



# Children's hearing

## A guide for parents



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# Creating the future

Children are our future. By giving them access to a world full of sounds, we can help them to develop the hearing skills they need to build their future.

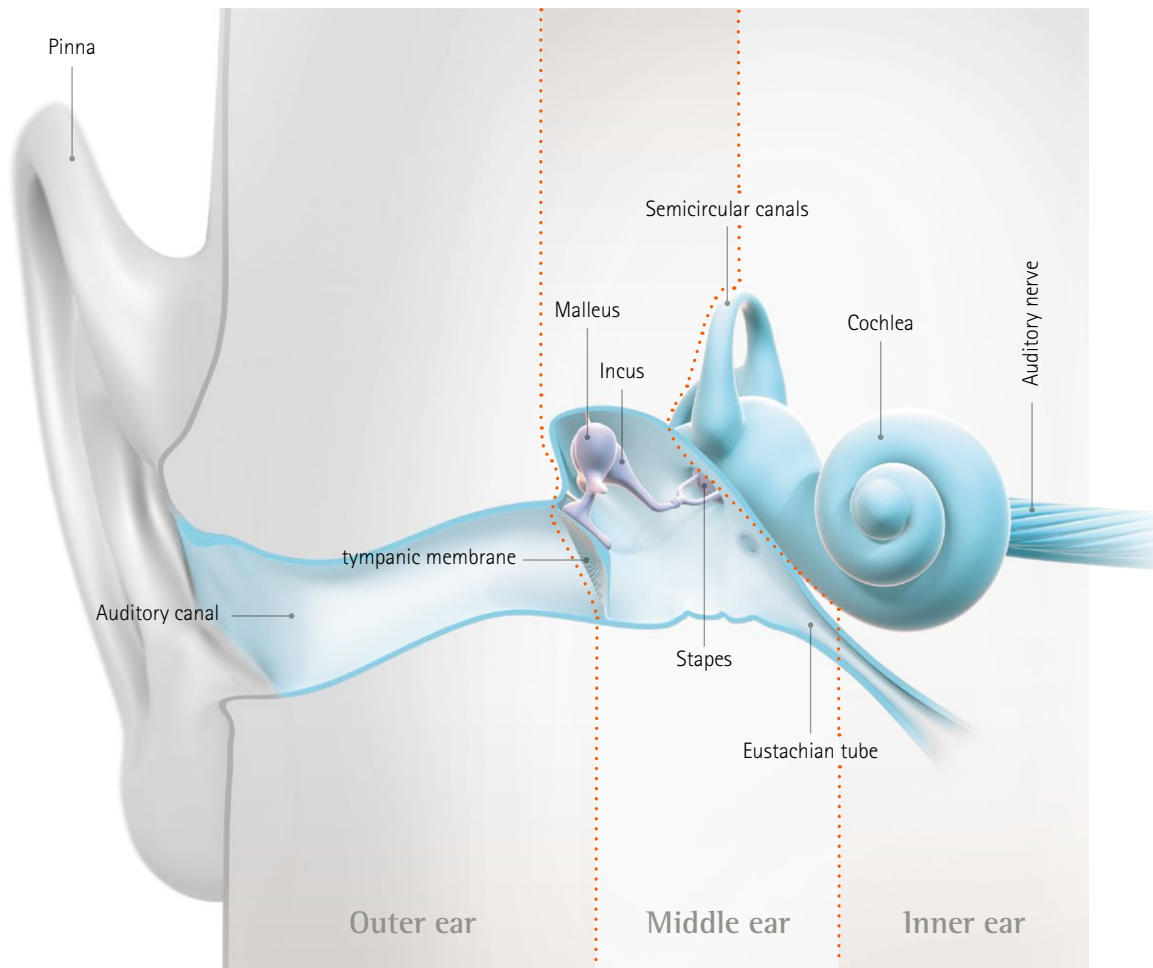
At Phonak, we understand the listening needs of children and the importance of providing them with optimal access to sound. Based on more than 40 years of expertise, and working cohesively with leading pediatric specialists, hearing care professionals and teachers, Phonak remains committed to creating innovative solutions for our future generations.

Providing children with quality hearing solutions from an early age is essential for developing speech, language, communication and social skills. The information in this booklet is designed to help you, as a parent, better understand your child's hearing and the milestones for their speech and language development.

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# How hearing works



The human ear has three main sections: the outer ear, the middle ear and the inner ear.

## The outer ear

This is the part of the ear that we see on each side of our heads and is called the pinna. Made from cartilage, the pinna is flexible and collects and channels sound into the auditory canal (ear canal). The ear canal amplifies the sound waves and further funnels them toward the tympanic membrane (eardrum).

## The middle ear

This is the space behind the eardrum made up of three small bones called ossicles. These bones, the malleus (hammer), the incus (anvil) and the stapes (stirrup), vibrate, magnifying the movements of the eardrum and transmitting the motions to the inner ear.

## The inner ear

This is made up of the cochlea, the actual sensory organ of hearing. The chambers of the cochlea are filled with fluid which causes changes in tiny structures called hair cells. This movement of the hair cells sends electric signals from the inner ear along the auditory nerve to the brain where they are processed as the "sounds" we hear.

# Learning to hear and listen

A newborn's cochlear sensitivity is similar to that of an adult's, but babies must learn how to use their hearing to form the foundations of communication.

## Localization

One of the earliest and easiest auditory skills to observe in your baby is localization – the ability to pinpoint the source of a sound. Because we hear through two ears (binaurally), we can localize sounds with extreme accuracy.

## Observing your child's localization ability

In general, newborns will move or widen their eyes when they hear a loud sound. This is known as the "startle reflex" and many loud sounds should prompt this reaction. When your child is approximately five or six months, you can better observe a true localization response by making soft sounds behind or beside your child while they are looking straight ahead. A soft rattle shake or a whisper should prompt your baby to turn toward the sound. It is very important to see how well your baby responds to soft sounds (such as the speech sound "s").

## Your child's speech and language development milestones

### 9 months

Demonstrates an understanding of simple words such as "mommy," "daddy," "no," "bye-bye."

### 10 months

Babbling should sound "speech like," with single syllables strung together ("da-da-dada"). The first recognizable words emerge around this time.

### 1 year

Speaks one or more real words.

### 18 months

Understands simple phrases, retrieves familiar objects on command (without gestures) and points to body parts. Has a spoken vocabulary of 20 to 50 words and uses short phrases ("no more," "go out," "mommy up").

### 24 months

Has a spoken vocabulary of at least 150 words, coupled with the emergence of simple two-word sentences. Most speech should be understandable to adults who are not with the child daily.

### 3 to 5 years

Uses spoken language constantly to express wants, reflect emotions, convey information and ask questions. A preschooler should understand nearly all that is said. Spoken vocabulary grows from 1,000 to 2,000 words, which are linked in complex and meaningful sentences. All speech sounds should be clear and understandable by the end of this developmental stage.

If you notice your child is delayed by 3 months compared to the above-mentioned developmental milestones, we recommend you have your child's hearing tested by a hearing healthcare professional.



## Signs of hearing difficulties

Sometimes a child will not respond because they are not paying attention. However, it is important to note if inconsistent responses are due to an inability to hear.

One of the most important signs of hearing loss is delayed development of speech and language. Other signs that a child may not be hearing normally include:

- Not aware that someone who is out of view is talking, especially when there are few distractions
- Startled or surprised look when they realize their name has been called regardless of noise level
- Sitting close to the television set when the volume is sufficient for other family members
- Increasing the volume of the TV or stereo to unreasonably loud levels
- Not responding to voices over the telephone and/or switching ears continually
- Not reacting to intense, loud sounds

# The following factors indicate that a child is at risk of hearing loss

## Newborns – birth to 28 days

- Failure of newborn hearing screening
- Family history of hereditary childhood sensorineural hearing loss
- *In utero* infection, such as cytomegalovirus, rubella, syphilis, herpes or toxoplasmosis
- Craniofacial deformities including those affecting the skull and face
- Birth weight less than 1,500 grams (approx. 3.5 pounds)
- High levels of jaundice that require transfusion
- Some medications containing aminoglycosides (such as antibiotics like Gentamicin) used in multiple courses or in combination with loop diuretics can damage the auditory system through toxins (ototoxic medications)
- Bacterial meningitis

- General health score (Apgar) of 0–4 at 1 minute or 0–6 at 5 minutes after birth
- Mechanical ventilation lasting 5 days or longer
- Findings associated with syndromes known to include sensorineural hearing loss

## Infants – 29 days to 2 years

- Concern regarding communication or developmental delay
- Bacterial meningitis or other infections known to cause sensorineural hearing loss
- Head trauma associated with loss of consciousness or skull fracture
- Otitis media with effusion (fluid) for 3 months or longer



# Children's hearing loss

Hearing loss in children can be caused by any number of conditions or illnesses during pregnancy, shortly after birth or throughout their childhood. In some cases, the hearing loss could be genetic, and often the cause is unknown.

## Conductive hearing loss

With a conductive hearing loss, the inner ear functions normally, but something affects the outer or middle ear, hindering sound from reaching the inner ear. Conductive hearing losses are mild to moderate in degree and are often treatable. Sounds from the outside are softer while your own voice actually sounds louder than normal. The following are some common causes of conductive hearing loss:

### Earwax (cerumen)

When wax becomes impacted in the ear canal, it acts as an ear plug, blocking sound waves from striking the eardrum. Excessive wax may be softened with wax-softening drops and flushed out or removed by a physician or other trained

personnel. Cotton buds should never be used to remove impacted wax because they may push the wax deeper into the canal or puncture the eardrum if inserted too deeply.



### Otitis media (middle ear infection)

This is the most common cause of hearing loss in children. Otitis media is a general term used to describe a variety of conditions affecting the middle ear. More than 85% of all children will have at least one ear infection in childhood.

Ear infections also may result from upper respiratory infections or exposure to cigarette smoke. The two most common types of otitis media are acute otitis media and otitis media with effusion.

There are various forms and causes of otitis media. The single most frequent cause is infected adenoids, which harbor bacteria or obstruct the Eustachian tube that connects the middle ear with the back of the nose (nasopharynx).

### Swimmer's ear

This painful bacterial infection occurs when the ear canal remains wet after bathing or swimming. It can cause the ear canal to swell shut, resulting in a temporary hearing loss.

## Sensorineural hearing loss

Sensorineural hearing loss is caused by dysfunction of the cochlea or auditory pathways to the brain and often is present from birth. It can also develop as a result of constant exposure to loud music or noise or exposure to medication that can damage hearing. These losses can range from mild to profound and may affect all or only certain frequency ranges.

Sensorineural hearing loss is permanent and cannot be treated with medicines or surgery. In most cases people with this type of hearing loss can be helped with hearing aids or in some cases by cochlear implants.

## Mixed hearing loss

Sometimes a combination of factors occur that affect both the outer or middle ear and the inner ear (cochlea), resulting in a mixed hearing loss.





## What to do if you think your child may have a hearing loss?

Hearing is not an all-or-nothing phenomenon. Even a mild hearing loss during those crucial first years of language and speech development can cause a child to misperceive speech sounds and may result in a delay of normal communication development. This is why after you have received a clear diagnosis, hearing technology should be chosen and fitted as soon as possible to ensure that your child can benefit early from auditory experience. In many countries, federal and state laws exist that mandate services for children who have hearing loss.

For further information about children's hearing visit our website at [www.phonak.com/kids](http://www.phonak.com/kids).





## We support your family

In addition to our dedicated portfolio of hearing solutions for kids, Phonak also offers a range of online support resources.

**[www.phonak.com/parents-resources](http://www.phonak.com/parents-resources)**

Online resources to support parents and their child every step of their hearing journey. Includes BabyBeats™, Leo's World and the Listening Room.

**[www.phonak.com/classroom-resources](http://www.phonak.com/classroom-resources)**

Online resources designed to help children with hearing loss succeed in the classroom and educate others on hearing loss.

**[www.phonak.com/teens](http://www.phonak.com/teens)**

A webpage designed specifically for teens, including topics that are particularly relevant for this age group.

**[www.hearinglikeme.com](http://www.hearinglikeme.com)**

Online community for those whose lives are affected by hearing loss. People from all around the world share stories that inspire hope in almost any hearing loss situation.

# Life is on

At Phonak, we believe that hearing well is essential to living life to the fullest. For more than 70 years, we have remained true to our mission by developing pioneering hearing solutions that change people's lives to thrive socially and emotionally. Life is on.

[www.phonak.com](http://www.phonak.com)

