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## Deafness - a range of causes

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### Summary

- Hearing loss can range from mild to profound and has many different causes, including injury, disease, genetic defects and the ageing process.
  - Hearing loss at birth is known as congenital hearing loss, while hearing loss that occurs after birth is called acquired hearing loss.
  - The most common cause of acquired hearing loss is noise, which accounts for over one quarter of people affected by hearing loss.
  - You can protect your hearing by reducing your exposure to loud noise or wearing suitable protection such as ear muffs or ear plugs.
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The ear is our organ of hearing. Hearing loss can range from mild to profound and has many different causes, including injury, disease, genetic defects and the ageing process.

The two types of hearing loss are conductive hearing loss and sensorineural hearing loss. When one has a combination of both conductive and sensorineural hearing losses it is called a 'mixed' hearing loss.

Hearing loss at birth is known as congenital hearing loss, while hearing loss that occurs after birth is called acquired hearing loss. The most common cause of acquired hearing loss is noise, which accounts for over one quarter of people affected by hearing loss.

### Ear anatomy

The **ear** is made up of three different parts:

- outer ear – this is the part you can see. Its shape helps to collect sound waves. The tubular shape of the ear canal leads inward to the eardrum
- middle ear – this is separated from the outer ear by the eardrum. The middle ear contains three tiny bones called the malleus (hammer bone), the incus (anvil bone) and the stapes (stirrup bone). These bones amplify the movement of the eardrum produced by sound waves. The Eustachian tube connects the middle ear to the back of the throat and helps to equalise air pressure
- inner ear – sound waves are picked up by a little spiral-shaped organ called the cochlea. Hair cells on the cochlea sense the vibration and pass the message – interpreted into electrical impulses – on to the brain via the cochlear nerve.

### Conductive hearing loss

Conductive hearing loss affects the transmission of sound between the outer and inner ear. For example, this may be caused by:

- impacted wax in the ear canal
- failure of the three tiny bones inside the middle ear to pass along sound waves to the inner ear
- failure of the eardrum to vibrate in response to sound waves. A build-up of fluid in the middle ear, for example, could dampen the movement of the eardrum.

In many cases, treatment is available for conductive hearing loss and normal hearing will return.

### Sensorineural hearing loss

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Sensorineural hearing loss occurs due to damage to the inner ear (the cochlea). For example, sensorineural hearing loss can be caused by disease, trauma or some other disruptive event targeting the cochlea and/or the cochlear nerve. The rest of the ear – including the tiny bones and eardrum – may be working, but the electrical impulses aren't able to reach the brain

Most cases of sensorineural hearing loss don't respond to treatment

### Causes of temporary hearing loss

Some of the causes of temporary hearing loss include:

- **wax** – the ear canal secretes cerumen, a waxy substance that helps to protect and lubricate the tissues. A build-up of wax can block the ear canal, leading to short-term conductive hearing loss
- **foreign object** – similarly to ear wax, a foreign object stuck inside the ear canal (such as the tip of a cotton bud) can temporarily cause hearing loss
- **excess mucus** – the common cold, a bout of flu, hay fever or other allergies can cause an excess of mucus that may block the Eustachian tube of the ear
- **ear infections** – including otitis externa (infection of the outer ear) and otitis media (infection of the **middle ear**). Fluid and pus don't allow the full conduction of sound.

### Causes of hearing loss

Some of the many causes of hearing loss include:

- **hereditary disorders** – some types of hearing loss are hereditary, which means parents pass on affected genes to their children. In most cases, hereditary hearing loss is caused by malformations of the inner ear
- **genetic disorders** – genetic mutations may happen: for example, at the moment of conception when the father's sperm joins with the mother's egg. Some of the many genetic disorders that can cause hearing loss include osteogenesis imperfecta, **Trisomy 13** (Patau syndrome) and **Treacher Collins syndrome**
- **prenatal exposure to disease** – a baby will be born deaf or with hearing problems if they are exposed to certain diseases in utero, including rubella (**German measles**), **influenza** and **mumps**. Other factors that are thought to cause congenital deafness include exposure to methyl mercury and medications such as quinine
- **noise** – loud noises (such as gun shots, firecrackers, explosions and rock concerts), particularly prolonged exposure either in the **workplace** or recreationally, can damage the delicate mechanisms inside the ear. If you are standing next to someone, yet have to shout to be heard, you can be sure that the noise is loud enough to be damaging your ears. You can **protect your hearing** by reducing your exposure to loud noise or wearing suitable protection such as ear muffs or ear plugs
- **trauma** – such as perforation of the eardrum, fractured skull or changes in air pressure (barotrauma)
- **disease** – certain diseases can cause hearing loss, including **meningitis**, mumps, **cytomegalovirus** and **chickenpox**. Severe cases of jaundice can also cause hearing loss
- **other causes** – other causes of deafness include **Meniere's disease** and exposure to certain chemicals.

### Age-related hearing loss

Often, hearing gradually becomes less acute as we age. This affects the clarity with which we hear speech.

Age-related hearing loss (presbycusis) typically begins with the loss of higher frequencies, so that certain speech sounds – such as 's', 'f' and 't' – end up sounding very similar. This means the person can hear, but not always understand. For example, the words 'see' and 'tea' might sound the same.

### Tinnitus is often associated with hearing loss

**Tinnitus** means a sensation of noises in the ears or head in the absence of any environmental sounds. These sounds can range from ringing, buzzing, whooshing, whistling, roaring, humming or cricket sounds.

**Tinnitus is not an illness or disease.** Some of the triggers of tinnitus include middle ear infections and damage to the ear from loud noises. Tinnitus may occur on its own, or in conjunction with hearing loss.

### Where to get help

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**betterhealth.vic.gov.au**

- Your doctor
- Audiologist
- **Better Hearing Australia**, Victorian branch Tel. 1300 242 842

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