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When you’re going to have a baby, it’s like planning a wonderful vacation trip to Italy. You get a bunch of guidebooks and make all your plans. The Colosseum, the Michelangelo David, the gondolas in Venice. You get a book of handy phrases and learn how to say a few words in Italian. It’s all very exciting. Finally, the time comes for your trip. You pack your bags and off you go.

Several hours later the plane lands. The stewardess comes in and says: “Welcome to Holland.” “Holland?!” you say. “Holland? I signed up for Italy! All my life I’ve dreamed of going to Italy!” “I’m sorry,” she says. “There’s been a change and we’ve landed in Holland.”

“But I don’t know anything about Holland! I never thought of going to Holland. I have no idea what you do in Holland!”

What’s important is that they haven’t taken you to a terrible ugly place, full of famine, pestilence and disease. It’s just a different place.

So you have to go out and buy a whole new set of guidebooks, you have to learn a whole new language and you’ll meet a whole new bunch of people you would never have met otherwise.

Holland. It’s slower paced than Italy, less flashy than Italy – but after you’ve been there for a while, and you’ve had a chance to catch your breath, you look around and discover that Holland has windmills and Holland has tulips. Holland even has Rembrandts. But everyone you know is busy coming and going from Italy and they’re all bragging about the great time they had there. And for the rest of your life you will say, “Yes, that’s where I was supposed to go. That’s what I planned.” And the pain of that will never, ever, ever go away. And you must accept the pain because the loss of that dream is a very, very significant loss.

But if you spend your time mourning the fact that you never got to Italy, you may never be available to enjoy the very lovely, very special things about Holland.

© 1987 by Emily Perl Kingsley. All rights reserved. Reprinted by permission of the author.
It is with much pleasure that Australian Hearing provides you with your copy of Choices. We know that the diagnosis of hearing loss can be a difficult and confusing time for families and Choices aims to help you through this challenging period by providing timely and useful information. Please feel free to discuss any issues you have with your audiologist. They are here to help you.

Choices is intended for use by parents and families of children newly diagnosed with hearing loss and will guide you through the first six months after diagnosis. You may find the information useful further down the track as well. It is not a complete and detailed textbook on audiology or educational philosophy; rather it provides basic information for you to use while you are learning about hearing impairment and related issues.

The information in Choices was collated by Australian Hearing with the help of representatives from a wide range of service organisations and consumer groups, including parent groups, educational programs and groups representing deaf people. Their contributions were made with an appreciation of how you as parents may be feeling and to help fulfil your need for information at this time. There are two parts to Choices: this book contains general information; your audiologist will provide you with a supplement containing information about services in your own state.

The book is called Choices because the information it contains will assist you in the choices you will be making. No one can tell you what is best for your child and your family. To make an informed choice about educational options, we suggest you make an appointment to visit each facility and then make a decision as to which program best suits the needs of your child and your family.

The choices that you make at this time may need to be reviewed in the future. Choices made now do not have to be permanent. There is nothing wrong with changing your decision if circumstances alter – in fact, flexibility and an open mind are great strengths. Be guided by your child’s abilities and personality. It is important to remember that each child is unique and looking at your child’s individual needs over time will help you make the appropriate choices.

Everyone involved with young children who are deaf or hearing-impaired understands that the time of diagnosis is a difficult and sometimes confusing for parents. The purpose of this book is to unravel some of the “mysteries” associated with hearing impairment and deafness and provide simple explanations about the various educational programs offered.

You will have been given this book by your Australian Hearing audiologist. Please do not hesitate to discuss any concerns you may have with your audiologist. Australian Hearing audiologists have no bias toward particular programs and can assist you in arranging appointments to visit educational programs if this would be helpful.

You and your child have an important job ahead of you but you are not on your own. This book will point you to the people and services that can help you prepare the way for your child while providing you and your family with support and information. We hope that Choices will help you discover the best pathway for you and your family.

FOOTNOTE:
Different terms are used by different people to describe varying degrees of hearing loss. The term hearing-impaired is used to describe people with any degree of hearing loss. Hard of hearing is used to describe those who have a hearing loss and communicate predominantly orally. Deaf is a medical term describing significant hearing loss. Some people who are deaf view themselves as part of the Deaf community and are described as Deaf with capitalisation.
Australian Hearing was established by the Federal Government in 1947 to assist World War II veterans with ear damage and to help the large number of children born deaf following the rubella epidemic of the late 1940s. It is now one of the largest and most comprehensive providers of hearing services in the world.

Our national Children’s Services Program supports children who have a hearing loss and their families. We aim to optimise each child’s speech, education and communication development.

The Federal Government funds this program and there is no charge for our services. If a child is fitted with a hearing aid, families are required only to pay a small fee each year for maintenance of the device and batteries*.

* $26.25 per year for one child or $42.00 per year for families with more than one child (as at 1 January 2005).
The Australian Hearing Children’s Services Program includes:

- Comprehensive hearing assessments for children of all ages
- Individual assessment of each child’s and family’s needs
- Fitting of the latest technology hearing aids where appropriate
- Fitting of other devices (FM systems and tactile aids) where appropriate
- Evaluation of the fitting and the child’s performance with hearing aids or other devices
- Assessment of the child’s ability to hear speech
- Regular monitoring of each child’s hearing and hearing aid benefit
- Replacement and updating of devices as required
- Regular visits to early intervention programs and educational facilities for hearing-impaired children
- Support for teachers including advice on management of hearing aids and other devices in the classroom and detailed reports
- Repairs for the majority of devices
- Batteries, replacement parts, repairs and upgrade processors for young children and young people using cochlear implants
- Postal service for batteries and technical repairs
- Information sessions for families, educators and community groups
- Ear health care training for health workers in Aboriginal and Torres Strait Islander communities
- Referral to other agencies where appropriate

**Australian Hearing has a wide range of hearing aids including the latest digital and digitally programmable hearing aids which are provided at no cost to families.**

Our Paediatric clinical services are provided by university-trained professionals with postgraduate qualifications in audiology. Audiologists working with children receive additional specialised training and experience to be able to provide the care needed by children with hearing loss and their families.

*Australian Hearing* has an important liaison role within the community. Our audiologists communicate with teachers from all educational programs. We believe in the importance of working in partnership with those who are caring for children with hearing loss to help each child reach his or her potential.

*Australian Hearing* also plays an important role in independent research and development of new products and services for the Australian community. Our website at www.hearing.com.au contains information about hearing, technology, research and our specialist services.

Each year we publish *Hear & Now*, a magazine providing information for children who are hearing-impaired, their families and interested professionals. *Hear & Now* is available from any of our hearing centres at no cost.

We are keen to hear your thoughts and comments at all times so that we can continue to be responsive to your changing needs. You should feel free to ask any questions you have about your child’s hearing and management and to tell us if you have ideas or suggestions about ways we can serve you better.

*Australian Hearing* has 78 permanent centres throughout Australia and provides limited services at more than 200 visiting sites. To provide better access to services for Indigenous clients, *Australian Hearing* has also developed culturally appropriate outreach programs, where services are delivered away from mainstream hearing centres. These outreach programs are known as *Australian Hearing’s Specialist Programs for Indigenous Australians* (AHSPIA). Local outreach programs are delivered in partnership with key community people, such as Aboriginal and Torres Strait Islander health workers and education officers.

To contact *Australian Hearing*, ring 131 797 and your call will be connected to the nearest permanent centre. Every centre has telephone and fax facilities and many also have TTY facilities.

See the supplement in the back of this book for the full address and contact details for each *Australian Hearing* location.
We understand the wide-ranging implications of hearing impairment on a child’s speech, language, educational and social development. We can work with children with all degrees of hearing loss, and all ages and abilities. Our expertise has been developed over more than 50 years and is supported by world-leading research.

We take a holistic approach to Paediatric Audiology. We know that you cannot separate the ears from the child, the child from the family or the family from the community.

We believe in the rights and the abilities of parents to make good choices in the audiological management of their children. We willingly provide our expertise to assist them in their choices.

We understand the benefits and limitations of technology in relation to children and will provide honest and informed advice to families.

We care about our clients and their families. We do our best to help them achieve their goals.

We believe in the right of every deaf and hearing-impaired child to communicate as effectively as possible with as wide a range of people as possible. We acknowledge that there are many paths to this end. Our expertise lies in helping children to make the best use of their hearing.

We believe that deaf and hearing-impaired children can grow up to become happy, healthy and active participants in their community.

We do not undervalue the potential of any child.

We respect cultures different from our own. In particular, we respect and seek to understand the Deaf culture. We acknowledge that Auslan is one of the living languages in use by members of our culturally diverse Australian community.

We are respectful of other professions and of views different from our own.

We are realistic in our expectations of families and other professionals.

We undertake to use available funding as efficiently and equitably as possible to optimise our contribution to assisting each individual child achieve their communication potential.

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**Australian Hearing’s Paediatric Charter**

Australian Hearing’s Paediatric Audiologists are experts in the audiological management of hearing impairment in children.
Feeling hurt and angry
Broken hearted too
Where do we start?
What do we do?
Talk to different people
They don’t really mind
Ask all of your questions
The answers you will find.
My daughter was 18 months old
Her loss is “profound”
Hard work and dedication
Results can be found.
The cause of her deafness
Specialists cannot say
Wish there was a reason
I’d find it easier that way.
Talking with our hands
Using our voices too
Learning how to sign
That’s what we decided to do.
Talk to your child
Tell them everything
How blue is the sky
Songs that you should sing.
The going’s been tough
Ten years have now passed by
She’s doing very well
Brings a tear to my eye.
If only I had known
What I know now
Things really do get easier
You find the strength somehow.
Remember they are children
Treat them as they are
Love them with your heart
They can and will go far.
When parents discover that their child has a hearing loss, whether it is mild or profound, they go through a range of emotions. People have different ways of coping with difficult situations. Family members and friends may react in different ways to the news and provide varying degrees of support. We are all individuals with different beliefs, attitudes and abilities to manage major changes in our lives.

The range of emotions experienced by parents is very broad. It is not unusual to experience sadness, guilt, fear, anger, denial, stress or a sense of overburdening responsibility.

For parents who are deaf or hearing-impaired themselves, the diagnosis of hearing loss may be something for which they were somewhat prepared. Other parents may experience relief because the diagnosis may answer questions about their child's behaviour and development.

However, for most parents this is a time of shock, fear and sadness as they try to reach some understanding of the impact of the hearing loss on their child's life and that of their family.

As parents, we have an intrinsic wish to have children who will travel easily along their paths in life. When it is found that a child has a special need, parents may experience an overwhelming sense of loss and may grieve for the life they thought their child would lead.

The significance of the loss will vary for each person affected and so their grief will be different. When this difference is between the mother and father there is a potential for tension and a lack of understanding.

Different emotions are experienced by parents at different times during their child's life. Parents may experience sadness when they learn about their child's hearing impairment or deafness. It may be a pervading feeling throughout their child's early years. Most parents say they learn to live with this feeling as they incorporate the reality of the diagnosis into their new view of life. It is not uncommon for these feelings to become stronger again at important times of the child's life, such as starting kindergarten or changing schools. With time, parents usually find that happiness becomes the more dominant emotion in their lives.

Guilt (in varying degrees) is a common experience for most parents. News of deafness or hearing impairment may prompt a sense of guilt in one or both parents, or in other family members. Parents may feel guilty that they were unable to ensure perfect hearing for their child, or that they failed to detect their child's hearing loss sooner. They may think back to situations at home where signs of a hearing loss were apparent but possibly discounted because their child appeared fine on other occasions.

If parents experience anger about their child's deafness or hearing impairment, this can be a difficult emotion to deal with. Anger may erupt at the most unexpected times or may never be fully expressed. Sometimes anger can be redirected to other people, including family members, doctors, teachers and even other children within the immediate or extended family. It takes time for life and feelings to settle.

Being told that a child is deaf or hearing-impaired can be very painful. Parents or family members may consciously or unconsciously deny the information presented to them by doctors, teachers or audiologists. However, if parents continue to deny the diagnosis, this can interfere with their child's progress and the parent's ability to ensure their child reaches their potential.

Some parents have concerns regarding their child's emotional and social development. They may worry about the way in which their family, friends and others will react to their child. They may be concerned that their child will be teased or ridiculed and question how their child will handle this. Some parents worry about their child's marital future or their educational and career opportunities.

Parents may have questions about medical issues related to their child's deafness. They may wonder whether their child will have to deal with any physical pain. Getting conclusive results at initial tests can prove difficult and this can add to the frustration and bewilderment.
For most parents, news of their child’s deafness or hearing impairment is an introduction to a lot of new words. Parents will meet new professionals such as audiologists, ear nose and throat (ENT) specialists and geneticists. Some parents may experience fear when they are introduced to a new field of knowledge. They may doubt their ability to comprehend such a new area of knowledge or their ability to make the best decisions for their child. To allay these fears, it can be beneficial to meet a person who is deaf or hearing-impaired or other parents who can offer a personal perspective. A sense of isolation is common and support services can be crucial at this time.

Gradually, most parents begin to gain confidence in their ability to understand their child's hearing loss and particular needs. They start to develop an idea of the direction they wish to take with their child. Increasingly, there are days when the focus is not their child’s hearing impairment or deafness. With varying periods of time, most parents are truly able to enjoy life with their child and to look forward to the future with hope.

How well will my child hear?

IT IS NOT POSSIBLE TO PREDICT EXACTLY HOW WELL A PARTICULAR CHILD WILL HEAR AND DEVELOP WITH HEARING AIDS OR A COCHLEAR IMPLANT. CHILDREN WITH SIMILAR AUDIOGRAMS MAY PROGRESS VERY DIFFERENTLY DESPITE EARLY DETECTION, APPROPRIATE HEARING AIDS AND THE BEST EFFORTS OF THEIR PARENTS AND TEACHERS. SOME OF THE IMPORTANT FACTORS INFLUENCING A CHILD’S PROGRESS IN USING THEIR HEARING INCLUDE THE:

* age at which the hearing loss occurs  
* parts of the auditory system affected by the hearing loss  
* extent of the hearing loss  
* age at which intervention is begun  
* effectiveness of any device given or a damaged hearing system  
* consistency of use of any device  
* ability of the child to understand speech in a variety of listening situations  
* child’s own speech, language and learning abilities  
* family’s resources and abilities  
* available teaching resources and skills.

Predictions about an individual child's potential must be made cautiously. However, we can say that in the great majority of cases, hearing aids, cochlear implants and FM systems will greatly improve a child’s ability to hear sounds and to learn and understand speech. For parents, it is difficult to make choices about early intervention and communication methods when many important factors are unknown.

With time, you will learn much more about your child’s auditory abilities, their needs and strengths and about your family’s resources. As noted in the introduction, flexibility and an open mind are important as you review your choices in the light of increasing knowledge about your child’s abilities and development.
Mother’s intuition and “gut feelings” are important; more professionals now recognise this.

If you are unhappy with an opinion regarding your child, seek a second opinion – it’s your right.

Allow yourself to grieve. It’s natural.

Try to remember the rest of the family – their welfare is important too.

Read as much as you can and talk to people about your child’s hearing loss, so that any decisions you make are fully informed ones.

No matter how much you do for your child, you may always feel that it is never enough. Don’t let anyone intimidate you or make you feel guilty because you can’t manage more. Everyone has different limits of coping.

Don’t blame your child with the hearing loss for everything that goes wrong in your family.

Keep a written record of your child’s early language development, be it Auslan, English or both. Record words that are used in correct context and that you are sure your child understands. This is useful for teachers of the deaf to see where language weaknesses lie and is a morale booster when you think there is no progress being made.

Use foam alphabets in the bath and spell out words for your child at each bath time, starting at a young age.

Don’t be surprised if your child doesn’t appear to need as much sleep as everyone else in the family. Because they may not be receiving as much auditory stimulation, particularly if “un-aided”, they just may not be as tired. Think about how worn out you feel if someone incessantly chatters to you ALL day! Attempting to get your child to sleep when they are not tired may be a nightmare for everyone in the family.

At night, your child may be more afraid of the dark than hearing children. A nightlight may be a useful investment.

Consider using “captioning” on TV even before your child learns to read, so that they begin to learn the importance of written communication (see pages 33 and 60 for more information on captioning).

Even if your child is not profoundly deaf, consider learning to sign. Many people who are hearing-impaired or deaf choose to learn to sign later in life and often regret that they had not learnt earlier.

Don’t be embarrassed about signing in public. The majority of people that stare do so because they are fascinated by the language, which can be beautiful to observe. Be proud of the fact that you are bi-lingual!

DI LIBBITER (MOTHER OF A CHILD WITH HEARING LOSS, TASMANIA) AND FRIENDS
What is early intervention?

Early intervention programs are based on the understanding that provision of assistance to families early in a child’s life will maximize the opportunities and outcomes for the child’s development across a wide range of areas. In particular, for children with impaired hearing, there is a focus on language development. However, other areas of attention will include social, emotional, motor (physical) and cognitive development.

Early intervention may have a family or child focus and programs may be centre-based, home-based, or have a combination of service delivery options. Services are typically available from the time of identification of a child’s hearing impairment. There are many strong reasons for beginning as early as possible.

Although there are differences in the services offered by the various early intervention agencies that work with children and their families, they typically all share the following aims:

* To assist parents to gain knowledge, understanding and skills relating to their child’s hearing impairment as a basis for making informed choices about associated courses of action.

* To assist parents to gain the knowledge, understanding and skills necessary to interact with their children to promote communication and language skills.

* To provide or facilitate the delivery of specialised educational or other developmental therapy support directly to children where required.

* To provide families with the opportunities to meet other families who have children with hearing impairment and to generally support the information needs of parents in regard to their children with impaired hearing.

Parents have the right to choose the service that best meets these needs and to move from one service to another at any stage.

People involved

When a child is diagnosed as having a hearing impairment, there suddenly seems to be a lot of new people involved in your family’s life. In this section we have included descriptions of the professional roles of many of these people.

Not all children will have involvement with all of these people. This section will help you understand where the different professionals may fit in to your child’s program.

You may not always feel comfortable or satisfied with the advice or opinion of a particular professional. If this happens we encourage you to seek another opinion.

**AUDILOGISTS**

Audiologists are university-qualified hearing specialists. They conduct hearing tests and perform other diagnostic techniques. They also prescribe and fit hearing aids and assistive listening devices and offer counselling and auditory rehabilitation.

**AUDITORY-VERBAL THERAPISTS**

An auditory-verbal therapist is a teacher of the deaf, speech pathologist or audiologist who has sat the international qualifying exam and is licensed by Auditory-Verbal International. The auditory-verbal approach is based upon a logical and critical set of guiding principles. These enable children who are deaf or hard of hearing to learn to use even minimal amounts of amplified residual hearing, or hearing through electrical stimulation (cochlear implants), to listen, process verbal language, and speak. The goal of the auditory-verbal approach is for children who are deaf or hard of hearing to grow up in typical learning and living environments and to become independent, participating citizens in mainstream society.

The auditory-verbal philosophy supports the option for children with all degrees of hearing impairment to develop the ability to listen and to use verbal communication within their own family and community constellations.

**AUSTRALIAN HEARING TECHNICIANS**

Australian Hearing technicians are trained in the repair and technical management of hearing aids and other assistive devices. They are located in most Australian Hearing centres.

**COUNSELLORS**

Counsellors have special skills in listening to people and assisting them with understanding problems and making choices. They work with families or individuals.
CLINICAL GENETICISTS
Clinical geneticists are doctors who have had special training in the way in which diseases or characteristics are passed from one generation to the next. Geneticists may be able to advise you on the chances of deafness occurring if you have more children and the likelihood of your child passing on deafness to their own children.

EAR, NOSE AND THROAT (ENT) SPECIALISTS
These are surgeons who specialise in the management of disorders of the ears, nose and throat. An ear, nose and throat (ENT) specialist examines children’s ears before hearing aids are fitted to determine if any additional problems are present. The ENT specialist may carry out any treatment required, including surgery – for example, the insertion of grommets – and is involved in the ongoing management of any ear infections or wax removal. An ENT specialist is an integral part of the cochlear implant assessment team.

GUIDANCE OFFICERS
Guidance officers work within the educational setting and provide guidance and support counselling services to schools and their communities. The emphasis is on support for educational, physical, social, emotional and intellectual development of children. This support is provided through activities such as assessment, intervention, counselling, addressing behaviour management issues, and supporting the educational and personal welfare of students.

INTERPRETERS
Interpreters convey one person’s message to another, where it involves a change in language, e.g. between Auslan and English. An interpreter is a bilingual/bicultural professional who facilitates the communication process between people who do not share the same language. In school settings a similar process may be needed between spoken English and signed English. This process is called transliterating.

OPHTHALMOLOGISTS
Ophthalmologists are doctors who specialise in the management of disorders of the eye and visual system. It is important that children with a hearing loss also have their vision checked.

PAEDIATRICIANS
Paediatricians are doctors who specialise in the management of the health and development of children.

PHYSIOTHERAPISTS
Physiotherapists have specialised skills to assess and diagnose physical problems. They will then plan and administer treatment programs that aim to restore normal mobility and strength or minimise dysfunction resulting from a disability.

PSYCHOLOGISTS
Psychologists are trained to assess cognitive and behavioural functioning through a variety of assessment techniques including specific tests, observations and interviews, with a view to developing a program to meet the needs of the individual or family.

SOCIAL WORKERS
Social workers are skilled in working with families and can provide short or long term support, counselling and therapy. Social workers work with individuals, families and groups. A social worker knows how to use community resources and can refer families to services which best suit their needs. The insights provided by the social worker about the family and its workings can assist in understanding the child in the educational setting and in setting expectations for family participation. A social worker may also work as a family support worker.

SPEECH PATHOLOGISTS
Speech Pathologists have the necessary expertise to assess, diagnose and treat all types of communication disorders, covering areas such as speech, language, voice quality and fluency.

TEACHERS OF THE DEAF
Teachers of the deaf are teachers who have received specialist training in teaching deaf/hearing-impaired children. The teacher works with the parents to enable the child to reach maximum potential in their development in the areas of speech, language, cognition, audition, social, emotional and motor skills.
I am a mother of a little deaf girl. I am different to many families. I have deaf parents, deaf grandparents and many deaf cousins, aunties and uncles.

When our daughter was diagnosed we chose to do both signing (Auslan) and speech therapy and she wears hearing aids.

At seven years old she is speaking like a normal child, she signs in Auslan and she understands sign.

She can hear with her hearing aids and her residual hearing in quieter environments, but as soon as there is background noise it makes it very difficult for her.

She lipreads and does it well but lip reading is 70 per cent guess work.

We are a different kettle of fish to most families, but in America and Sweden they are doing what I have done by doing both. And they are having success just like I have.

Tiahana’s story
Hearing loss AND HEARING TESTS
You will come across a whole new set of words which are used by audiologists, teachers and doctors to explain things relating to hearing, hearing loss, hearing aids and education.

These unfamiliar terms can be confusing at first and trying to remember them and understand what they mean can be a real challenge.

In the following pages we have put together a basic “survival kit” of definitions and explanations to help parents and family members understand these unfamiliar terms.

We have deliberately kept these definitions and explanations short and simple. Your child’s audiologist or teacher of the deaf can provide you with more detailed information about any of these topics if required.
How do your ears work?

Sound waves enter your ear canal and hit your ear drum. This makes it vibrate. Three tiny bones in your middle ear link the vibrating ear drum with the inner part of your ear. The last of these bones is connected to a bony structure that looks a bit like a snail shell, but is about the size of a pea. It is called the cochlea (pronounced cock-lee-ah). Your cochlea is filled with a liquid that carries the vibrations to thousands of tiny hair cells. Each cell is tuned to a particular sound (or frequency). As these little hair cells move in the fluid, they carry a message to the nerve which is connected to your brain, which turns this signal into what you hear. And all this happens in a fraction of a second!

**EACH OF YOUR EARS HAS THREE SECTIONS:**

**THE OUTER EAR** consists of the pinna and the ear canal.

The pinna is the external flap of skin that we can all see. It is not very important for good hearing but it does serve to collect or “funnel” sounds into the ear canal and to help us know the direction of sound.

The ear canal varies greatly in size and shape from person to person. It runs nearly horizontally toward the centre of the head for about 2.5 centimetres in adults and finishes at the ear drum.

The skin along the outer part of the canal has stiff hairs and produces wax (called cerumen). This ear wax has an important function. It discourages foreign objects from entering the ear, and prevents the skin of the canal and ear drum from drying out.

**THE MIDDLE EAR** consists of the ear drum membrane, the air-filled cavity behind it and its contents, including three tiny bones – the hammer (malleus), anvil (incus) and stirrup (stapes).

The ear drum is cone shaped, like the cone of a loud speaker. It is stretched across the ear canal and is quite stiff, but flexible. Behind the drum are the three tiny middle ear bones or ossicles connected in a chain. The hammer is connected to the ear drum membrane and the bones vibrate together as the drum moves.

The stirrup is the last of these three bones and is the smallest bone in the body, smaller than a grain of rice. It rests against a membrane called the oval window that leads into the inner ear. The stirrup moves in and out of this window like a piston.

The round window is located just below the oval window. When the stirrup moves in and out it pushes the fluid in the cochlea. The round window is flexible and allows the fluid to be displaced.

The middle ear cavity is filled with air and is connected to the back of the nose and throat by the eustachian tube. The purpose of this tube is to adjust the air pressure in the middle ear space to match the air pressure on the outside of the ear drum. It is normally closed but opens when we swallow or yawn, or when we blow our nose. This is why it helps to yawn or swallow when you are going up or coming down in a plane.

**THE INNER EAR** consists of a complicated series of channels and chambers.

The three loops at the top are the semicircular canals, which form the organ of balance, and the snail shaped part is the organ of hearing, the cochlea.

The cochlea is a bony structure, about the size of a pea and very complex inside. Each cochlea contains fluid and about 15,000 tiny hair cells that move when the fluid moves with a sound.

Each hair cell connects to the hearing (auditory) nerve. When the hair cells move in response to a sound, they send messages along a complex pathway of nerves to the brain. The brain is very good at interpreting what these sounds mean – a dog barking, the phone ringing, a voice. But things can go wrong with this delicate and complex hearing mechanism.
Hearing loss

A HEARING LOSS CAN RESULT IF THERE IS A PROBLEM AT ANY POINT IN THE HEARING PATHWAY – IN THE OUTER, MIDDLE OR INNER EARS OR IN THE COMPLEX AUDITORY NERVE PATHWAY UP TO THE BRAIN.

Hearing loss can be described as congenital or acquired.

**Congenital hearing loss** is a hearing loss that is present at, or very soon after, birth.

**Acquired hearing loss** occurs later on.

Depending on which part of the hearing system is affected, a hearing loss is categorised as conductive, sensorineural, or a mixture of both.

**CONDUCTIVE HEARING LOSS**

This type of hearing loss is caused by blockage or damage in the outer and/or middle ear. A conductive loss can often be helped by medical or surgical treatment. Some causes of conductive hearing loss include:

- excess wax or foreign object in the canal
- “glue ear” or middle ear infection, called Otitis Media
- hole in the ear drum.

Some children are born without ear canals (Ear Canal Atresia). Atresia also causes a conductive hearing loss but the issues associated with treatment are much more complex.

The degree of hearing loss from conductive causes varies but you cannot be completely deaf with a purely conductive hearing loss.

**SENSORINEURAL HEARING LOSS**

This type of loss is a result of damage to, or malfunction of, the cochlea (the ‘sensori’ part) or the hearing nerve (the ‘neural’ part).

Some causes of sensorineural hearing loss include:

- inherited hearing loss
- viral infections (rubella, measles, mumps, cytomegalovirus)
- drugs which damage the hearing system
- birth trauma
- complications to do with prematurity.

A sensorineural hearing loss is permanent and there is rarely any medical treatment available.

In recent years, hearing researchers have identified a relatively uncommon type of “neural” hearing condition where the outer hair cells in the cochlea seem to be functioning normally, but there is a problem that stops the hearing nerve sending sound from the cochlea to the brain. This condition is commonly called Auditory Neuropathy but may also be known as Auditory Dys-synchrony or Hair Cell De-Synchrony.
Hearing abilities of children who have Auditory Neuropathy are much more unpredictable and interpretation of test results is more complex than for children who have a cochlear, or “sensory” hearing loss.

**MIXED HEARING LOSS**

This is hearing loss where there is a problem in both the conductive pathway (outer and middle ear) and in the nerve pathway (inner ear).

An example of a mixed hearing loss may be the temporary presence of glue ear in a child who has a sensorineural hearing loss caused by meningitis.

### How audiologists test hearing

**THERE ARE MANY WAYS TO MEASURE THE WAY THE AUDITORY SYSTEM IS FUNCTIONING.**

For adults and children, the most common test of hearing ability is called **pure tone audiometry** where you listen to a range of beeps and whistles (called pure tones) and indicate when you can hear them, usually by pressing a button. The loudness of each tone is reduced until you can just hear the tone. The softest sound you can hear (your hearing threshold) is then marked on a graph called an audiogram.

When hearing is measured with pure tones presented through headphones, the measurement is called **air conduction**. The sounds go via the air, down the ear canal, through the middle ear and to the very delicate organ of hearing in the inner ear – the cochlea.

The sensitivity of the cochlea can also be tested by placing a small vibrator on the mastoid bone behind the ear, and again measuring the softest sounds that can be heard. Sounds presented this way travel through the bones of the skull to the cochlea and the hearing nerves, bypassing the middle ear. This type of testing is called **bone conduction**.

The air conduction and bone conduction hearing levels on the audiogram can tell us a lot about where the hearing problem is.

### How do we test the hearing of babies and young children?

There are two main types of hearing testing for babies and young children – **behavioural testing** and objective (electrophysiological) testing. Both have advantages and it is useful to have results from both types of tests.

**Behavioural testing** is where children do something to let us know that they have heard the sound. This has the advantage of telling us the complete picture about the function of the auditory pathway.

For children under six months we can use **Behavioural Observation Audiometry (BOA)** to test their hearing. In this type of test, the child’s behavioural responses to sound are assessed. Behavioural responses may include startling to loud noises, stirring from sleep in response to a sound, stopping sucking when a sound is heard or trying to look to the sound. An assortment of noisemakers, such as crunching cellophane, tiny bells, chimes and bicycle hooters, are used and most can be classified as low, mid or high-frequency sounds. The loudness of the sound is measured with a sound level meter. Although hearing levels cannot be determined exactly, an experienced audiologist can obtain a great deal of information from this procedure about the severity of a hearing loss and the child’s ability to detect different sound frequencies. This procedure tests both ears at once as the child does not wear headphones.

Once the child has good head control and can localise sound (turn to where a sound is coming from), a more advanced procedure can be used.

**Visually Reinforced Orientation Audiometry (VROA)** involves the child turning towards a loudspeaker whenever a sound is presented. When the child looks to the speaker, a puppet or some other visual reward is given. Children soon learn that when they hear the sound, the puppet is there if they look around. From this procedure, accurate hearing thresholds can be obtained. As VROA is usually performed without headphones, individual ear information is not available. However, individual ear results can be obtained if the child will wear headphones. Most children enjoy this game and soon learn its rules.
Hearing Loss and Hearing Tests

VROA is used from when the child is about six months until the time their concentration span is long enough to move on to play audiometry (usually two-and-a-half to three-and-a-half years).

Play audiometry works the same way as pure tone audiometry described earlier except, on hearing a tone, the child puts a marble in a marble race, presses a computer keyboard to make something happen, or puts a piece in a puzzle. Making a “game” of the tests keeps the child’s interest and enables a larger number of thresholds to be obtained. This style of testing is sometimes called stimulus-response testing where the pure tone is the stimulus and the child’s action (putting a marble in a race) is the response. As the child wears headphones for this test, individual information from both ears is obtained.

Objective testing does not require the child to participate. The objective tests commonly used are:

- Auditory Brainstem Response (ABR).
- Otoacoustic Emissions (OAEs)
- Tympanometry
- Electrocochleography (ECochG)
- Auditory Steady State Responses

Auditory Brainstem Response (ABR) (Sometimes Known as BERA)
The Auditory Brainstem Response (ABR) procedure measures the activity of various parts of the nerve pathway from the ear to the brain when a sound is administered. Electrodes (small metal disks) are attached to the child’s head to record electrical energy that occurs in the auditory pathway in response to sound. The child wears headphones and this allows recording of the auditory system’s response to specific frequencies and different intensities. This can usually be done as the child sleeps or lies quietly, but sometimes a light sedation is needed for older children who are inclined to wriggle! Tone Burst ABR can provide information about the detection of information at different frequencies. It measures the electrical signal being carried to the brain by the auditory nerve. Each ear can be tested separately. Young babies usually sleep through the procedure and it does not cause any pain or discomfort.

Otoacoustic Emissions (OAEs)
The Otoacoustic Emissions (OAEs) procedure is fairly quick and involves a small probe (or plug) being placed in the ear. The child then hears a series of “clicks” or tones through the probe. OAEs measure whether or not the outer hair cells in the cochlea are functioning normally in response to sound. OAEs test each ear individually but cannot give information about the degree of hearing loss. If a hearing loss greater than 40dB is present, no emissions will be measured. OAEs are used mainly as a way of finding out whether or not the hair cells in the inner ear are functioning properly. If a child has OAEs they are likely to have near normal hearing in that ear or at the frequencies where OAEs are measured. The exception to this is where a child has Auditory Neuropathy and the OAEs do not predict the hearing ability.

Tympanometry
Tympanometry is not a hearing test, but a test of how well the middle ear system is functioning and how well the eardrum can move.

A small rubber tip is placed in the ear and a little air is pumped into the outer ear canal. If there is a problem in the middle ear it will usually show up on this test. For example, if there is very little movement of the eardrum, it may indicate there is fluid behind the drum as a result of a middle ear infection. Often the results of tympanometry indicate the location of the blockage that is causing the hearing loss and whether medical treatment may help.

Electrocochleography (ECochG)
In Electrocochleography (EcochG), a very fine electrode is placed through the eardrum into the middle ear and rested against the cochlea. The electrode can then pick up the tiny electrical signals generated in the cochlea in response to sound. The electrical activity measured in EcochG supplies information about the functioning of the cochlea and the start of the nerve pathway up to the brain. In children, this test is performed in hospital under anaesthetic. This allows the measurement of hearing at different frequencies.

Auditory Steady State Response (ASSR) (Sometimes Known as Steady State Evoked Potentials (SSEP))
Auditory Steady State Response (ASSR) results are recorded in the same way we measure an ABR. That is, electrodes are placed on the child’s head to record electrical energy that occurs in the auditory pathway in response to sound. This allows recording of the auditory system’s response to specific frequencies and different intensities. It is more accurate for severe-to-profound hearing losses than mild-to-moderate losses.

There are other objective assessments which are not used as frequently but which may be suggested by your ENT Specialist.
When assessing children, a test battery is used. A test battery is a number of different tests to give different types of information about a child’s hearing ability. An example of a test battery for a young baby may be:

- behavioural observation audiometry
- tympanometry
- OAE’s
- ABR.

Doing a variety of tests gives the audiologist and the parent a more thorough picture of the child’s hearing ability. The younger a child is, the longer it can take to obtain all the necessary information about the hearing loss.

Newborn Hearing Screening
DETECTION OF HEARING LOSS IN INFANCY

Early intervention is important for helping hearing-impaired children to reach their full potential in all areas of development. Certain children have risk factors for hearing loss, but approximately 50 per cent of hearing-impaired children have no known risk factors. As a result, a steadily increasing number of hospitals in Australia and around the world are offering hearing screening at birth in order to detect hearing problems as early as possible. These programs will have different names in different states.

A hearing screening test is a way of quickly determining whether a baby is at risk of having a hearing loss. Testing is either done by Automated ABR or Otoacoustic Emission testing – usually within a few hours of birth or just before the baby leaves hospital.

If the baby passes the screening test it is unlikely that they have a hearing loss at the time of the test. If a clear pass result is not obtained, the baby is referred for further detailed diagnostic testing at a hospital or audiology centre. If this testing confirms a hearing loss, the baby will be referred to Australian Hearing for discussion about options.

What exactly is an audiogram?

Look at the blank audiogram graph below. Along the top of the graph the numbers range from 125 to 8000. These numbers refer to frequencies, or different pitches of sounds.

Frequency is expressed in terms of the number of cycles per second, or Hertz. The higher the number, the higher the pitch of the sound. For example, 250 Hertz (250Hz) sounds like middle C on the piano, while the high pitched ringing of the telephone is about 3000Hz.

Normal young, healthy human ears can actually hear frequencies as low as 20Hz and as high as 20,000Hz. However, we test hearing in the range 250Hz to 8000Hz, as most of the sounds of speech occur in this frequency range.

Loudness or level of sound is measured in units called decibels. Zero decibels (0dB) does not mean “no sound” – it is just extremely soft. Conversational voice level is around 65 decibels, and 120 decibels (120dB) is very, very loud – about as loud as a jet taking off if you are standing 25 metres away! The figures along the side of the graph are hearing levels in decibels.

Air conduction hearing thresholds for the right ear (i.e. the softest sounds the right ear can hear at each frequency) are marked as an “O” and the left hearing thresholds are marked as an “X” on the audiogram.

Bone conduction thresholds are marked on the audiogram as P (better ear), [ (right ear) or ] (left ear).
What does the audiogram mean?

The audiogram gives a “picture” of your hearing. It indicates how much hearing varies from normal and, if there is a hearing loss, where the problem might be located in the hearing pathway.

If the hearing thresholds obtained by bone conduction are the same as the air conduction thresholds, this indicates that there is nothing stopping the sound from travelling through the outer or middle ear to the cochlea. The hearing loss would therefore be caused by a loss of sensitivity in the cochlea or hearing nerve. This type of loss is called sensorineural hearing loss.

If the bone conduction hearing thresholds are normal, but there is a loss of hearing for air conduction sounds, this is called a conductive hearing loss. This means that the cochlea is normal, but there is some blockage to sound in the middle or outer ears.

Middle ear infections, called Otitis Media, can cause a conductive hearing loss. Middle ear conditions caused by Otitis Media can usually be corrected by medical or surgical treatment.

It is possible to have both a sensorineural and a conductive hearing loss. For example, if a person has impairment due to noise exposure and a perforated ear drum. This is called a mixed hearing loss.
How is hearing loss described?

HEARING LOSS IS MEASURED IN DECIBELS, BUT IS USUALLY DESCRIBED IN TERMS OF DEGREE OF IMPAIRMENT FOR HEARING CONVERSATIONAL SPEECH.

Sometimes people give their hearing loss as a percentage, for example, “I have a 50 per cent loss of hearing”. This may seem easier to understand, but it is not really the most accurate way to describe hearing. A 100dB hearing loss is a considerable impairment, but it certainly does not mean 100 per cent or total deafness. Percentages are only used for purposes of compensation for hearing lost in a noisy workplace or in an accident.

WHAT DO THE DIFFERENT DEGREES OF HEARING LOSS MEAN IN “REAL LIFE” TERMS?
The following classifications show the approximate relationship between the decibel hearing loss (dBHL) and the degree of difficulty it may cause.

0–20dB: RANGE OF NORMAL HEARING
If hearing thresholds fall within this range, hearing is within normal limits.

21–45dB: MILD HEARING LOSS
A person with a mild loss would have some difficulty hearing soft speech and conversations, and people may sound as though they are mumbling. However, they can often manage in quiet situations with clear voices. Speech and language usually develop normally if a child is fitted with hearing aids early. Hearing aids will assist most hearing problems.

46–65dB: MODERATE HEARING LOSS
A person with this degree of loss would have difficulty understanding conversational speech, particularly in the presence of background noise. TV and radio would have to be turned up to be heard. Speech and language development are generally affected if a hearing aid is not provided early to a child born with this degree of loss. Hearing aids usually assist most hearing difficulties if speech discrimination (i.e. how clearly speech is heard) is good and the listening environment is not too noisy.

66–90dB: SEVERE HEARING LOSS
For severely hearing-impaired people, normal conversational speech is inaudible. Speech and language do not develop spontaneously in a child born with this degree of impairment. Hearing aids will amplify many speech sounds and will greatly assist a child to develop speech, but speech quality is likely to be affected. Visual cues usually assist in understanding speech.

91dB+ PROFOUND HEARING LOSS
Profoundly deaf people have difficulties similar to those people with a severe hearing loss but there is greater inconsistency in the benefit derived from hearing aids (particularly with hearing losses greater than 105dB). Learning to speak is difficult for children born with a profound hearing loss, but
it depends on the degree of the loss as to how difficult it will be. Some profoundly deaf people can understand clear speech in quiet conditions when they are wearing hearing aids, while others find it almost impossible even with hearing aids. Many children with profound hearing loss are now fitted with a cochlear implant.

**THE CONTINUOUS AUDIOGRAM**
Continuous audiograms are a way of comparing a child's hearing test results over a long period of time. They are very useful in detecting gradual changes where the hearing slowly changes. Your Australian Hearing audiologist will routinely update a continuous audiogram on your child's audiological file.

Changes in hearing levels

Sometimes, a child with a hearing loss can have a change in their hearing levels. Changes may be temporary or permanent. Otitis Media is the most common cause of temporary hearing loss. It causes a temporary conductive hearing loss which can make a child's hearing worse than usual. Middle ear problems are very common in childhood, but fortunately most are medically treatable. If you think your child may have developed a middle ear problem, you should consult your family doctor or ENT specialist for advice.

Occasionally a child's hearing will get worse and there will be no indication of a middle ear problem. This may mean there is a worsening of the sensorineural hearing loss. In most cases, this type of change is due to the same factors which originally caused the child's hearing loss. The changes in hearing may happen very slowly. It is important that an ENT specialist investigates all changes. Sometimes these changes are medically treatable and early treatment can be important. If your child experiences a sudden or dramatic worsening in their hearing levels, you should consult your family doctor, ENT specialist or audiologist as soon as possible.

Very occasionally, a child's hearing may get worse through a combination of factors including:
- the child's hearing sensitivity to noise
- the hearing aids and the volume setting that is used
- the child's exposure to high levels of environmental noise.

Children with hearing loss can be affected by long exposure to high levels of noise in the same way as a person with normal hearing. They should protect their hearing during woodworking and metalwork activities just like other students. Children who frequently use their hearing aids at higher-than-recommended volume settings, or who often use their aids in very noisy places, are at increased risk of a noise-induced change in their hearing. Fortunately, this sort of change in hearing is temporary in the early stages. Provided it is recognised early and appropriate action is taken, no permanent change in hearing levels need result.

It is important to recognise any changes in a child's hearing so that potential causes can be investigated and appropriate action taken. If your child's audiologist detects a significant change in hearing levels, they will refer your child for medical advice, and carry out tests to exclude the hearing aid as a possible factor in the changing hearing levels. (This is not necessary if the change is clearly due to a middle ear condition.)

**Acquired hearing loss**

Some children acquire a hearing loss after previously being able to hear normally. Where a hearing loss is acquired, there may be quite different challenges for children and their families compared to the challenges for a child who is born with a hearing loss.

Children with acquired hearing loss or deafness may go through significant emotional changes. Depression, fearfulness, withdrawal or demanding behaviour is common. Children and their families may benefit from a period of help with a psychologist or counsellor experienced with deaf children. Many families will benefit from contacting other families with hearing-impaired children so that the recently deafened child realises that there are other children who have had this experience.

Families of children with acquired hearing loss may also go through a natural grieving process which may be particularly accentuated by landmarks such as the first fitting of hearing aids or a change in educational program.
CHILDREN WITH ACQUIRED HEARING LOSS CAN BE DIVIDED INTO TWO GROUPS:

CHILDREN WHO DEVELOP A HEARING LOSS SUDDENLY
This is usually a very distressing experience for the child and family. They need to link up rapidly with a teacher of the deaf who will be able to help them find the best way of teaching and communicating with the child. Sign language, oral language and all forms of visual communication should be explored immediately if a child is suddenly deafened. A trial of hearing aids is usually undertaken as soon as possible. The effects of hearing aids will be established soon after, using evaluation by an Australian Hearing audiologist.

A baby or young child may suddenly become deaf (often profoundly deaf) because of meningitis. Although immunisation (H.I.B.) is now available for one type of meningitis, it is not available for several other types. All children who have had meningitis should have their hearing tested before they leave hospital or within one to two weeks of recovery. If they are very young, they will need to have hearing tests every few months until the audiologist is certain about the level of hearing in each ear. Hearing aids can be fitted when there is evidence that the hearing has not returned to normal, and when the child and family are ready to proceed. If a severe-to-profound hearing loss is found a cochlear implant is likely to be an option for the child.

CHILDREN WHOSE HEARING DETERIORATES GRADUALLY
Some children with normal hearing gradually lose it. A few children who have mild hearing loss may deteriorate to severe or profound levels. These children should be thoroughly investigated by an ENT specialist or other doctor experienced with hearing loss.

Scanning of the inner and middle ear is usually necessary and careful physical examination, family history review and a vision check are essential. Some children may also benefit from cochlear implantation if their hearing loss becomes profound.
Vision problems and deafness

Vision is especially important for children who have a hearing impairment. The early identification and correction of minor visual problems such as short-sightedness is necessary if the child is to function to the best of their ability.

By examining a child’s eyes, the doctor occasionally picks up clues as to why the child is hearing-impaired. For example, children who have had intra-uterine infections by viruses, such as rubella or cytomegalovirus, have characteristic retinal markings.

Assisting the deaf/blind child

It is very rare for a child to be born or to become completely deaf and blind. However, deafness with varying degrees of visual impairment is not rare. Complications of prematurity and some genetic conditions including Usher’s Syndrome may occur in some of these children.

Children with significant vision and hearing impairment may benefit from very specialised programs. For some of these children the disability experienced may be greater than the estimated disability of the deafness added to the estimated disability of the vision impairment.

Usher’s Syndrome

There is a rare condition, called Usher’s Syndrome, which involves hearing loss (often profound) followed later by the development of blindness or vision impairment. If a child is very deaf and later becomes blind or visually-impaired, their contact with the outside world becomes very limited. The presence of Usher’s Syndrome will play an important role in the family’s decisions about communication and intervention options. An eye doctor can be asked to check for very early signs of Usher’s Syndrome by examining the retina (back of the eye). Where indicated, electrophysiological testing (electroretinography) can be used to check for this condition.
When I found out Misha had a bilateral profound hearing loss I was shocked. A couple of days later, after I had gone through a box of tissues, I looked at my chubby, 10-month old, adorable angel, the picture of health, and thought – “this is only news to me”. Nothing for him had changed.

Very soon after diagnosis I happened to visit my parents. My mother was very proactive, saying, “OK, we know he’s deaf, now we have to thoroughly educate ourselves as to the best path for him to take”. We researched dozens of sites on the internet and visited the library for all the books on deafness we could get our hands on.

One of my main concerns was language development, since I’d read that deaf children were generally two to three years behind their hearing counterparts. I also wanted to avoid the sad situation I found in my research, where some children who had grown up without signing at home had felt left out of family discussions because they couldn’t follow the conversation, and those who also felt like they had missed out on a lot of their childhood by spending inordinate amounts of time in speech therapy from a very young age.

My mum borrowed Oliver Sacks’ Seeing Voices from the local library, and it opened my eyes to the amazing world of deafness. I found it incredibly uplifting that through sign language, Misha would have an easily accessible language through which to communicate.

I’m happy to say that this is exactly what happened. Straight away we learned a few signs and started using them all the time. It was as if a light bulb had lit up in his head. Within a week, Misha who had just turned one, was signing “light”, “food” and “drink”, and we enrolled in a TAFE course so we could continue to be language models for him.

A year after Misha was diagnosed, we visited the Cochlear Implant Clinic, having done a lot of research into the relative success of the CI. When they told us they couldn’t guarantee an improvement greater than the equivalent of an aided severe hearing loss, we didn’t think it was worth the risk of implanting a foreign object into Misha’s head. It didn’t feel right for us – we felt that by implanting Misha we would effectively be saying “You aren’t good enough the way you are.”

Two years down the track, my husband and I are enrolled in a Graduate Diploma in Auslan to further our skills and fine-tune our grammar. Misha has a good language base in Auslan and with his current cognitive and language skills he has shown a lot of interest in tackling speech. He is now old enough to spend a bit of time in speech therapy, and more importantly, understands the purpose of it.

With his funky bright red hearing aids, Misha signs non-stop at home, at the playground, everywhere…

People often approach me because they are fascinated by seeing us sign in Auslan and express interest in learning it. Often I show them a few signs so they can sign with Misha and they love it when Misha signs back!
Hearing Aids
They do not change the hearing of the child wearing the aid and they cannot restore “normal” hearing. What they can do is make more sounds loud enough for the child to hear them. In time, with consistent use and educational support, the majority of children learn to use and make sense of the new sounds they can hear through their hearing aids.

There is no lower age limit to fitting hearing aids. Early and consistent use of amplification is a great advantage to a child with a hearing loss. Hearing aids need to be fitted and adjusted to suit your child’s particular hearing loss. This is an ongoing process and changes will be necessary as more information becomes available about your child’s hearing or as new research and technology becomes available.

There are a number of different styles of hearing aids, including behind the ear (BTE), in the ear (ITE), in the canal (ITC), completely in the canal (CIC), and body worn aids.

Children diagnosed with a permanent hearing loss are generally fitted with hearing aids. Hearing aids are miniature amplifying devices that make sounds louder. They are crucial to the task of helping children with hearing loss make the best use of their hearing.

ALL HEARING AIDS HAVE THE SAME THREE BASIC COMPONENTS:

MICROPHONE
Picks up the sound and converts it into an electrical signal.

AMPLIFIER
Increases the size (amplifies) the electrical signal and provides additional processing as required e.g. tone adjustment and compression.

EARPHONE
Converts the increased electrical signal back into sound.

Most hearing aids have a battery, on/off switch, telecoil and a volume control.

To use a hearing aid, it is necessary for an ear mould to be made. The procedure for making the ear mould involves taking an impression of the ear.

Taking an ear impression

Firstly, the outer ear and ear canal is inspected with an otoscope or auriscope (a light), to ensure that the canal is clear and the ear is suitable for taking an ear impression. Then a cotton or foam block is placed in the ear canal. This block prevents the impression material from going too deep into the ear. After the block is in place, impression material (a plasticine-like substance) is placed in a large syringe and squeezed into the ear. This impression material becomes firm in a matter of minutes and the impression of the ear is then removed and sent to the manufacturer.

Although this may be a slightly uncomfortable procedure, it is not painful. New ear moulds will need to be made at regular intervals as your child grows or the ear moulds wear out.
HEARING AIDS

Other aids

Apart from the “conventional” hearing aids already mentioned, there are other devices which assist people who are hearing-impaired or deaf to detect and utilise spoken language. These include bone conductors, vibrotactile aids, cochlear implants and FM systems.

Bone Conductors

A bone conductor is a hearing aid designed to amplify sound waves and transmit the amplified signal to a bone conductor vibrator worn on the bone behind the ear (the mastoid). Vibrations of the bone conductor cause the signal to be presented directly to the inner ear by vibrating the bones of the skull. This type of hearing aid is only used when an ear mould cannot be worn or when a conventional hearing aid is not suitable. It allows the entire middle ear system to be bypassed and for sound to be taken directly to the inner ear.

In some situations where a bone conductor causes discomfort or is unacceptable for other reasons, a bone anchored hearing aid may be an alternative. A bone anchored hearing aid is a device which clicks on to a titanium screw that is implanted in the bone of the skull, just behind the ear. This requires medical assessment and surgery and should be discussed with your audiologist.

Vibrotactile Aids (sometimes known as “tactaids”)

Some children with profound hearing loss who show little benefit from wearing their hearing aids may benefit from the use of a vibrotactile aid, used in conjunction with their hearing aids. A vibrotactile aid consists of a microphone and speech processor in a unit worn on the child’s chest, connected to small vibrators worn on the skin. This aid changes sound into a signal that is felt rather than heard.

Vibrotactile aids transmit limited information about sounds. This information is most useful when combined with visual information and hearing aids or a cochlear implant. Consistent and intensive training and appropriate use of the device are very important to achieving benefit with a vibrotactile aid.

For infants and children who have a severe-to-profound sensorineural hearing loss and receive little or no benefit from hearing aids, a cochlear implant may be suggested as an option.

Cochlear Implants

What is a Cochlear Implant?

Unlike hearing aids, which simply amplify sound, a cochlear implant bypasses the part of the ear that is not working and electrically stimulates the hearing nerve directly. A cochlear implant is a surgically implanted device, which can provide useful hearing sensations by sending electrical signals to the nerve endings in the inner ear (called the “cochlea”).

Which children may benefit?

Every child who attends a cochlear implant clinic is carefully assessed. The cochlear implant team will discuss the process with you, advising you and your family of the potential benefits and the likelihood of success. Only those who are suitable candidates are recommended for an implant.

The surgery is a routine procedure performed by a cochlear implant surgeon. While the surgery may only take an hour, it usually involves an overnight stay in hospital.

Once a child has received a cochlear implant, the outcomes will vary, however a comprehensive habilitation program will increase a child’s ability to benefit from a cochlear implant and support optimal outcomes. Family involvement is an important factor in an effective habilitation program.

What are the benefits?

The aim of a cochlear implant is the same as that of hearing aids – to allow a child to hear as much of the range of speech sounds as possible so they may develop useful listening, speech and spoken language skills.

The major benefits of cochlear implants are:

- Children have a greater awareness of everyday sounds in the environment, e.g. people calling, doorbell, telephone ringing, traffic noise.
HOW DOES IT WORK?
All systems consist of a surgically implated device, a cable and transmitting coil and an externally worn speech processor. There are two types of speech processors: a body worn style and the behind the ear version (similar to a hearing aid).

LISTENING WITH A COCHLEAR IMPLANT AND A HEARING AID
Many people are now benefiting from wearing a cochlear implant on one ear and a hearing aid on the other. This is called “bimodal hearing”, and is particularly helpful for managing hearing losses that are moderate-to-profound in degree or worse. Bimodal hearing can maximise the use of residual hearing in the opposite ear to that implanted, and make the most of the available hearing technology, especially for those who struggle to manage with hearing aids alone.

Your Australian Hearing audiologist will be pleased to provide you with further information or referral to a cochlear implant clinic.

For further information visit www.cochlear.com or contact Cochlear’s toll-free phone number on 1800 620 929.

WHILE HEARING AIDS AND COCHLEAR IMPLANTS ARE VERY HELPFUL TO CHILDREN WITH A HEARING LOSS, OFTEN THEIR BENEFIT IS LIMITED BECAUSE OF THE EFFECTS OF BACKGROUND NOISE, REVERBERATION AND DISTANCE.

FM SYSTEMS
To help reduce these problems, Australian Hearing provides children who may benefit with Frequency Modulated (FM) radio frequency systems.

FM systems are made up of: a microphone and transmitter worn by the teacher/parent, and a receiver worn by the child.

Sound is transmitted directly from the teacher or parent to the child’s own hearing aids. As long as the child is within the transmission range of the FM, the teacher/parent’s voice will be as loud and clear as if they were standing a metre away from the child.

LISTENING WITH A COCHLEAR IMPLANT AND A HEARING AID
Many people are now benefiting from wearing a cochlear implant on one ear and a hearing aid on the other. This is called “bimodal hearing”, and is particularly helpful for managing hearing losses that are moderate-to-profound in degree or worse. Bimodal hearing can maximise the use of residual hearing in the opposite ear to that implanted, and make the most of the available hearing technology, especially for those who struggle to manage with hearing aids alone.

Your Australian Hearing audiologist will be pleased to provide you with further information or referral to a cochlear implant clinic.

For further information visit www.cochlear.com or contact Cochlear’s toll-free phone number on 1800 620 929.

WHILE HEARING AIDS AND COCHLEAR IMPLANTS ARE VERY HELPFUL TO CHILDREN WITH A HEARING LOSS, OFTEN THEIR BENEFIT IS LIMITED BECAUSE OF THE EFFECTS OF BACKGROUND NOISE, REVERBERATION AND DISTANCE.

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**Most children demonstrate an improved ability to communicate verbally, especially when combining lipreading with hearing**

**Many children understand speech through hearing alone**

**Many children develop advanced speech skills.**

It should be remembered though, that a cochlear implant cannot return a child’s hearing to “normal”.

**While hearing aids and cochlear implants are very helpful to children with a hearing loss, often their benefit is limited because of the effects of background noise, reverberation and distance.**

**FM SYSTEMS**
To help reduce these problems, Australian Hearing provides children who may benefit with Frequency Modulated (FM) radio frequency systems.

FM systems are made up of: a microphone and transmitter worn by the teacher/parent, and a receiver worn by the child.

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If your child wears hearing aids or a cochlear implant, the FM receiver can be connected to these. If your child doesn’t wear hearing aids, an FM receiver can be used with lightweight earphones.

An FM system does not actually improve the child’s hearing. Rather, the FM system improves the signal quality and allows the child access to a consistent signal level.

FM systems can make a big difference to what a child can hear in poor listening conditions such as in the classroom. However, FM systems cannot solve all the problems associated with background noise and distance and they may be of limited use in some situations.

**SOUNDFIELD AMPLIFICATION SYSTEMS**
Many school-aged children have a mild hearing loss, often as a result of ear infections (Otitis Media). A conventional individually fitted hearing aid may not be suitable, particularly if the hearing loss fluctuates as if often the case with a conductive hearing loss. For these children, a classroom soundfield amplification system which delivers the voice of the teacher, through a transmitter, at a level that can be comfortably heard throughout the classroom, provides major benefits to both students and the teacher.
ASSISTIVE LISTENING DEVICES
As your child gets older, there are a number of devices other than hearing aids, cochlear implants and FM systems which may be useful. Information about assistive listening devices – including what they do, how much they cost and where they can be purchased can be found in the free Deafness Resource Guide available from your Australian Hearing centre.

ALARMS
Alarms are available for a number of applications. They can indicate when the phone is ringing or there is someone at the door, or when a baby is crying. They can be used as smoke detectors, or simply to wake someone at the correct time. The alarm used may involve a flashing light, vibration, a loud signal or a combination of these options.

Many hearing-impaired and deaf people make a lot of use of SMS messaging on mobile phones, even if they are unable to hear a voice on the phone. Some hearing aids suffer from interference and are not successful with mobile phones and some are shielded and are compatible with mobile phones.

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TELEPHONE
As it is impossible to use lipreading cues, using the phone may be a very difficult task for someone with a hearing impairment. Even children with mild to moderate losses may find telephone devices useful to reduce background noise, improve the signal of the speaker and to hear the phone ring at a distance.

**Telecoil:** A special coil is installed in the earpiece of the phone, which can be accessed by using a hearing aid on its “T” switch.

**Telephone amplifier:** A volume control on the phone which can be used to make voices louder.

The advantage is that only the speech from the coil goes into the hearing aid, reducing extraneous background noise.

Many public telephones have telecoils installed. Telecoil adaptors are also available for mobile phones.

**Teletypewriters (TTYS):** Used by many severely hearing-impaired people who have difficulty using the telephone. A TTY is like a small typewriter with a screen or printout to display a message coming from another TTY, via the telephone system. There is a National Relay Service available, which relays calls between voice and TTY callers (see section on the Australian Communication Exchange and the National Relay Service on page 60).

TTYs can be rented through Telstra for the same cost as a standard telephone and parents can apply on behalf of a child who has a permanent hearing loss. For more information and an application ask your Australian Hearing audiologist, or phone:

VOICE 1800 068 424 (free call number) or TTY 1800 808 981 (free call number).

TELEVISION
For a child with a hearing loss, understanding TV at a volume which is comfortable for the rest of the family can be a challenge even when hearing aids are worn.

**Audio loops for TV:** These come in several different forms, including cushions and neck loops, and except for a room loop, involve a direct connection to the TV through the audio input socket. The audio loops eliminate problems of distance and extraneous background noise by using the aid’s “T” switch.

**TV Listener:** Consists of a pair of headphones, some with an on-unit volume control, which plug directly into the TV. Some have a separate volume control unit and microphone that can be attached to the TV speaker.

**Mobile phones:** Many hearing-impaired and deaf people make a lot of use of SMS messaging on mobile phones, even if they are unable to hear a voice on the phone. Some hearing aids suffer from interference and are not successful with mobile phones and some are shielded and are compatible with mobile phones.

**Telephone ringer:** Alters the pitch/loudness of the telephone to make it easier to hear. There are also visual alarm ringers where a light flashes when the phone rings.

Portable attachments with amplifiers or coils are also available.
Infra-red Headphones: Consist of a transmitter that connects into the TV or VCR and receiver headphones with on/off switch and volume control. The advantage of these is that there is no cord between the receiver and the TV.

Teletext/Supertext: Many programs on TV have subtitles (closed captions) transmitted with the picture that are not visible on an ordinary television. Teletext TVs and some VCRs have a decoder built into them that will put the subtitles on the bottom of the screen. Some decoders allow the captions to be recorded onto a video cassette, and DVDs contain closed captions accessible from a normal DVD player. Decoders can also be used to give you teletext information including the latest information and news from Austext on Channel 7.

For further information about caption TV contact the Australian Caption Centre 1800 777 801 (Voice/TTY. See section “Support Services” for details about the Australian Caption Centre).

What do hearing aids do?

IT IS A COMMON BELIEF THAT PEOPLE WITH HEARING LOSS JUST CAN’T HEAR SOUNDS LOUDLY ENOUGH, BUT THE PROBLEM IS MUCH MORE COMPLICATED THAN THAT.

There are four main problems caused by hearing loss:

People with a hearing loss don’t hear soft sounds. Consequently, the softer speech sounds, which are usually the consonants, may simply not be heard. For example, the sequence of vowel sounds “i-e-a-ar” may have belonged to “pick the black harp” but could be heard by a hearing-impaired person as “kick the cat hard”. To overcome this difficulty, a hearing aid has to provide amplification to make these soft sounds loud enough to be heard.

Key parts of particular speech sounds, such as the high frequency parts, might not be audible. To overcome this problem a hearing aid has to provide more amplification for frequencies where hearing loss is the greatest and where speech has the weakest sounds.

A hearing-impaired ear has difficulty separating sounds. When we are listening to a sound in noise, such as a person speaking at a party, the normal ear will send a message to the brain that two separate bundles of sound are coming through. The brain, by using other information available, such as context and direction of the sound, may then be able to ignore the unwanted noise and make good use of the speech. The impaired ear however is much less efficient at this task. Also, once speech and noise get mixed together inside a hearing aid, there is no way the hearing aid can separate the two to compensate. Directional microphones can help prevent the sound and noise from getting mixed together before they are passed to the amplifier.

In a normal ear, a wide range of environmental sounds can fit between the softest sound that can be heard and the loudest sound that can be comfortably tolerated. In a hearing-impaired ear this ‘dynamic’ range is greatly reduced; i.e. soft sound becomes inaudible and loud sound becomes uncomfortable and sometimes painfully loud. If a hearing aid makes all sounds louder so that the hearing-impaired person can hear the softest sounds then most of the loud sounds may be far too loud. So a hearing aid must give more amplification to a soft sound than it does to a louder sound. This squashing of sounds into the reduced range of an impaired ear is called “compression.”

So a hearing aid has a big task. It must:

• make sounds louder but not make loud sounds uncomfortably loud
• provide more amplification for frequencies where hearing loss is the greatest and speech sounds are the weakest
• try to keep unwanted sounds, such as background noise, out of the signal provided to the wearer.

HOW DO HEARING AIDS WORK TO COMPENSATE FOR THE EFFECTS OF A HEARING LOSS?

Hearing aids amplify sounds so they are loud enough to be heard. A hearing aid also amplifies some frequencies more than others to allow for the characteristics of hearing loss and speech. The audiologist will set the hearing aid to make sure its output never exceeds a predetermined upper limit, so that sounds do not become uncomfortably loud.

PEAK CLIPPING VERSUS COMPRESSION

The hearing aid limits loud sounds by either clipping off the peaks of the sounds (peak clipping) or by squashing or compressing them into a softer signal (compression).
Both result in some distortion and loss of detail, but the distortion is less noticeable for compression than for peak clipping. In general, compression provides a clearer signal for speech in quiet, better listening situations, comfort for loud sounds, and less need for volume control adjustment.

Research has shown that most people with hearing loss, except some of those with profound hearing losses, prefer compression output limiting. This is why Australian Hearing has had compression as a feature in its hearing aids since 1986.

There are many new types of hearing aids now becoming available that use complex forms of compression, all with the aim of maximising clarity and filling the impaired dynamic range with audible and comfortable sound.

Australian Hearing’s standard hearing aids have many independently adjusted compressors which interact to provide controlled and comfortable loudness. This means that compression can be set to suit the individual needs of each child.

HEARING AID TECHNOLOGY
There are three types of hearing aid technology.

ANALOG HEARING AIDS
With an analog hearing aid the electronic adjustments that need to be made so that each client can hear well can only be done manually by the audiologist using a small screwdriver to turn tiny internal controls called trimpots (potentiometers).

DIGITAL-ANALOG HEARING AIDS OR DIGITALLY PROGRAMMABLE HEARING AIDS
These hearing aids have two parts – a programmable memory and an analog amplifier.

The audiologist programs the hearing aid’s memory using a computer, and the memory then tells the analog part of the hearing aid what to do.

The great advantage of digital-analog (or digitally programmable) hearing aids is that it is possible to control a large number of characteristics of the amplifier and therefore better tailor or match the output of the hearing aid to the needs of the wearer. These adjustments can be made quickly and easily.

Digital-analog hearing aids also have the potential for more than one listening program. For example, different settings can be used in different listening conditions, such as in quiet (e.g. a library) and in noise (e.g. a playground). The programmable memory of these hearing aids provides the potential for more than one listening program.

Some of the hearing aids fitted by Australian Hearing are digitally programmable.

DIGITAL HEARING AIDS
These hearing aids have become available in the last few years and have the potential for even greater flexibility than previous technologies.

In fully digital hearing aids the sound is converted by a digital converter into a series of numbers. The processor then performs arithmetic on these numbers to change the sounds before turning them back into an analog signal. Digital hearing aids are sometimes referred to as having “CD sound quality” as they use the same technology as compact disc players. However, by the time the hearing aids get to manipulate the sound, the background noise has already been mixed in. CDs on the other hand are usually made in very quiet sound recording studios under ideal conditions. The result is that CDs have no background noise, and this is unlikely to ever be true for hearing aids which have to operate in real life situations.

Many digital hearing aids amplify sounds in a “non-linear” fashion. This means that they amplify soft sounds more; medium sounds similarly to any other hearing aid; and loud sounds less. This makes listening more comfortable, especially in noise.

Some digital hearing aids have particular features to try to suppress background noise or to use directional microphones to help with reducing background
noise. Some also have sophisticated feedback (whistling) management circuits. In future, digital hearing aids will be built that have few restrictions on what they can do to modify sounds for the hearing aid user.

Most of the hearing aids fitted by Australian Hearing are fully digital.

A number of factors come into play when determining which hearing aid will best suit your child’s needs.

**The degree and type of hearing loss.** The range of hearing aid styles that would suit your child may depend upon the type and degree of hearing loss.

**Speech discrimination.** How clearly can they hear speech? If sound travelling from the ear to the brain is distorted, as it can be with some types of hearing loss, the benefits of the advanced technology features may be more limited.

**Developmental level.** Children have different hearing and listening needs at different stages of their development.

**Independence with hearing aid management.** Some hearing aid features need to be switched on or off by the listener, depending upon the listening conditions. Age is a factor when considering these features.

**Activities.** What sort of activities does your child do in a typical week? Where do they have the most hearing difficulty? This information will help you to select which of a wide range of hearing aid features may be useful for your child.

It is also important to consider how the child feels about wearing and managing the hearing aids.

*Australian Hearing* offers children a range of high quality, fully digital hearing aids, some which are fully subsidised (i.e. no cost to families) and some which are partially subsidised.

The features in our fully subsidised range are those which research suggests will suit the hearing and communication needs of most children with hearing loss.

The hearing aid models which offer special features and advanced technology are also subsidised and the family covers the additional cost.

Different hearing aid manufacturers may use a range of terms to describe the features of their particular hearing aids. Your audiologist will be happy to answer any questions you have about particular hearing aid features and how they may or may not be helpful for your child.

Modern hearing aids have many features to enhance the speech signal as it enters the ear. However, the final sound that the listener hears is influenced by the amount of damage in their auditory system. For instance, if a child has a profound hearing loss and their cochlea is not detecting or
HEARING AIDS

transmitting the full range of speech sounds to the brain, even the most sophisticated hearing aid cannot restore perfect clarity.

HOW DO AUDIOLOGISTS SELECT HEARING AIDS?
The type of hearing aid that is most suitable for your child will depend on many factors such as:
- your child’s degree of hearing loss
- the type of hearing loss
- their age
- the shape and size of their ear
- your child’s attitude towards the aid
- your child’s tolerance to loud sounds
- any other disabilities your child may have
- whether an FM system is required.

When an Australian Hearing audiologist fits a hearing aid, they use a set of scientifically validated mathematical formulae to work out just how loud the hearing aid should be for that person in order to optimise the hearing they have.

When an ear has a hearing loss, particularly in the case of sensorineural hearing loss, it is just as sensitive to loud sounds as a normal ear. For instance, a sound pressure level of 110 dB will be just as uncomfortable for someone with a severe hearing loss as it would be for someone with normal hearing. When setting the hearing aid it is important that sounds are made audible but not intolerably loud, in order to ensure speech understanding is optimised.

The particular formula Australian Hearing currently uses to prescribe hearing aids is known as the NAL-NL1 prescription. This is based on extensive and thorough research undertaken by Australian Hearing’s research arm, the National Acoustic Laboratories (NAL), over more than 20 years.

The procedure aims to maximise the amount of speech signal received by making all the amplified frequency bands of speech equally loud while achieving the best level of intelligibility and comfort.

The hearing aid selection procedure includes various adjustments, the main one being to allow for the fact that the low frequencies of speech are more intense than the high frequencies and hence do not need to be boosted as much to reach the person’s most comfortable listening level.

Research has shown that simply trying to make all the sounds of speech loud enough to be heard does not give a good hearing aid fitting. Instead it can result in amplified speech which is uncomfortably loud, unclear and distorted. The procedure recommends how much gain or “loudness” should be added to soft, moderate and loud sounds to allow softer parts of speech to be heard and louder sounds to be comfortable.

Using the formulae is just the first step. Some form of assessment is then performed to ensure that your child is receiving the optimal hearing aid response for their hearing loss. Any feedback you can give on how your child is performing with their hearing aid(s) assists us. Your child will be regularly seen for aided and unaided assessment and review.

HOW DO AUDIOLOGISTS ASSESS A CHILD’S AIDED HEARING?
At Australian Hearing your audiologist will carry out various measures to determine the level of sound the ear is receiving and what your child is hearing with their hearing aid. These tests are carried out to ensure your child’s hearing aids are set for optimal speech intelligibility and comfort according to the NAL hearing aid selection procedure.

In addition to these measures, feedback from you, your child and your child’s teacher is essential in determining that the hearing aids have been fitted appropriately.
The main measures audiologists can use to assess aided performance are:

- Insertion Gain (Real Ear) Measurements
- Real-Ear-to-Coupler Difference Measurements
- Sound Field Evaluation (Aided Thresholds)
- Speech Perception Testing
- Aided Cortical Auditory Evoked Potentials.

**INSERTION GAIN**

For older children and adults, we measure the level of a reference sound in the ear canal without the hearing aid, and then repeat the measurement with the hearing aid in the ear and switched on. The difference between these two measurements is the insertion gain of the hearing aid.

This measurement gives an accurate indication of whether the prescribed insertion gain (targets) is being achieved in the real ear. If not, the audiologist can further adjust the hearing aid.

**EXAMPLE OF INSERTION GAIN MEASUREMENT RESULTS**

Below is an example of an insertion gain measurement. By comparing the hearing aid response (red line) with the NAL-NL1 Target (solid black line) the audiologist can see that additional amplification is required in the high frequencies to optimise intelligibility and comfort.
REAL-EAR-TO-COUPLER DIFFERENCE MEASUREMENTS
Accurate measurements can be tricky to achieve with young children and the two measurements required for insertion gain often cannot be obtained. Real-Ear-to-Coupler-Difference (RECD) measurements are preferable for younger children and infants because they only require one real ear measurement.

In this procedure, the level of a reference sound is measured in the child’s ear with the aid and ear mould in place. The level of the same sound is then measured with the hearing aid connected to a standard coupler (connector) in a hearing aid test box. The difference between these two measurements (real ear and coupler) is the Real-Ear-to-Coupler Difference.

Using this measure, the audiologist can accurately predict the level of sound in the child’s ear when the aid is worn. Therefore, the hearing aids can be adjusted in the test box to achieve the best possible match to targets.

SOUND FIELD EVALUATION
Sound field evaluation involves obtaining the hearing thresholds for your child’s aided hearing. The sounds are presented through a speaker instead of headphones and the softest sounds your child can hear with their hearing aid are recorded. Responses are then compared to target aided thresholds using the NAL-NL1 procedure.

With the use of digital hearing, which uses compression circuits (see hearing aid section), this type of evaluation is used less than it used to be to determine the way a child is able to use aided hearing. As the procedure relies on detecting the softest sound or threshold, the hearing aid is most likely to provide more gain at this level than it may for normal speech inputs.

More commonly, a speech-o-gram will be predicted from the NAL-NL1 prescription algorithms. See below for an example of a speech-o-gram.

SPEECH PERCEPTION TESTING
Speech Perception Testing tells us how clearly a child can hear speech, and can be used to develop a more comprehensive picture of the child’s listening ability with the hearing aids. Australian Hearing audiologists have a range of formal speech materials they can use depending on the child’s age and linguistic skills.

AIDED CORTICAL TESTING
The Aided Cortical Testing means of evaluation is still very new and highly specialised. It is just being developed as a clinical test and equipment is not available in most hearing centres. It can be used where children are not able to have reliable evaluation through other means. It involves attaching electrodes (small metal disks) to the child’s head and presenting some speech sounds through a speaker at known levels. The electrodes are trying to pick up the electrical activity of the brain that is created by these sounds. (This is a type of EEG) This helps us to determine whether the sound is being detected and may tell us how to adjust a hearing aid even for a very young baby.

EXAMPLE OF A SPEECH-O-GRAM
THE SPEECH-O-GRAM
The speech-o-gram is a way of displaying information about your child’s hearing aid fitting. It gives a picture (for each ear individually) of what sounds the child should detect in speech when using their hearing aids, including information about how much of average speech is audible and the effects of changes in the hearing aid fitting.

The part of the spectrum that is above threshold is indicated with darker shading than the part that is inaudible. For people with mild and moderate hearing loss at all frequencies, more audibility generally means more intelligibility, but this is not necessarily the case at any frequency where the loss exceeds about 60 dB HL. Also, more audibility always means more loudness, and this may not always be desirable.

Remember that the speech signal going through a hearing aid is constantly changing as the speaker talks. Also, people may speak with soft or loud voices, and may be up close or far away. So in real life the speech signal going into the hearing aids will often be different from what is shown on the speech-o-gram – it is only a guide.

FINE-TUNING
After adjusting the hearing aids to get the best possible match to the amplification targets, the audiologist continues to monitor and evaluate the fitting to see if any fine-tuning needs to be done to account for individual factors. This can be done in a number of ways:

Asking the child’s opinion
This has obvious limitations with babies and children who have limited speech and language abilities. Even if a child is able to tell the audiologist what they think about the sound of their hearing aids, it can still be very difficult to interpret the comments to determine what adjustments should be made. However, a child’s feedback about the sound of their hearing aid is always taken seriously.

Paired comparisons
This procedure is most appropriate for children over six years old with severe and profound losses, and is available at some Australian Hearing centres. The child is required to listen to a simple story that is recorded on video. They are asked to compare speech amplified in different ways, and to tell us which one sounds best. If the child prefers an alternative setting to what is prescribed, the hearing aids can be adjusted accordingly.

Asking the parent’s and teacher’s opinion
Gathering information from parents and teachers is vital to understanding how the child is hearing and functioning in the real world. This feedback is particularly valuable in evaluating if the hearing aid is set to a comfortable loudness, and how well the child is accepting and using the aids. The information may be gathered using formal questionnaires or by discussion with the parent or teacher. If behavioural test information is limited, observations from parents and teachers help to build up a more complete picture of the child’s hearing abilities.

CAN HEARING AIDS DAMAGE HEARING?
Under particular circumstances, hearing aid use can be associated with Temporary Threshold Shift (TTS) and/or Permanent Threshold Shift (PTS). These terms are used to describe the worsening of hearing after the ear has been exposed to loud noise.

TTS is a temporary change in hearing. Many people, including people with normal hearing, experience TTS after exposure to loud sounds. If TTS occurs over a long period of time it can lead to a permanent loss of hearing (PTS).

Hearing aids fitted to people with severe-to-profound hearing impairment may be very powerful and deliver very loud sounds to the ear and could therefore cause TTS.

The NAL-NL1 prescription is one of the safest, most effective prescription methods of hearing aid amplification available. Hearing aids now use compression circuits that increase the protection available for high level inputs. Research has shown that amplification won’t cause deterioration in hearing in the vast majority of clients. However, for a very small number of clients (less than 0.05 %) even the NAL-NL1 prescription and typical input levels may still result in temporary worsening of hearing levels.

If the hearing aid is regularly used at volume settings higher than recommended, this increases the likelihood of temporary threshold shift occurring. This temporary worsening of hearing recovers almost completely overnight. Provided this type of change is recognised early and appropriate action is taken, no permanent change in hearing levels need result.

Children who often use their aids during very noisy activities are at increased risk of a noise-induced change in their hearing. They should use ear protection during woodwork and metal-work activities in the same way as other students.
At Australian Hearing we will check and compare your child’s hearing test results over time to see if any changes are occurring. If hearing levels are getting worse, your child’s hearing will be checked to see if the hearing aids are producing the change, and if so, its response will be altered to prevent any permanent damage to hearing. It may also be necessary to refer on to an ENT Specialist since the deterioration of hearing can be due to a medical condition which may be treatable.

As your child gets older, it is good if you give them more and more responsibility with regard to checking and maintaining their own hearing aids. Your audiologist will be able to help you teach your child to perform some simple maintenance tasks.

Your child’s hearing aids should be checked every day. The morning is better to ensure they are in working order for the day ahead.

You and your child should follow these simple steps to check how well the hearing aids are functioning:

**VISUAL CHECKS**

**a) Ear mould:**
* Is the hole in the ear mould blocked with wax? This will stop the sound coming out. Pick out any wax with the wax tool (available from Australian Hearing).
* Is the ear mould clean? Wipe it over with a tissue or damp cloth to remove any grime. If a behind-the-ear mould is very dirty, remove the ear mould from the hearing aid and wash it in warm, soapy water. Take care to remove all water from the earmould before putting it back on the aid. Puffing through the mould with an air puffer will help remove moisture.

As your child gets older, it is good if you give them more and more responsibility with regard to checking and maintaining their own hearing aids. Your audiologist will be able to help you teach your child to perform some simple maintenance tasks.

**b) Hearing aid**
* Are there any cracks in the hearing aid itself? This may make the hearing aid work intermittently. Take the aid to Australian Hearing for repair.
* Have any of the switches broken? Take the aid to Australian Hearing for repair.
* Is there any corrosion on the battery or in the battery compartment? This will look like powder. Throw away the leaking battery and try cleaning the battery contacts carefully with a cotton bud dipped in methylated spirits, or take the aid to Australian Hearing for repair.

If the hearing aids are BTEs, are the hearing aids on the correct earmoulds? The hearing aids may be set differently for each ear. Your Australian Hearing audiologist can mark them for you to make it easy to tell them apart. Many children have stickers on their hearing aids to help identify them.
LISTENING CHECK
How to listen to your child’s hearing aid:
To perform a listening check you will need to use an ear bud or a stethoclip or a special ear mould from Australian Hearing. The more you listen to the hearing aids the better you will become at detecting any problems with sound quality. When listening to the aid using a normal voice level some parents count or recite a nursery rhyme. Listen to your own voice and take note of the sound quality when the hearing aid is working well.

What to listen for:
✽ Is the hearing aid working? Switch the hearing aid off and on a few times, and change the battery if necessary.
✽ Is the volume control effective? Is the control moving as it should? Is the volume softer/louder than normal? (The volume control in many children’s hearing aids is locked. If so, the aid will not get softer and louder.)
✽ Is there any static or distortion?
If a problem is identified during a listening check or you are not sure whether the hearing aid is working, bring it in or send it to your Australian Hearing centre and let them check it for you.

SPEECH DETECTION TEST
Another way of checking that the hearing aid is working is to carry out a speech detection test. It involves you making some speech sounds (ahh, ee, or, oo, sh, sss, and mm) whilst standing behind your child. Your child needs to acknowledge or repeat the sound. How much the child hears when the aids are functioning properly will depend on the severity of their hearing loss. Check with your audiologist how many of these sounds your child should be able to hear.

FMS AND OTHER DEVICES
Other equipment that your child uses to help them hear should also be checked on a regular basis. Ask your audiologist for further advice.

BATTERIES ARE DANGEROUS IF SWALLOWED
If a battery is swallowed, seek medical advice urgently from the Poisons Information Centre in all capital cities, your doctor or local hospital.

Please remember the following:
✽ Keep batteries out of reach of children
✽ Children like to copy, so do not change batteries near them
✽ Do not put batteries in a fire or incinerator as they may explode
✽ Do not attempt to recharge button batteries.

HANDY HINTS ABOUT EAR MOULDS
The ear mould is an important part of a hearing aid. It directs the sound to where it is meant to go in the ear and should fit well and comfortably.

FEEDBACK
Feedback is caused by amplified sounds from the hearing aid leaking out from inside the ear through tiny spaces between the ear mould and the ear, and then going back into the microphone of the hearing aid.

There are five things which can affect or cause feedback:
1. Degree of hearing loss
Feedback is more common when the hearing aid is a powerful one; there is more sound to leak out. This is why a tightly fitting ear mould is so important for people with severe losses.

Small children who are growing fast will grow out of their ear moulds more quickly than an adult, so some little children will need to have new moulds quite frequently if a good fitting ear mould is to be maintained. As their growth slows then ear moulds will fit better for much longer.

2. Ear movement
Small children’s outer ears are quite soft. When they move their heads the “seal” between the ear mould and the ear may be broken, leaving space for the sound to leak out. As they grow and their ears become firmer this becomes less of a problem.

3. Mould material
Soft materials ensure a better and more comfortable fit when used with powerful hearing aids. Unfortunately soft moulds shrink and deteriorate more quickly than the hard materials commonly used with lower gain hearing aids.

4. Ear wax
Excessive wax in the ear can also cause feedback by reflecting sound back out of the ear. If there is too much wax it will have to be removed by a doctor. Your audiologist can see if there is any build up of wax.

5. Tubing
The plastic tubing of the mould can become brittle with age and split, allowing sound to leak out.
What can I do to stop feedback?
The best solution is often a new ear mould. While you are waiting for the new moulds to come back from the laboratory you may find that using a lubricant like Auragel will help by filling in the spaces between the mould and the ear. You can get Auragel from your Australian Hearing centre. Alternatively, a light smear of Vaseline or KY gel on the mould can help.

If your child has ear infections or skin problems we recommend you check with your doctor first before using Auragel or Vaseline.

Can I get new moulds quickly in an emergency?
Urgent ear moulds can be made up quickly. Australian Hearing centres have a courier service to the ear mould laboratories, and large metropolitan centres usually have a daily collection. If the ear impression is taken just before the courier pickup it will get to the mould laboratory – and back to you – with a minimum of delay, usually within a week.

What can be done if there is a chronic feedback problem?
Your audiologist can ask the ear mould laboratories for “problem” ear moulds to be specially handled. Sometimes it’s a process of trial and error, but a solution can usually be found.

UNCOMFORTABLE EAR MOULDS
As already mentioned, people who wear powerful hearing aids need to have firmly fitting ear moulds. This is when sore ears can become a problem.

When the ear mould laboratory gets each ear impression they dip it in wax to smooth out any irregularities. If asked by the audiologist, they will put extra wax or “build up” around those parts of the ear mould where sound commonly leaks out causing feedback. While this often solves the whistling problem, it can cause pressure points and sore spots. It can be quite a delicate job, balancing build up to stop feedback without causing pressure points.

If an ear mould hurts, make an appointment to see your audiologist. Some trimming of the ear mould may be all that is required, or perhaps special instructions regarding build up and ear mould materials to the laboratory may also be necessary.

Ear mould materials
There are several different types of ear mould materials varying in softness and non-allergenic properties. Some people will do better with a particular type of ear mould material and your audiologist may try more than one type before finding the best one.
Looking after ear moulds

Ear moulds should always be kept as clean and dry as possible. If ear infections or skin irritations are a problem, ear mould hygiene is even more critical.

Wipe the ear moulds over with a damp cloth and remove any wax from the canal of the mould every time you take them out.

If your child wears behind-the-ear hearing aids, you can wash the ear mould in warm soapy water.

1. Carefully remove the mould from the hearing aid.
2. Wash in warm soapy water and then flow hot water through until mould is clean.
3. Dry mould thoroughly. Make sure there is no moisture in the tubing before placing it back on the ear hook.

The tubing must be dry inside before it is reattached to the hearing aid. An air puffer does this well and these are available from your local Australian Hearing centre.

You can use disinfectants in the washing water, though they can cause some mould materials to deteriorate more quickly.

In-the-ear hearing aids should never be immersed in water as the electronic components are inside the ear mould. Just wipe over with a damp cloth and remove any wax carefully with the small tool provided.

In summary

Examine the ear mould regularly. If it is becoming loose in the ear, hard or discoloured, go to your Australian Hearing centre to check if a new one needs to be made. Hard tubing should be replaced before it splits.

Carefully clean the ear mould every time you take the hearing aid out.

If you need a new mould back in a hurry, ask the audiologist to mark the impression “urgent” and come into the hearing centre to collect it.

If there is a persistent problem with feedback or discomfort, make an appointment to discuss it with your audiologist.

As early as you can, teach children how to look after their own ear moulds and keep them clean.

Getting used to hearing aids

For children to develop speech and language skills, they need to hear sounds, words and sentences over and over again. Therefore, for a child with a hearing impairment to develop speech and language skills, it is essential that the hearing aids are worn consistently.

The first few days and weeks of getting used to a hearing aid can be a difficult time for the whole family, or it can be a breeze! While some children take to hearing aids like ducks to water, accepting them immediately and wearing them all the time, for others it can take quite some time to establish regular and consistent use.

Your child’s age, temperament and hearing level can all influence the reaction to hearing aids. It is also important to your child’s acceptance of the devices that they are comfortable and don’t feed back (whistle).

Your own reaction to hearing aids can also influence your child’s acceptance of the devices. Children are perceptive from a very young age and will respond to your facial expressions and body movements when handling or discussing the hearing aids. The thought of getting your child to accept hearing aids can be very daunting, particularly as you may feel uncertain about using the devices or of their benefit. This is especially true if your child initially shows little or no response to sound at early tests.

Luckily for most families, these fears are unfounded and the child accepts the aids without much fuss.

Please feel free to discuss any concerns at all regarding the hearing aids with your family audiologist. Many parents also find it helpful to discuss a variety of issues with other parents. Your audiologist will be happy to put you in touch with other families or with your nearest parent support group. Your child’s teachers/early intervention staff are also a mine of information about helping your child adjust to hearing aids.

Gradually increasing the time the hearing aid is worn is often the most successful approach. Initially select a time when the child is most likely to accept the hearing aid. This usually would be a time of day which your child enjoys such as play time, story time, lunch time or during their favourite television program. Ensure your child wears
HEARING AIDS

the aids for part of this activity, gradually increasing the amount of time that the aid is worn daily. While your child is wearing the aids give lots of individual attention and positive encouragement.

If the aid is removed, cease the activity. Once the child is happy and accepting, replace the aid and commence the activity again. If the child responds well to wearing the aids, and makes few attempts to remove them, remove the aids after 30 minutes to one hour. If your child is negative towards the aids, removing them almost as soon as they are put on, aim for only five minutes of aid use to start with.

It is important that you make the decision to remove the aids and finish the session, demonstrating that you are in control of the situation. If things go well, you may wish to use the hearing aids for several sessions in a day. If your child is resistant, you may try to use them for only one or two very short sessions. If you are feeling upset or stressed, give it a break and try again tomorrow! If your child is totally unaccepting of hearing aids, it may help to share the burden of persisting among several family members. The key to success with an infant or young child is giving positive rewards when the aids are in place and avoiding chastising your child for removing the aid.

After several successful sessions of short duration hearing aid use, the aids can be left on for increasingly longer periods of time. This is a guide only as parents need to use their own judgement and do what they feel is best for their child.

The ultimate goal for children with a significant hearing loss is that the aids be worn for all of the child’s waking hours. The time taken to achieve this goal can vary enormously, however you need to be comfortable about how this process is managed. It is important to keep calm – but be persistent. Children are very quick to realise if you are wavering!

By using this gradual approach, full-time aid use can be achieved reasonably easily and the process can be both rewarding and successful. Good luck!

Strategies to get the most from your child’s hearing aids

LISTENING TACTICS HELP ENSURE YOUR CHILD RECEIVES A CLEAR SIGNAL WHENEVER POSSIBLE FOR EFFECTIVE COMMUNICATION.

Even with the best-fitted hearing aid or cochlear implant, children may experience hearing difficulties in some environments. Noise, distance, reverberation and poor visibility can contribute to your child having difficulties. The following suggestions may help parents and others overcome some of the difficulties children with hearing loss experience at home, in the supermarket, park or playground.

REDUCE NOISE
Where possible decrease the level of extraneous noise. For example, turn the TV or radio off when talking to your child.

Move away from noise sources such as other children, fans, air conditioners, loud speakers and traffic noise.

Your child will hear you best when you are no further than one metre away, or using an FM system. FM systems improve the clarity of speech in noisy conditions.

Be aware that in large rooms without carpets, curtains and soft furnishings your child will have more difficulty hearing due to reverberation (sound “bouncing off” hard surfaces).

ENSURE VISIBILITY
Ensure that your child can see your face, especially your mouth. Do not eat or cover your mouth while you are talking to your child.

Make sure that you are in the same room as your child and that you are facing them.

Be aware of lighting. Too much glare or insufficient light will cause difficulties.

Speak clearly but naturally. Exaggeration or shouting can make it more difficult for your child to understand speech. Shouting is likely to overload your child’s hearing aid, resulting in distortion.

Try to remain in one area while talking. It is difficult to lipread someone moving about.

When reading aloud, exaggerate your facial expression and try not to let the book cover your face.

ATTENTION
Call your child’s name or gesture to them, if you wish to talk to them.

Make sure that your child is attending when you want to communicate with them.

Try to use visual aids as much as possible. For example, write, draw pictures, and use gestures to assist your child understand what you say.
Don’t expect continuous attention from your child as your child works harder to communicate effectively than their hearing peers.

**LANGUAGE**

Ensure that your language is appropriate for your child’s language development. For example, initially use short simple sentences. Increase the length and complexity of your sentences as your child’s language skills progress. Discuss this further with your early intervention teacher if you are unsure what level of language you should use.

**CHECK FOR UNDERSTANDING**

Check that your child has understood instructions by observing your child’s response to what was said or by asking questions to determine the level of understanding.

**REPHRASING**

If your child did not understand what you said, try saying the same thing another way.

**HEARING AID AND DEVICE CARE**

Check your child’s hearing aids or implant and FM once a day and do a listening check such as the Ling seven sound test (ahh, ee, or, oo, mm, s, sh). Ask your family audiologist how to administer this test.

From an early age encourage your child to tell you if the device is not working so it can be fixed as soon as possible. This ensures your child obtains optimum benefit from the aid rather than it acting as an earplug or noise generator.

**HELPING YOUR BABY TO HEAR**

Parents of hearing-impaired infants face particular challenges as they are introducing hearing aids while getting to know their new baby and a new routine.

Hearing aids are vital in developing your baby’s ability to listen and speak. Ideally, your baby will wear hearing aids whenever they are awake. However, this is not always possible during the early months of life.

For many practical reasons your baby might only use the hearing aids for certain times of the day when they are very tiny. It will be important to increase the use of the hearing aids as your baby develops. The aim is for your baby to wear the hearing aids for all their waking hours, as soon as possible.

In these very early stages, your baby may not give much indication of hearing with the hearing aids. Do not be discouraged. Very young babies are unable to do much to show you they are hearing.

Try to use the hearing aids as much as you can in ways that still allow you to enjoy spending time with your baby. It helps if you can make wearing the hearing aids part of your baby’s routine.
If you can only use the hearing aids for certain times of the day:

✶ pick times when you are free to spend time with your baby, talking or singing

✶ pick a quiet place where there is no background noise. For instance, turn off the television and radio

✶ position your baby, if possible, so that there is nothing up against their ears, as this can make the hearing aids whistle

✶ try to make sure your baby can see your face and mouth as you speak.

A baby chair can be helpful because your baby’s head and neck are supported, you can face your baby directly and your baby can have a clear view of your face.

As an alternative you could sit upright on a chair or the floor with your baby lying in your lap with their head on your knees and legs on your chest. You can get good eye contact and it is a good position for playing “Peek-a-boo” or “This Little Piggy Went To Market”!

Feeding is a special time with your baby. Most babies are cuddled close while they feed so whistling from one or both hearing aids can be a problem.

Cuddling is important, both for you and your baby. You may be able to find a way to cuddle your baby that does not cause the aids to whistle. Otherwise, turn off one or both hearing aids at this time. If you can only leave one hearing aid turned on, this is still helpful.

Remember to turn the aids back on after feeding if your baby is still awake.

There will be times when it is impractical to have the hearing aids on your baby, for example, sometimes babies will not want to wear their hearing aids when they are tired. At these times, there are some things you can do to help your baby hear a little better.

Try to speak in a raised voice, but don’t shout — shouting makes your speech less clear to your baby. Instead, speak up as though you are talking to someone on the other side of the room.

Try to keep your baby nearby if you can. Your voice will be louder and it will be easier for your baby to hear you as well as see you. Even if your baby cannot hear you, being able to see you may be important for your baby’s feeling of security.

This is a good time to hold your baby close and have a cuddle as you talk because feedback will not be a problem. Some people suggest holding your baby so that their head is snuggled up under your chin or against your cheek. This can help your baby feel vibrations from your voice when you speak.

Your Australian Hearing audiologist will be able to give you more information about ways to encourage your baby to start listening.
Alex was born 14 November 2000. I took care of myself throughout the pregnancy and was so relieved when our perfect, beautiful daughter was laid in my arms. I enjoyed every moment with Alex, watching her grow and develop. She was so placid and made parenting look easy! I diligently took her to each check up, confidently filling out my book “yes, my baby turns to loud noises”, “no, my baby does not have any deafness risk factors” etc.

Everything changed when Alex failed her hearing test at eight months.

I knew she could hear so it was just a matter of returning for another test and proving it. I had never considered partial deafness – you were either deaf or you weren’t, right? After three months of further testing, it was confirmed that Alex had a moderate hearing loss. With every test, I willed Alex with all my heart to hear the sounds so our life could return to normal. When the audiologist told me Alex needed hearing aids, it didn’t sink in. I assumed it would be temporary and one day her hearing would be fixed.

When Alex was fitted with hearing aids the day before her first birthday, reality finally sank in. Seeing those big hearing aids on her tiny ears prevented me from ignoring the fact that my daughter had a disability and would have to deal with it for the rest of her life. I wished I could give her my perfect hearing and I’d be the one to deal with the hearing loss. A mother just wants her child to have an easy happy life, never having to suffer or face difficulties. Of course this is entirely unrealistic but it doesn’t stop you wishing for it. Every time I looked at Alex in those aids, every time she threw them on the floor, I was reminded of what we were dealing with.

One of the hardest things to deal with was wondering what life would be like for Alex. Would she learn to speak clearly? Would she do well at school? Would other children tease her? If only I had a crystal ball in those early months of uncertainty. After four months Alex stopped removing her aids and playing with her became fun again. At 15 months she started early intervention and we were reassured to learn that her speech was on track. Alex’s hard work with her teachers and at home paid off. At three and a half years, her receptive language was equal to a hearing five year old and she tested at or above average in all other aspects of language.

At age four, she is learning to write, read simple books and attends a mainstream kindergarten. She understands her hearing loss and when asked tells people “my hearing aids help me hear better”. She asks for her hearing aids and some nights won’t let me take them out until after she falls asleep.

Having a hearing loss does not stop your child from being who they are.

Alex does everything she would have done without her hearing loss – music class, gym class, swimming lessons etc – she just happens to wear hearing aids and she will never stop being my perfect beautiful daughter.
When a child is diagnosed as being deaf or having a hearing impairment, the family will need to consider which way is most appropriate for them to develop their child’s language and communication.

Method of communication is a very broad subject and we have divided the following definitions into three modes: oral, manual and written. The term language is used frequently. A language is any accepted, structured, symbolic system which is used for communication. It is arranged in ordered sequences that express thoughts, intentions, experiences and feelings. English is a language and so is Auslan.

**ORAL**
The oral method of communication has three components:

1. **Speech**. Speech is the motor act (involving muscles and movement) of spoken language. It is the way in which we articulate the sounds in syllables, words and sentences.

2. **Listening**.

3. **Lipreading**.

The oral method uses lipreading, with the assistance of amplified residual hearing to develop speech and language.

**MANUAL COMMUNICATION**
Manual communication is non-verbal and uses the hands rather than the voice to convey meaning. Under the broad heading of manual communication, several communication systems exist:

**Auslan** is the sign language of the Australian Deaf Community. It is a recognised community language and is different from English in its grammar and vocabulary.

**Sign systems** are used when people need to represent a spoken language, such as English. They do not have a grammar of their own as Auslan does, as they use the grammar of the spoken language they are representing. Signed English is a sign system which uses some of the signs from Auslan and some contrived signs. Signs are used in English word order.

**Fingerspelling** uses 26 signs which represent the 26 letters of the alphabet. Using fingerspelling is like “writing in the air”, spelling out English words letter by letter.

**Pidgin Signed English** is a signed system combining aspects of both Auslan and English. It uses Auslan signs mostly in English word order. Pidgin sign occurs naturally when Auslan and English users communicate with each other, combining different aspects of each others’ sign system.

**Gestures** are movements of the body and especially of the hands and arms which express an idea, emotion or attitude. Gestures are used by both hearing and hearing-impaired people.

**Mime** is a way of using gestures and bodily movement, without speech or sound to act out something.

**WRITTEN COMMUNICATION**
Communication via the written word.
Education and communication programs

THE VARIOUS EDUCATIONAL PROGRAMS AVAILABLE TO HEARING-IMPAIRED CHILDREN SUPPORT DIFFERENT APPROACHES WHEN CONSIDERING LANGUAGE AND METHOD OF COMMUNICATION.

AUDITORY-VERBAL/ ORAL-URAL
Programs using the auditory-verbal or oral-aural approach focus on the use of even minimal amounts of amplified hearing to develop spontaneous speech and to process language in a natural way through auditory pathways. These programs enable children with hearing impairment to learn to listen, understand spoken language and communicate through speech using their residual hearing, and in the oral-aural approach, using lipreading as well. These programs usually place the parent in the role of primary educator.

TOTAL COMMUNICATION
Programs supporting a total communication philosophy focus on the use of a wide range of methods of communication including speech, lipreading, listening, signing and finger spelling. These various methods of communication may be used alone or in combination with each other. When speech and signing are used together this is known as simultaneous communication. Simultaneous communication is used to manually represent English using a sign system known as signed English.

BILINGUAL/BICULTURAL
Programs supporting a bilingual/bicultural approach focus on education through two languages, Auslan and English. English is taught as a second language via reading or writing or through sign systems representing English.

In many educational programs and school settings, children who are Deaf or hearing-impaired may learn about the Deaf community and its history, language and culture, as well as learning about the hearing community.

For children with multiple disabilities, the following terms may be encountered:

AUGMENTATIVE AND ALTERNATIVE COMMUNICATION (AAC)
Augmentative and Alternative Communication (AAC) systems add to existing speech and language or replace speech when it is not available. Some examples of AAC systems include signs (e.g. from Makaton Vocabulary Language Program), gestures, objects, pictures and symbols.

DEAF-BLIND COMMUNICATION
Deaf-Blind communication refers to communication methods that are expressed and understood entirely by touch on a person’s hand:

* **palm fingerspelling:** letters of the alphabet are spelt on the hand and are read by touch. Some letters used by deaf people have been modified to reduce the need to manipulate the deaf-blind person’s hand.

* **hand-over-hand finger spelling:** the interpreter uses the standard deaf finger spelling method while the deaf/blind person’s hands rest loosely on that formation. The motion and tactile contact is read.

* **signing:** The deaf/blind person and the interpreter sit opposite with the deaf/blind person holding the interpreter’s wrists. The interpreter signs and the motion and tactile contact is read.
Daniel was born 14 weeks early, and spent his first four harrowing months in intensive care, fighting for his life with the same spirit and courage that he has shown ever since.

Because of his prematurity, Daniel was tested regularly for hearing, vision, physical and intellectual development.

I tried to do regular things too, like mothers’ groups and play groups, but that was often sadly confronting, because it was hard to avoid the comparisons with the other babies, who could roll over or sit up, babble, and reach up to be cuddled.

The first audiograms showed a moderate/severe loss. Since Daniel’s birth, my experiences had made me suspicious of health professionals. I should have known better, but I hoped that maybe he just needed more practice with the hearing test.

He obviously responded to sound. Like all mothers do, I had made noises behind his back, and he had turned and responded. So he wasn’t profoundly deaf. But time and again we went to the Hearing Centre and his audiogram seemed to get worse, not better.

The awful truth finally became undeniable when the audiologist prescribed hearing aids. Daniel was nearly one. I was a former teacher of the deaf, and I felt under a lot of pressure to be professional and strong. I knew I was lucky because I already had a lot of information, whereas other parents would have to start from scratch. But this was cold comfort at the time and I had a crisis of confidence about how much I really knew about anything!

Having a new baby can be stressful on at the best of times, so we were fortunate that we had a supportive network of friends and family. It was tough on Daniel’s Dad. From the time we met, my husband and I had always shared a love of music. You can’t help thinking when you decide to have a child with the one you love that your shared passions will be part of your family life. Suddenly we had to deal with the disappointment that we would not be able to share this with him.

That turned out to be the least of it.

Dan’s audiograms continued to deteriorate and he was also eventually diagnosed with cerebral palsy.

I knew a little bit of sign language but, because of his cerebral palsy, Daniel’s manual dexterity was poor. His vocal cords had been damaged by prolonged intubation and so his voice was very soft and gravelly. Either way, oral or Auslan, Daniel was going to face a challenge.

I went “early intervention mad” because I knew from my teaching experience how vital it would be.

We began a number of programs, including weekly visits to the wonderful teacher of the deaf at Australian Hearing Services. There was also the Shepherd Centre, physiotherapy, occupational therapy, speech therapy, endless doctors and specialists and all the anxiety that goes with the territory.

I launched into the task of giving Daniel as much oral language input as I could. We’d spend hours every day playing games (and putting the hearing aids back in his ears every time he’d pull them out!) while the housework piled up around us. It was exhausting. But finally, Daniel began to babble and develop a vocabulary. And that was exhilarating!

He was going to be oral. →
All parents are thrilled when their children reach their various milestones. But when your child has to overcome such adversity to achieve them there are no words to describe the joy, the pride and the sheer relief!

When Daniel was three (and with much trepidation) we started him at the local preschool but after two years it was clear that he was not developmentally ready to start “big school”. His speech was difficult to understand and, although his language skills were developing, they were still significantly delayed. He was tiny and immature. We made the difficult choice to hold him back another year. We enrolled him in a deaf nursery unit, which unfortunately involved a lot of traveling, but which turned out, in hindsight, to be one of our more brilliant decisions.

Dan is eleven now and has attended his local state school since he started kindergarten at age six. He is aided by an FM system and wears splints on his legs. The miracle that we always hoped for has occurred and he is functioning at his age level, thanks largely to the support he receives from our dedicated teacher of the deaf, our loving teacher’s aide, our miraculous physio at the Spastic Centre, his devoted swimming instructor and the great team of audiologists who keep us up to date on the available technology. He has fantastic language skills. His speech is clear and he loves to draw, paint and sculpt. He has turned out to be a talented and beautiful artist.

We all talk very loudly at home and when there is a lot of background noise, I can sign to him a little bit. Dan hates to miss out on anything that’s going on and when he doesn’t hear something, and if the speaker gets sick of repeating him/herself and gives up, understandably, he gets very upset.

Luckily Dan now has an eight year old brother (Maxi) who patiently explains conversations and jokes and who also loves boogie-woogie and blues and plays the piano. Sometimes we turn the music up loud and both boys dance around the lounge room. Dan has a good sense of rhythm as he can hear the booming bass rhythms (even if the rest of it sounds a bit distorted!).

So we ended up with a musician. But we got even more than that. We have an artist in the family as well!

There are still times when we feel overwhelmed by the relentlessness of the demands on our time, patience, finances, emotions and endurance. And it frightens me that Dan’s life will always have huge challenges and difficulties.

But that little boy has got more guts than anyone I have ever met, and his gentle soul and enormous strength of character so enrich the lives of all of us who know and love him.

We are the proudest of parents and I know Daniel will always embrace life with the same courage, curiosity, enthusiasm and unconditional love that pours out of him every day.
One source of support and information that parents often overlook, but wish later that they hadn’t, is the community of adult Deaf people.

The Deaf community is an extensive and diverse network of individuals with a shared language and culture and a long tradition of common experience. It also includes a wide variety of loosely affiliated social, sporting, religious and political organisations. The individuals that make up this community are mostly those who were born deaf or became deaf early in life and may also include hearing friends, family members and those who work with Deaf people, such as interpreters and community workers.

What particularly links these individuals and groups and makes them a distinct community is their shared use of a language, Australian Sign Language (Auslan) and for most, their strong sense of identity as Deaf persons. Estimates of the number of deaf people using Auslan in Australia vary from between 6,700 to around 15,400. There are thousands more hearing people who use the language when participating in the Deaf community. Similar Deaf communities exist everywhere in the world. Deaf people always evolve into strong communities and develop signed languages, and have done so throughout history.

Meeting Deaf people

Many parents, when faced for the first time with adult Deaf people, have two predominant responses.

The first is, “So that’s what my deaf child might look like in twenty or thirty years’ time. Well, that’s not so bad. They grow up, leave home, work, marry, travel, buy houses, have kids, and go through most of the normal experiences of life without their parents needing to be there all the time. And plenty of them are happy, intelligent, good-looking, funny, interesting people. Well, what a relief!”

The second reaction many parents have is, “But why, after all those years that parents and teachers put in, helping their deaf child to speak, hear and get along in the hearing world, do they end up spending so much of their time with other Deaf people? Does that mean their parents and teachers failed, that they can’t survive out there in the hearing world?”

This reaction often occurs because it is not immediately obvious how much time Deaf people spend with hearing people at work, studying and training, conducting the business of everyday life, and being with their families. For many, the confidence and ability to do this comes from their participation in the Deaf community. It gives them a feeling of group “belonging”, the opportunity to meet and become friends with a wide variety of people with whom they have no communication difficulties, and a way to easily share knowledge, ideas and dreams. This sense that one is “normal” and part of a community is necessary to everyone, and we all gravitate towards people who will reinforce these feelings in us.
Language
THE IMPETUS TOWARDS COMMUNITY AMONG DEAF PEOPLE IS SHAPED BY SIMILAR EXPERIENCES AND COMMON HISTORY, BUT PRIMARILY BY SHARED LANGUAGE AND CULTURE.

It is these which distinguish communities of Deaf people from the support groups formed by people with other disabilities. Deaf people claim to be more like an ethnic community and this has been recognised in Australian government policy.

Although Auslan has sometimes been dismissed in the past as mere mime and gesture, it is now officially accepted as one of Australia’s community languages, and its rich and inventive tradition of storytelling, humour and drama is acknowledged. This is now being enhanced with linguistic research, and Auslan is being taught alongside other languages in TAFE colleges, universities and adult education centres. Interpreters translate between Auslan and English in a wide variety of settings, working in the same way as interpreters of other languages.

Different countries have different sign languages. There is no universal sign language, contrary to many people’s expectations, but there are recognised “language families”, such as British Sign Language and Auslan, French Sign Language and American Sign Language. When Deaf people from different countries gather for conferences and sporting events they communicate through a specially devised “International Sign” system, similar in purpose to Esperanto. Of course, their years of experience trying to communicate with those who don’t understand them makes most Deaf people very inventive, flexible and imaginative communicators, and so it is comparatively easy for them to work out the fundamentals of each other’s sign languages and learn to communicate with each other much more rapidly than most hearing people would in similar circumstances.
THE DEAF COMMUNITY

Culture

It is easier if we define culture as a way of looking at the world and giving meaning to events, people and patterns. Deaf people experience the world differently, and in their community different events assume prominence and different people become influential and important. The emergence of a culture that incorporates these perceptions and interpretations is natural.

For example, Deaf people may avoid restaurants or gathering places where flashing or flickering lights are used to attract attention. In their homes flashing lights indicate doorbells or phones ringing, babies crying, or alarm clocks going off, and it is distracting and irritating to have lights flash without these meanings, in much the same way as constant meaningless noise irritates hearing people.

People in the Deaf community have different values about some things – one pertinent example is deaf children. Young Deaf children are seen very positively by Deaf adults, as complete little human beings with a precious heritage and much to contribute to the world. This can come as a surprise to hearing people who are used to seeing these children as victims of tragedy, in need of “intervention”, and only complete when attached to hearing aids or other technological devices. These culturally different responses are evident sometimes when one meets Deaf parents of Deaf children (approximately 10 per cent of Deaf children have Deaf parents) – they demonstrate ready acceptance and easy communication with their Deaf children, although they may be equally confused by the seeming labyrinth of educational options they must navigate.

There are opportunities for parents of young Deaf children to meet with Deaf adults and learn about their language and culture. With genuine communication and acceptance, living with Deaf and hearing cultures can be a revelatory and fascinating experience – it does not need to be something that divides people. Most parents who avail themselves of such opportunities find this community a vital resource in bringing up their Deaf children and discovering ways to enjoy the experience.

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I’ve always wondered what it would be like to be able to hear like a normal person. See, I’m deaf, and wear hearing aids. When people ask me what they are, I explain to them what they are and what they do. When they ask me how long I have had them, I surprise them when I tell them that I have had the hearing aids since I was diagnosed with a bilateral sensorineural hearing impairment at the age of four.

I sometimes imagine what it would be like to walk down the corridor without strangers taking second glances at my hearing aids. My hearing aids don’t affect me physically, or mentally, but my deafness does. Although physically I am one of the fastest and fittest people in my class, and I do alright when it comes to schoolwork, which my grades indicate, I do tend to get really tired, especially by the end of the week. The amount of concentration that I use to lip-read and to ‘try’ to hear what people are saying takes its toll on me.

When I need to have quiet, I turn my hearing aids off. Once I do that, the world surrounding me turns into a world of silence. People look like goldfish, because their mouths are moving, but there is no sound.

I can still remember the hearing test before I got my hearing aids. My mother and I were sitting on one of those couches that look comfortable, but when you sit on them, they feel as hard as concrete. I would have been just four years old. My mother was looking at the posters on the wall advertising hearing aids and information about deafness. I was playing with a little car, making vroom vroom noises. Then the administration lady called out “the audiologist is waiting to see you in room 4”. I knew what the lady said because Mum turned to me and beckoned for me to go with her. I was terror-stricken at that moment. I knew what was coming, I had been there before. Only weeks earlier I had been tested, only to be told that there was nothing wrong, but my mother’s instincts told her otherwise and we were back for a second opinion. I started whimpering like a puppy and Mum had to drag me along the floor to the loathsome room where the audiologist waited patiently. He had blue eyes that peered at me through glasses shaped like a half-moon.

If he had a beard, I reckon he would have been the spitting image of “Professor Dumbledore” in the Harry Potter movies.
“Hi there, little Jack”, he said in a booming voice. I cowered behind Mum.

The first test that he ran on me was a ‘bone conductivity test’, where he placed two pieces of plastic on the bones behind my ears and when the plastics vibrate, I pressed a button to indicate that I could feel the vibrations. This particular test is done to rule out certain types of deafness and to measure bone density. After that test, earphones were placed over each ear and, like the other test, I was to push the little red button when I heard a sound. This was the test where I didn’t react very often and where the audiologist could gauge the degree of my hearing loss. The degree of hearing loss at this stage was moderate.

I was diagnosed with a progressive loss. This meant what hearing I did have would decrease.

Six weeks later I returned to the Australian Hearing centre to be fitted with my hearing aids (now affectionately referred to as “my ears”).

Both my mum and dad and my baby sister Ashlea were with me on this occasion so I wasn’t quite as scared as on my previous visits. The hearing aids were fitted and as I searched Mum’s face for reassurance and comfort, the audiologist switched my aids on.

Then I heard it. It frightened the hell out of me.

For the first time since my baby sister was born, I not only saw her cry, I actually HEARD her cry!

This was to be one of many incredible experiences in my life. Having “ears” and hearing sounds that most people take for granted opened up a whole new world for me.

So while I walk down the corridor and people continue to stare, I will continue to act and feel like a normal person... and that’s because I am!
Australian Caption Centre

Street address:
Level 4, 187 Thomas St, Haymarket
Postal address:
as above
P: FREECALL (Voice/TTY) 1800 777 801
F: (02) 9281 2198
E: infoserv@auscap.com.au

The Australian Caption Centre is a national not-for-profit organisation that produces captions for television, video and TV commercials for use by people who are Deaf or hearing-impaired or who speak English as a second language. The aim of the Australian Caption Centre is to:

- promote captioning and the use of captioning to the Deaf and hearing-impaired
- provide a wide range of free information services about captioning
- develop and expand captioning.

The Australian Caption Centre has offices in Sydney, Melbourne, Perth and Brisbane. It operates a free National Captioning Helpline and produces a quarterly magazine called Supertext © News.

What Are Captions?
Captions show the entire soundtrack (words, music and sound effects) of a TV program or video as text on the TV screen. Captions are also coloured and positioned on screen to accurately denote who is speaking.

Captions are available on all prime time TV programs (6.00–10.30pm) plus on all news and current affairs programs outside these hours. TV guides denote captioned programs with “S”, “St” or “CC”.

Equipment
Captions are accessed using a teletext television or digital set-top box. These are available from most department stores and electrical retail outlets. Once you have the equipment, the captions are a FREE service.

Australian Communication Exchange

The Australian Communication Exchange (ACE) is a national community-based company whose mission is to facilitate equity of access to the telecommunication network for people who are Deaf or have a hearing or speech impairment. This not-for-profit organisation operates a national outreach program which provides community awareness and training around Australia. Through its retail arm, Deafness Resources Australia (DRA), ACE distributes a comprehensive range of deafness-related products and services including: devices to access televisions, telephones, doorbells, meetings and alarms, books, videos and promotional items, advice regarding its products for people who are Deaf or hearing-impaired.

The organisation’s products and services are listed in the Deafness Resource Guide (see Books section of Resources chapter in this book). Anyone is welcome to apply for membership of the ACE and members are entitled to a regular newsletter, announcements and updates, and discounts on DRA products.

Through a contract with the Australian Government, the ACE provides the National Relay Service (NRS). The NRS operates 24 hours a day every day of the year to relay calls between people who are Deaf or have a hearing or speech impairment and the wider community. People who are Deaf or have a speech or hearing impairment can contact anyone anywhere through the NRS using a TTY or a computer modem and assisted by a Relay Officer. Friends and families of hearing-impaired people can contact them through the NRS using a normal telephone. Local and toll free calls can be made without an account and at no extra charge, but long-distance and other time-charged calls do require an account.

For further information contact the ACE at:
P: 1800 555 660 (voice)
TTY: 1800 555 630
F: 1800 555 690
E: feedback@aceinfo.net.au
Postal address:
PO Box 473,
STONES CORNER QLD 4120

For advice on DRA products and services contact a Resource Consultant at:
P: 1800 555 201 (Voice)
TTY: 1800 555 203
F: 1800 555 690
E: dra@aceinfo.net.au
Postal address:
Locked Bag 5380,
PARRAMATTA NSW 2124
BETTER HEARING AUSTRALIA
Better Hearing Australia is a non-profit, self-help organisation controlled by its members and providing an Australia-wide community support service offering rehabilitation and help for hearing-impaired adults. Better Hearing Australia (New South Wales) Inc., a branch of Better Hearing Australia, provides services including community education, sessions in hearing loss management and information and advice on hearing loss and devices.

For more information contact:
Street address:
5 High Street
Prahran VIC 3181

T: 03 9510 1577
TTY: 03 9510 3499
F: 03 9510 6076
www.betterhearing.org.au

CARER’S ALLOWANCE
This Federal Government allowance is paid to parents of children with disabilities who require “substantially more” care and attention in comparison to a child of the same age without a disability.

Contact Centrelink and request a Carer’s Claim Pack for Under 16 year olds or talk to the Disability Support Officer at your nearest Centrelink office.

Carer’s Allowance
T: 132 717

Multilingual Telephone Information
T: 131 202

TTY Service (free call)
T: 1800 810 586

DEAF CHILDREN AUSTRALIA FREE CALL HELPLINE
A national information, support and referral service for families of deaf and hearing impaired children and young adults

Telephone and TTY:
T: 1800 645 916
Available Australia-wide, Monday to Friday 10.00 am to 4.00 pm (EST)
E: helpline@deafchildren.org.au
www.deafchildrenaustralia.org.au
DEAFNESS FORUM
The Deafness Forum was established in 1993 and now represents all interests and viewpoints of the Deaf and hearing-impaired communities of Australia.

The representational base of the Deafness Forum is divided into five sections:

HEARING-IMPAIRED SECTION: people with a hearing loss who communicate predominantly orally.

DEAF SECTION: people who consider themselves to be members of the Deaf community by virtue of its language and culture.

EAR DISORDERS SECTION: people with a chronic ear disorder (such as Tinnitus, Meniere’s Disease or Acoustic Neuroma).

PARENTS SECTION: parents or legal guardians of people who are Deaf or hearing-impaired.

SERVICE PROVIDERS SECTION: service providers to the Deaf and hearing-impaired communities.

Most people in the general community are unaware of the differences between Deaf people and those who experience varying degrees of acquired hearing impairment. Few know about the richness and ethnic characteristics of Deaf Culture. There is little understanding of the range of communication strategies and devices available to break through the isolation that hearing impairment creates.

The Deafness Forum’s mission statement is: “To improve the quality of life for Australians who are Deaf, have a hearing impairment or have a chronic disorder of the ear by:

* Lobbying government
* Making input into policy and legislation
* Generating public awareness

For more information contact:
National Secretariat
Postal address:
Churchill House,
218 Northbourne Ave
BRADDON ACT 2600
P: (02) 6262 7808
TTY: (02) 6262 7809
F: (02) 6262 7810
E: deaforum@ozEmail.com.au
www.ozEmail.com.au–deaforum

PARENT SUPPORT NETWORKS:
Parent support networks are available in each state. Your Australian Hearing audiologist will be able to provide you with local information. Aussie Deaf Kids provides online support and resources for parents of hard of hearing and deaf children living in Australia
www.aussiedeafkids.com

TELSTRA DISABILITY SERVICES
Telstra provides equipment to assist Deaf, hearing-impaired, and speech-impaired people. The equipment can be rented at the same price as other Telstra equipment.

To access this service, ask your Family audiologist or contact Telstra on:
T: 1800 068 424
TTY: 1800 808 981
F: (03) 9892 8109
www.telstra.com.au

WORKPLACE MODIFICATION SCHEME
The Workplace Modification Scheme is a scheme that was introduced on 1 July 1998 by the Federal Government to help with the cost of workplace modifications for employees with disabilities. The Workplace Modification Scheme is designed to encourage employers to provide work for people with a disability by assisting with the cost of special equipment or workplace modifications. The scheme is administered nationally by NSW office of the Department of Family and Community Services and replaces all previous workplace modification schemes.

A contribution towards the cost of special equipment to a maximum of $5,000 may be available. Special conditions apply to both the employee and the nature of the job to qualify for the scheme. A Disability Employment Service, to which the worker may be referred by Centrelink, will help with your application and any necessary workplace assessment. There is also a hotline number for enquiries about the scheme.
T: 1800 814 838
Today marks one year since our beautiful son was diagnosed as being profoundly deaf. One year since we lost some of our hopes and dreams for our newborn baby and gained some others. One year later and so much has happened... and we wouldn’t change it for the world.

After three failed SWISH tests, while we awaited his retest we performed our own tests including popping balloons and blowing whistles, clapping near him which he never responded to and these experiences in retrospect were the beginning of us as a family starting to deal with the possibility that our beautiful little boy may have a hearing impairment.

The day Ethan was diagnosed as being profoundly deaf was a very sad day for us as any hopes we may have been harboring was extinguished, but on the other hand it was also a new beginning, a steep learning curve into a world that has existed for many for a long time, a world we knew virtually nothing about.

There was so much to take on board and it was really overwhelming, but we survived.

You learn how to get by and we did over the months that followed as our lives started to change and move in a different direction as a family. Many specialists needed to be seen, appointments needed to be made and many questions needed to be answered.

As our little 11 week old got fitted with his hearing aids, we felt cruel. It was so hard expecting a little baby to have to deal with this. As he grew, he started to take them out and throw them or chew on them (we could never leave them on him in the car). It was very hard trying to put them back in his little ears. It felt like we were at Australian Hearing every week for new moulds and even new aids due to Ethan throwing them away or liquid getting into the microphones.

Our family had to make some drastic changes if we were going to give our son the best chance in life. Work was one of the first things to go considering all the appointments and also meeting the needs of our two year old daughter. We knew that money would be tight, but we owed it to Ethan to give him our best. Our family were extremely supportive in every way; babysitting, attending appointments, learning Auslan and just talking through things with us.

We looked at all the early intervention services available and found that most were not in our local area. We wanted Ethan to be able to sign and speak, but found that there were not many places combining the two.
We decided to explore Audio Verbal Therapy at The Annette Shepherd Centre and felt very welcome straight away. We continued with Ethan’s therapy and the playgroup was so beneficial for information and meeting other parents with similar experiences.

After many more tests at Australian Hearing, The National Acoustics Laboratory, The Shepherd Centre and Westmead, it appeared that Ethan was not accessing sounds in the speech range. Even the most powerful digital hearing aides were not helping him. The frustration of the hearing aides constantly whistling drove us insane.

We decided at this time to start teaching Ethan some sign language whilst we were still considering our options. We attended a Parents’ Heritage School at the Royal Institute for Deaf and Blind Children, doing two six weekly courses where we learnt some basic Auslan along with Deaf history and culture. During this time, we decided to join SCIC as we desperately wanted Ethan to have the opportunity to access speech as well.

All the tests and information from each institution we visited concluded that Ethan’s hearing was profound in both ears and that he would most likely benefit from a cochlear implant. After hours of appointments, discussion and research our decision was made.

Through various discussions, we consistently found ourselves saying that when Ethan was old enough we wanted him to have the option of how he wanted to communicate, whether through speech or Auslan or both.

The decision to have Ethan implanted was extremely hard for us. We wanted the best for our son and realized the huge decision we were making on his behalf. The surgeon we saw was fantastic and she assisted in every way possible, without putting us under any pressure. The surgery went extremely well and Ethan recovered easily. He was switched on a little over two weeks later which was exciting although he didn’t react in a big way, which slightly disappointed us.

A year later, Ethan has now had his cochlear implant for approximately three months. We have worked closely with SCIC and they have been gradually fine tuning his implant. It has been in recent weeks that for the first time we are hearing him speak instead of growling. Nothing can replace the feeling of hearing your child for the first time saying your name. We can see that the use of sign and has assisted him in his verbal language.

We believe that incorporating speech and sign into Ethan’s language development has been the best choice for him and his future.

Our advice to other parents is ask questions, research, but most of all make your own decisions and believe in your ability to make the best decision for your child.
Australian Communication Exchange
Deafness Resource Guide lists products and services available to anyone with an interest in deafness provided through Deafness Resources Australia. Included is an extensive list of books and videos for children and adults available by mail order, some of which are listed below. The guide is available free from your Australian Hearing centre.

Books


Altman, E. 1988. Talk with me! Giving the gift of language and emotional health to the hearing-impaired child. Alexander Graham Bell Association for the Deaf, Washington, D.C.


Lane, H. 1996. **A journey into the deaf-world.** San Diego, Calif.: DawnSignPress.


Moore, M.S. & Leviatan, L. 1993. **For hearing people only: answers to some of the most commonly asked questions about the Deaf community, its culture, and the “Deaf reality”** Rochester, N.Y.: Deaf Life Press.


Videos

ACE.NRS Video. Produced by the Australian Communication Exchange: explains the various ways to use the NRS. Available free from ACE.

Families with deaf children: discovering our needs and exploring our choices. Center for Hearing Loss in Children, Boys Town National Research Hospital, Boys Town, Nebraska, USA. Parents talk to other parents about having a deaf child. They discuss their reactions to being told that their child was deaf, and the various steps they took to help their child.

Fingerspelling in Auslan (Australian Sign Language). National institute for Deaf Studies and Sign Language Research, La Trobe and Monash Universities, Bundoora, Vic. 1995. Demonstrates finger spelling and provides exercises arranged in groups of commonly occurring combinations of letters in English, signed with the correct rhythm and intonation for Auslan.

First signs: signs to teach your baby. Special Education Directorate, Sydney, NSW, 1994. This video demonstrates 50 basic words in signed English suitable to teach hearing-impaired babies and young children. Each sign is introduced by the word written in Arabic, Vietnamese and Chinese.


Hearing development and hearing loss: birth to three years. Bill Wilkerson Center Nashville, Tenn., 1995. This program looks at hearing development in the first three years of life. It also looks at the structures of the ear and their role in hearing, the risk factors and the conditions associated with hearing loss.

In a small valley. Written and directed by Dennis K. Smith [Sydney]: Open Channel and Byzantine Productions; Video Classroom [distributor], 1996. Explores the unique but ignored cultural enclave – the world of the Deaf. The program’s message is that deafness is not a sickness, defect or handicap – though historically our society has treated it as such. Shows the life of Peter Adams, a deaf artist, and the campaign to have Auslan recognised as a language in its own right.


Listen Hear! Making the Most of Radio Frequency Hearing Aids. Australian Hearing, NSW. 1990. Developed for students and teachers to inform them of the many uses of Radio Frequency (FM) systems. Looks at how the aids function, creative ways of using them in a range of settings, and a light-hearted look at some of the pitfalls of FM use for the unwary.
Passport without a country: the hearing children of deaf parents. Centre for Deafness Studies and Research, Griffith University, Nathan Qld., 1992. This video is about CODAs, hearing children of deaf adults. It provides an intimate glimpse into the lives of seven CODAs from their earliest memories of childhood to where they find themselves now. We learn of the dilemmas facing CODAs who are searching for their identity. As one CODA puts it, it’s like having a passport that is not accepted by the country to which you are born.

Signs of language. QUT Educational TV Facility, Centre for Deafness Studies and Research, Griffith University, Qld., 1991. The video explores the Australian deaf community and shows the depth and range of deaf people’s use of Australian Sign Language (Auslan). Gives insights into the nature of the language, and its place in the lives of the people who use it.

Signs of life: Australia’s deaf community. Produced by AV Production Unit, Brisbane College of Advanced Education [for the] Deafness Resources Project, 1989. This informative portrait of the Australian deaf community shows deaf people from young children to senior citizens – leading normal, purposeful lives, participating in the wide range of activities which their thriving community supports, working, playing, socialising, and talking about their lives with inspiring candour, insight and humour.

Talking hands. Lessons 1–18. University of Sydney Television Service in association with the Royal Alexandra Hospital for Children and the Australian Deafness Council, 1984. This is a programmed course which aims at fostering communication in the families of young deaf children, and teaches the simultaneous method of speaking and making signs. To be used in conjunction with the Dictionary of Australasian signs.

Talking Hands Noisy Lives. Royal South Australian Deaf society, 1992. This video examines little known aspects of the Deaf world such as sleep-signing, self-signing, the controversy over cochlear implants and the developments of sign dictionaries and bilingual education programs.

Understanding hearing loss. QUT and Griffith University Deafness Resources Project, 1991. Explains sound, hearing, hearing loss and the relationship between listening to speech and different kinds of hearing loss. Simulations of what speech sounds like with different kinds of hearing loss help us to understand how much deaf people can get from listening and lipreading. Contains useful hints on how to communicate better with deaf people.

What if your child has a hearing loss? Center for Hearing Loss in Children, Boys Town National Research Hospital, Boys Town, Nebraska. Parents talk about their feelings and experiences of having a hard-of-hearing child. Some of the questions parents ask when they first learn that their child has a hearing loss are answered.
The Internet opens up a whole range of possibilities in terms of accessing local and overseas information in areas of interest to you. Listed below are some websites related to hearing impairment and deafness. Most of these websites contain links to other websites.

Internet Resources

If you don’t have internet access at home, you might like to inquire at your local public library to find out whether internet access is available as a library service.

- **www.auditory-verbal.org**
  Website of Auditory Verbal International, Inc.

- **www.aceinfo.net.au**
  The Australian Communication Exchange website.

- **www.accih.vic.edu.au**
  The Advisory Council for Children with Impaired Hearing (Vic.). An Australian website with links to a number of other sites.

- **www.aad.org.au**
  Website of Australian Association of the Deaf, Inc., an Australian national voluntary consumer organisation that represents the view of Deaf people who use Australian Sign Language.

- **www.agbell.org**
  The Alexander Graham Bell Association for the Deaf (USA) offers a great deal of information on educational and communication strategies for the parents of children with hearing loss.

- **www.cid.wustl.org**
  The website for the Central Institute for the Deaf, an American institution with parent and child programs and information.

- **www.deafnesscouncilofnsw.org.au**
  An informative site from the Deafness Council of NSW Inc.

- **www.deaf-vic.org.au**
  Victorian Council of Deaf People provides advocacy and information service which represents the deaf community in areas such as education, employment and community access.

- **www.gohears.org**
  An American site with many links to other sources including links to pages created by parents of hearing-impaired children.

- **http://groups.yahoo.com/group/phidcoz**
  A website where parents of hearing-impaired and deaf children can meet online to discuss issues and ideas and receive informed, supportive and non-judgemental feedback.

- **www.hearing.com.au**
  Australian Hearing’s website with information about hearing loss, hearing aids, current research in the area of hearing aids and much more.

- **www.hearingaustralia.org**
  Community orientated site with the aim of furthering communication between those with or involved with hearing and hearing loss.

- **http://home.connexus.net.au/~dba**
  Website of the Australian DeafBlind Council, an Australian network for people interested in deaf-blindness.

- **www.johntracyclinic.org**
  The John Tracy Clinic is an educational centre for preschool deaf children and their families, based in the USA. It offers distance education courses for parents of deaf and hard of hearing babies and preschoolers, as well as parents of young deaf-blind children.

- **www.netspace.net.au/~deafness/main.html**
  The website of the Australian Deafness Foundation (Victoria).

- **www.ridbc.org.au**
  Website of Royal Institute for Deaf and Blind Children NSW.

- **www.vicdeaf.com.au**
  Information about the services of the Victorian Deaf Society.

- **www.tased.edu.au/tasonline/deafviet/index.htm**
  Website of the Deaf Vietnamese Information Service. Provides a mutual support and information exchange for deaf Vietnamese internationally.
Scott and I waited years to have a baby. I was careful during the pregnancy, we had the usual tests and got an “A” report card at our ultrasound. I remember the doctor saying “now you realize we can’t test for things like deafness”…yeah, yeah.

In June 2003 Isabella Mae was born – and we were besotted. Everyone exclaimed how beautiful she was from day one. At two weeks we took her for a routine SWISH test at the local country community health centre. The test was “negative”. It was a black day. We read that the test could be incorrect or she might be blocked up with a cold (well she did have the sniffles), and Bella’s doctor said this had happened to other patients of his and further tests invariably came back OK. We did the same test again a week later with the same results but again were able to allay our fears by saying “of course this test is negative again – we need a second opinion”. They told us we would go to Brisbane – two hours away, but not Sydney.

I will never forget that day. Bella was six weeks old. We were shuffled into a yucky waiting room filled with deaf, cochlear implant and decibel charts on the walls but ignored all this as we wouldn’t need any of it. Thankfully Bella slept while they attached electrodes and fiddled. Finally the technician turned and said “I’m getting nothing”. Wait a minute, what does that mean? “She is profoundly deaf.” What does that mean? The meeting was over. I somehow managed to ask for some information to take home as we couldn’t assimilate anything right then. (It wasn’t until weeks later that we received the Choices book. How I wish we had received it on that first day). The two hour drive home was terrible. Silence for the first hour. Couldn’t take it in, couldn’t believe it or speak it. We tried to be rational and positive instead of emotional. We talked about what we could do – find out everything we could about deafness and do everything to make her life full. It felt good to be positive and talk through our fears and sadness and this was the first step to overcoming this initial sad news.

The next few months were a flurry of activity as we empowered ourselves with knowledge.

We got Bella hearing aids. I was fine until they put them on her – she was only 12 weeks old and they were so big! I could not even bear to keep them on as we left Australian Hearing. It was a few weeks before I could bring myself to put them on her but we slowly got used to it. It was hard with a baby as she lay down all day so the hearing aids constantly whistled and popped out.

Bella’s tests showed her to be profound “plus” in both ears. Even with the hearing aids she was only getting to around 95 dBls – still in the profound range and not good enough to hear speech. We started looking into the cochlear implant. This was when I joined Aussie Deaf Kids internet group for parents of deaf children. They were and still are one of the best resources I have. Talking to other parents who had been through similar experiences was invaluable. Asking the silliest questions and admitting the silliest fears lightened our load considerably and we
were able to get a good, honest insight into this new world.

We drove down to Sydney a few times at the end of 2003 and had meetings with the Royal Institute for Deaf and Blind Children and Sydney Cochlear Implant Centre. After much deliberating we decided to start the evaluation process for a cochlear implant in Feb 2004. SCIC agreed to fast track Bella, but this meant a big commitment on our part over the next 12 months. So we started the trips to Sydney in earnest. Luckily, we discovered IPTAAS – a government agency providing partial funding for medical related travel.

The evaluation usually takes three months but we did it in six weeks, and Bells got the cochlear implant at nine months of age in March 2004. Surgery went well although it was a long and horrible day and night spent in hospital. Bella’s head swelled the next day but she was up and racing around like she hadn’t just spent four hours in surgery. Switch on a few weeks later – 13 April 2004 – went really well and was a momentous occasion. Bella was quite happy and normal hearing for the first time. I remember saying “Isabella, hello I love you”. We shared great joy as we showed her all the noises her toys made that she had never heard before. It was wonderful to watch her expression.

Although we decided to do Auditory-verbal therapy for Bella’s cochlear implant, our real beliefs on communication methods are more steeped in Total Communication. We believe that Bella having the cochlear implant doesn’t change the fact that she is deaf so we want her to be a part of the hearing world and the Deaf community too. We started Signed English at TAFE one night/week with a fantastic teacher. Bella knows about 40–50 signs already and we find it is great living near the beach that we can still communicate with her when her cochlear implant is off (beach, bath, bedtime). We feel very strongly about being able to communicate with her at all times and not just with the aid of a listening device. An invaluable resource has been the services of the Dept of Education Itinerant Teacher (IT) for country families with deaf kids. Our IT comes to our house once a week to do therapy with Bell – a combination of auditory-verbal and signing (at our request).

It has now been 10 months since Bella got the cochlear implant and her progress is incredible. She is 21 months old and age-appropriate in her speech and listening. She can say about 40–50 words and lots of sounds as well as some sentences. She listens to music and nursery rhymes and dances to the beat as well as trying to sing along. In current VROA tests her hearing has improved to around 30–35 dBls – well within speech range. This confirms that she is hearing most everyday sounds.

It has been an amazing journey. It has been tough but everything we have done has been so worthwhile.

We now realize what we didn’t in the early stages of the journey – all our fears and sadness were unwarranted.

Bella will grow up to be a healthy, happy, deaf, normal individual who can hear, talk and sign.

She is being introduced to every facet of the Deaf world as well as the hearing world and this can only be to her advantage. We now know that no matter what “Choices” we would have made for her – cochlear implant, signing – everything is fine.