Hearing Loss Guide

Welcome!

Welcome to Texas Children's Audiology. Our goal is to provide comprehensive, specialized care for children with all degrees and types of hearing loss, and to help them achieve the best possible communication outcomes.

Your child may be a candidate for hearing technology, such as hearing aids, in one or both ears. Hearing aids come in different types, sizes and colors. Your audiologist will guide you through this process and be there every step of the way. This guide is to be used as a reference to support and inform you.

Thank you for the opportunity to help your family through this journey. All of our team members are dedicated to helping children with hearing loss achieve their full potential. If you have any questions or concerns, please do not hesitate to call your Audiologist.

Sincerely,
Texas Children's Audiology

Important next steps

Otologic Evaluation – Following the diagnosis of hearing loss, your child must see an Ear, Nose & Throat (ENT) doctor to obtain clearance for appropriate hearing technology and recommendations for other testing as needed.

Hearing Aid Evaluation and Fitting – A hearing aid evaluation with a pediatric audiologist is necessary to determine the best hearing technology for your child. Fitting your child with hearing technology as soon as possible following the diagnosis of hearing loss is extremely important for your child's overall hearing, speech and language, and brain development.

- It may take several visits to obtain all the necessary information.
- Your child must wear the hearing aids/devices to all the appointments.

Speech & Language Evaluation – A speech and language evaluation by a therapist trained in working with children who have hearing loss is essential to monitor development. With appropriate evaluations and interventions, your child has the opportunity to develop listening, speaking and literacy skills on par with hearing peers. Children with hearing loss are at a higher risk for developing a speech and language delay. Speech evaluations are necessary to monitor progress of speech development. Evaluations may need to be completed every 6-12 months.

Other tests may be recommended by your ENT doctor

MRI and/or CT Scans – These tests will show the physician the inner ear, auditory nerve & related structures

ECG – This test will assess your child's heart activity

Genetics Evaluation – A genetics health provider may investigate genetic reasons for hearing loss

Neuropsychology – This evaluation will assess your child's overall development and learning abilities

Ophthalmology Consult – These tests will check your child's vision

Lab Work – This is to investigate a possible reason for hearing loss

Vestibular Testing – This test will assess your child's balance system

For questions or to schedule appointments
texaschildrens.org/departments/audiology

Texas Children's Hospital®

How we hear

An overview

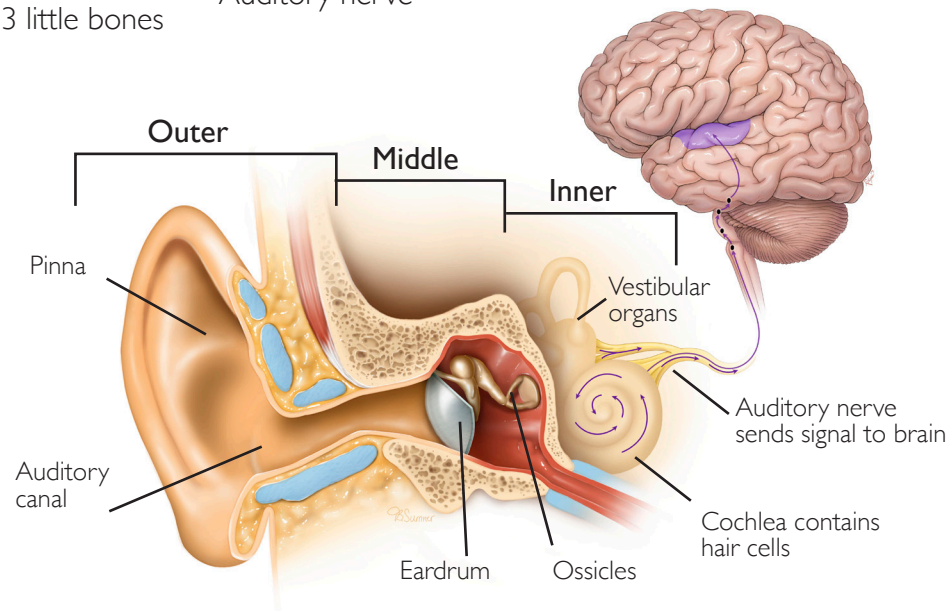
The auditory system, or hearing system, keeps us connected to our world 24 hours a day. This system never turns off! Even when we are asleep, the auditory system is working. The auditory system consists of the ears, auditory pathways and the brain. It is the brain that gives those sounds meaning.

Outer Ear
- Pinna
- Auditory canal

Middle Ear
- Eardrum
- Ossicles – 3 little bones

Inner Ear
- Round window
- Cochlea – responsible for hearing
  - Fluid filled, snail-shaped structure
  - Contains sensitive hair cells
- Vestibular organs – responsible for balance
- Auditory nerve

Central Audiory System
- Auditory pathway
- Brain



The role of each part of the auditory system in hearing a sound

- The pinna collects sound waves and funnels them into the auditory canal.
- This sound makes the eardrum vibrate.
- The ossicles connect to the eardrum. As the eardrum vibrates, the ossicles move.
- The movement of the ossicles creates enough force to move the fluid inside the cochlea.
- The movement of the fluid creates movement of the hair cells.
- The movement of the hair cells creates impulses that stimulate the auditory nerve.
- The auditory nerve passes sound to the auditory cortex of the brain.
- The brain processes the sound for meaning.

QR code: Youtube video by NIHOD: Journey of Sound to the Brain

Types of hearing loss

What are the most common types of hearing loss?

Conductive Hearing Loss (CHL) happens when sound has difficulty traveling through the outer ear and middle ear. This can be caused by ear wax, ear infections, fluid or abnormal structures of the ears. This hearing loss can typically be treated by medicine or surgery.

Sensorineural Hearing Loss (SNHL) happens when the inner ear is damaged, or sound does not travel normally from the inner ear to the auditory pathway. This is a permanent hearing loss.

Mixed Hearing Loss happens when there is both conductive hearing loss and sensorineural hearing loss.

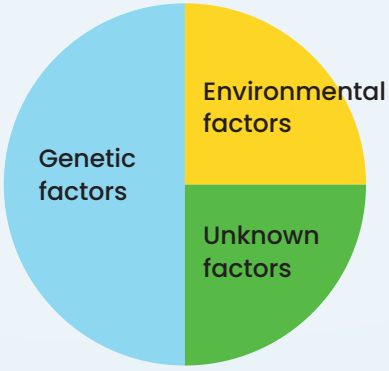
Auditory Neuropathy Spectrum Disorder (ANSD) happens when the sound is received by the cochlea but the nerve impulses within the auditory system are disrupted. Most often a child with ANSD has difficulty hearing and understanding speech.

What causes hearing loss?

About 50% of hearing losses present at birth (congenital hearing loss) are caused by genetic factors passed down from one or both parents. In some cases, a child's hearing loss may exist along with other conditions as part of a syndrome.

Another 25% of congenital hearing losses occur because of environmental factors during pregnancy or birth. These hearing losses may stem from an infection contracted during pregnancy (such as cytomegalovirus or rubella), a lack of oxygen (anoxia) or issues related to low birth weight and prematurity. Hearing loss may also be caused by lifesaving medications given to infants in the Neonatal Intensive Care Unit (NICU) or from acquired infections, like meningitis.

The cause of the remaining 25% of hearing losses are unknown (idiopathic).



What else can happen when a child has hearing loss?

- Speech and language delays
- Communication difficulties
- Language processing difficulties
- Developmental delays
- Learning problems
- Social isolation and poor self esteem
- Vocabulary develops slowly
- Listening comprehension struggles
- Difficulties pronouncing certain sounds, for example "sh", "s", "f", "th", "k", "m", etc.
- Speaking loudly because they cannot hear themselves
- Academic performance and achievements are poor compared to their peers
- Fatigue

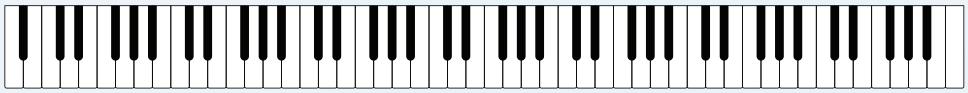
These are some examples of the effects hearing loss could have on your child. The greater the hearing loss, the more of these issues may arise for your child.

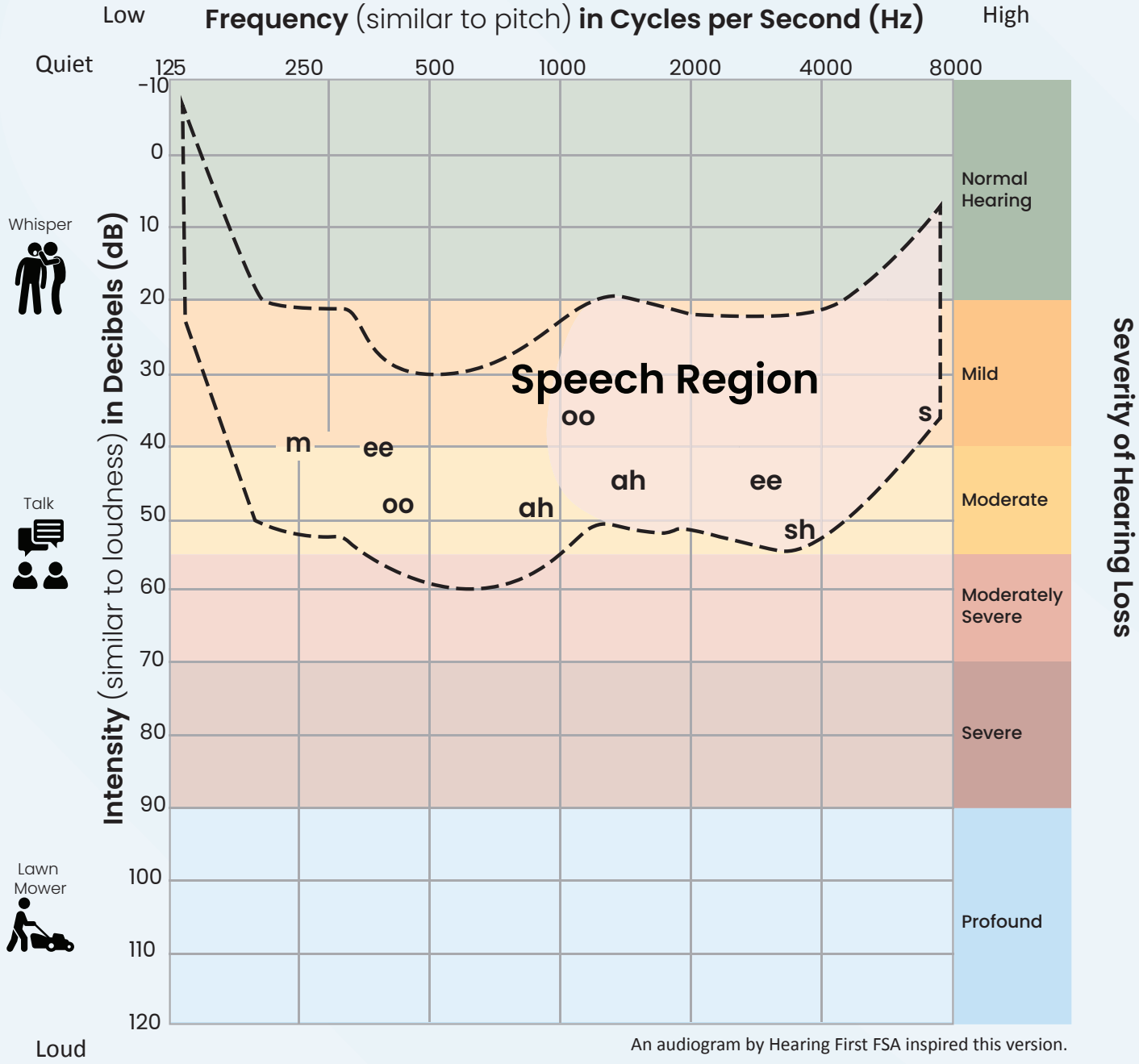
Why does the type of hearing loss matter?

The type of hearing loss your child has been diagnosed with determines which hearing device option is the best for your child. The audiologist will guide you through the process.

Audiogram of Familiar Sounds

An audiogram is a graph that shows at what intensity (decibel, dB) you can hear different sound pitches (Hertz, Hz). Audiometric testing will compare your child's results to the results of children with normal hearing. This audiogram shows the speech region of any person speaking approximately 3 feet away from the listener (60 dB SPL). Example speech sounds, from an adult female, are also included.





An audiogram by Hearing First FSA inspired this version.

Compare your child's audiogram results to this chart to better understand what they hear.

Different symbols are used to mark the hearing in each ear.

Left **Right**

Degree of Hearing Loss	Decibels (dB HL)	Sound Examples	Communication Concerns
Normal Hearing	0-20 dB HL	Rustling of leaves	Will hear speech and language clearly.
Mild	20-40 dB HL	Quiet/whispered speech	Difficulty hearing soft speech especially in noisy areas.
Moderate	41-55 dB HL	Normal conversational speech	Difficulty hearing speech clearly especially at a distance, in background noise, and when speaker is not facing the child.
Moderately-Severe	56-70 dB HL	Normal to loud speech, vacuum cleaner, baby crying	More difficulty hearing speech clearly especially at a distance, in background noise, and when speaker is not facing the child.
Severe	71-90 dB HL	Loud shouting, dog barking	May hear loud voices up close but continue to have difficulty understanding speech even with hearing aids. May need a cochlear implant to understand speech.
Profound	≥91 dB HL	Airplane, chainsaw, fireworks	Difficulty understanding speech with hearing aids. May need a cochlear implant to understand speech.

dB HL = Decibels, Hearing Level

Hearing Devices and How They Work

Traditional hearing aids (non-surgical)

- Make sounds louder
- Sounds still have to travel through the inner ear which is usually the area of impairment
- Hearing aids can help by making sounds louder, but if the hearing loss is very severe, the volume and the quality of the sound may not be enough for adequate language development and communication
- The style of the hearing aid will depend on your child's age, hearing loss and size of the ear canal. This type of hearing aid is for children who have an outer ear and ear canal

Bone-conduction hearing aid (non-surgical and surgical options)

- Bone-conduction hearing aids transfer sound by vibrations through the bones in the skull to the inner ear
- These devices are designed for people with certain types of hearing loss who cannot benefit from a traditional hearing aid. Your child may benefit from this device if they have:
  - Conductive or mixed hearing loss from congenital ear malformations
  - Chronic middle ear disease
  - Chronic external ear canal infections
  - Single-sided deafness
- There are 3 types
  - Osseointegrated/Implanted device (surgical)
  - Softband Adaptor (non-surgical)
  - Adhesive (non-surgical)

Cochlear implants (surgical)

If none of the above devices are an option for your child's hearing, they may be a candidate for a cochlear implant (CI). The CI works by bypassing the damaged hearing cells within the cochlea and stimulating the auditory nerve directly.

Hearing Assistive Technology (HAT)

These devices allow children to hear speech better in noisy listening environments, such as in a school setting. They work in conjunction with the hearing devices (hearing aids, bone anchored hearing aids and cochlear implants).

Insurance

Does my insurance cover the hearing devices?

Insurance coverage for hearing devices varies. Call your insurance to check benefits. Coverage for an assistive listening device may be different than other hearing devices.

Hearing aids are typically covered through Medicaid, if your child's hearing loss qualifies.

Insurance Plans in Texas

Most insurance plans in the state of Texas are required to provide hearing aid or cochlear implant benefits for a covered individual who is 18 years of age or younger. Coverage is limited to one hearing aid in each ear every three years and one cochlear implant in each ear with internal replacement as medically or audiologically necessary. There are exceptions.

Citation: Tex. Ins. Code Ann. § 1367.251 [as created by H.B. 490 (2017)]

Routine Evaluations Needed

After your child has been fit with a hearing device, there are several follow-up visits that are needed.

1. **Speech and language** to monitor progress of speech development and to make sure your child is receiving appropriate intervention. Evaluations may need to be completed every 6-12 months.

2. **Audiology** to monitor for any changes in hearing. The timing will depend on the child's age and amount of hearing loss.

   Hearing aid checks and ear mold appointments are necessary to ensure your child's hearing device is providing the appropriate benefit. And as your child grows, adjustments and new ear molds may be necessary to ensure the devices continue to fit appropriately.

3. **ENT** to check your child's ears each year. If you have any concerns, for example ear infections or a decrease in your child's hearing, visit your ENT sooner.

My Child's Hearing

There can be different types of hearing loss in each ear. The type of hearing loss your child has been diagnosed with determines which hearing device option is the best for your child. The audiologist is your guide through this process. Use this page to document your child's appointments and the results of previous hearing evaluations.

Date: _____

Right ear: _____

Left ear: _____

Date: _____

Right ear: _____

Left ear: _____

Date: _____

Right ear: _____

Left ear: _____

Date: _____

Right ear: _____

Left ear: _____

Date: _____

Right ear: _____

Left ear: _____

Important Contacts

Audiology appointments are necessary to monitor for any changes in your child's hearing. Call to make an appointment.

Houston 832-822-2778

Austin 737-220-8200