationship with the patient in order to provide help and direction on the best possible intervention and a carefully outlined management plan. This will include advice on cosmetics, technology, assistive devices, fitting formulae, and realistic expectation of adjustment to corrective amplification.

The patients support network with normally consist of the audiologist, the significant other, family and friends. Other specialists that may be included: ear nurse (for wax removal), GP, social worker, psychologist and tinnitus councilor/tinnitus support group.

Figure 5: Congenital verses Acquired Hearing Loss

Congenital verses Acquired Hearing Loss

Congenital	Acquired
Prelingual Hearing loss and potentially impaired speech & linguistic development.	- Mostly slow onset post-lingual. Potentially better speech & linguistic ability.
Unable to know what 'normal' sound is like since only ever exposed to amplification.	Aware of gradual decline in hearing and lack of clarity and can fully appreciate clarity restoration.
High level of acceptance.	Help seeking delayed 10-15 years: affected by denial, stigma, prejudice, fear.
Reliant on Multidisciplinary team for support.	Needs to learn to rely on a support netwok: family, significant other, audiologist.
Good aquired knowledge and experience of assistive devices, visual cues, speech reading, lip reading, possibly sign language.	Little to no understanding of assistive devices. May have growing reliance on visual cues as loss progresses.
Identity with hearing impaired or 'deaf community'.	No want to be identified as having hearing impairment.
Set in their ways regarding acceptance of ear mould amplification (DSL) and reluctance to change	Once in a state of acceptance, more willing to be guided by a trusted audiologist regarding technology

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Appendices

Appendix 1

Automated otoacoustic emission (AOAE). The test is performed in just a few minutes. A soft-tipped earpiece is placed in the baby's ear and presented with a range of clicks. The sound received in the cochlear displaces the basilar membrane and the displacement produces cochlear echoes that can be recorded by the test probe. This can test the health of the auditory pathway. The test however cannot always be carried out if there is a blockage i.e. embryotic fluid in the external auditory meatus (EAM), excessive noise or the baby is wrestles.

Automated auditory brainstem response (AABR). This is performed when AOAEs are not possible. Electrodes are placed on the baby's head and click sounds played through transducer cups placed over the baby's ears. The electrodes record neural activity from the ear to the brain stem in response to sound presentation. This can pick up any abnormality in response to sound and eliminate retro cochlear pathology (NHS UK).