Our vision is a world without barriers for every deaf child.
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We use the term ‘deaf’ to refer to all types of hearing loss from mild to profound. This includes deafness in one ear or temporary hearing loss such as glue ear.

We use the term ‘parent’ to refer to all parents and carers of children.

All the equipment in this guide can be used with either hearing aids or cochlear implants unless we say otherwise.

Most of the equipment can also be used with other hearing technology such as bone conduction hearing implants, active middle ear implants and auditory brainstem implants. Ask your implant team, audiologist or contact our Freephone Helpline on 0808 800 8880 (voice and text) or email helpline@ndcs.org.uk for more information.

Throughout this resource we’ll direct you to some of our other free information resources which are available to download from our website www.ndcs.org.uk, or to order from our Freephone Helpline.

If you want to know more, go to www.ndcs.org.uk/technology where you can find up to date information, product descriptions and user reviews. These pages are regularly updated and are a useful tool for helping you choose a product for your child.

All quotes used in this booklet were provided by families of deaf children who borrowed radio aids from our Technology Test Drive product loan service (see page 38).
Introduction

This guide explains what radio aids are and how they can help deaf children. It describes the different types of radio aid systems and how to use and look after them. It also looks at classroom soundfield systems and acoustics – creating good listening conditions for learning in the classroom.

We’ve written this guide for families, but teachers and other professionals working with deaf children and young people will find it useful as well.

Joe’s story

“Joe has had two cochlear implants since he was seven years old. Until recently he has relied on lip-reading and a portable soundfield system in the classroom, but by the end of school term Joe gets very tired as he has to work extra hard to understand the teachers.

“We decided to try a new digital radio aid system from the National Deaf Children’s Society’s Technology Test Drive loan service. When the system arrived it was very simple to set up and worked ‘straight from the box’. In fact as soon as it was connected I was speaking to Joe and he could hear me immediately. At the end of the first day, Joe couldn’t believe how clear the system was and the distance it covered. He went onto the football field with one of his friends at lunchtime to check the distance and almost managed the full length of the pitch before it cut off. The radio aid is interference-free, even in areas with other electrical equipment, and in classrooms with high background noise the speaker’s voice is still very clear. Both the transmitter and receiver are easy for Joe and his teachers to use.

“Joe has told us: ‘The teachers’ voices are very clear most of the time, even when my friends are talking in class. Lip-reading is much easier as there is no delay between the lip movements and hearing the teacher’s voice’.

“One comment made by Joe’s tutor was: ‘Considering we are reaching the end of term Joe appears to be more relaxed in class and less tired for this time of year’.”

Michael, grandad of Joseph (13)

Dylan’s story

“Dylan has had a radio aid for two years now. He uses it at school with receivers attached to the bottom of his aids and it allows him to hear his teacher much louder than the background noise in the classroom. Since he got them his focus in lessons has improved enormously – previously he would be distracted very easily.

“When he is doing group work in class his teacher takes the transmitter and places it in the middle of the table. This helps Dylan to hear the other children and take part in group activities.”

David, father of Dylan (8)
What is a radio aid?

“Theradioaidhasmadeahugedifferencetohim.Everythinghas changed–hisattitudeandhisbehaviour.Hewasstrugglingwith school...butnowhe’sabovaverage.”

A radio aid system consists of a transmitter, worn by a teacher for example, and a receiver, worn by your child. The radio aid works by making the sound your child needs to hear, such as the teacher's voice, clearer in relation to unwanted background noises.

Modern hearing aids and implants allow most wearers to hear quiet speech in ideal listening situations. However, in reality most speech isn't heard in ideal listening situations so there will be times when your child may struggle to hear.

Situations when it's difficult to hear and listen include when:

- there’s background noise
- sounds are bouncing off hard surfaces around the room (also known as reverberation) leading to distortion of sound or echo
- there’s a distance between the person speaking and the deaf child.

Radio aids can help overcome these problems. They are used widely in education to help deaf children hear teachers and other students better, although they're useful in lots of other situations too (see page 26).
Who can a radio aid help?

“Classrooms are loud and busy places. Using a radio aid helped my daughter feel involved.”

Radio aids are recommended for children who have:

- hearing aids
- cochlear implants
- bone conduction hearing implants
- other implantable devices.

A radio aid works with your child's hearing aid or implant to make it easier for them to concentrate on the sounds or voices they want to hear.

A radio aid can also be useful for children who don’t use hearing aids or implants, for example:

- children with a mild hearing loss or unilateral hearing loss (one-sided deafness)
- children who have difficulty concentrating, particularly in noisy settings, such as children with an auditory processing disorder (APD) or attention deficit hyperactivity disorder (ADHD).

Go to page 17 for more information on using radio aids if your child doesn’t have hearing aids or implants.
The parts of a radio aid

“
He doesn’t mind going up to the teacher to hand over the
transmitter because he knows he needs it in the class with all the
children making noise.”

A radio aid system is made up of a transmitter, receiver,
microphone and batteries.

Transmitter

This takes the sound the child needs to hear, converts it to
a radio signal and sends it to the receiver. There are two
different types of radio aid transmitter: digital and FM radio
(see page 21).

Most radio aid transmitters can be worn by the speaker
(usually a teacher or parent). However, some are hand-held
which means they can be passed around a group, put on a
table pointing towards the speaker or used like a conference
microphone (see page 10).

Most transmitters will automatically limit the volume of the
radio aid when there’s a very loud sound close to the transmitter.

Receiver

The child wears the receiver or receivers. The receiver picks up the signal from the
transmitter and changes it into a sound that the child can hear. Most receivers
have a volume control, which will be set by your child’s Teacher of the Deaf or
educational audiologist using specialist software. Some
body-worn receivers may have a lockable volume control,
although older children can adjust this themselves.

There are five types of receiver:

1. Tiny ear-level receiver units that attach to hearing
   aids and implants, often via a hearing aid direct
   input shoe (see page 11).

2. Integrated receivers which are built into the hearing
   aid direct input shoe.

3. Neckloop receivers which require the T programme
   (see page 13) to be set on the child’s hearing aids or
   implants.

4. Body-worn receivers which are usually worn by the child
   in a chest harness or bumbag around the waist.

5. Ear-level receivers for children who don’t use a
   hearing aid.
Microphone

There are different types of microphone that can be used in different situations.

**Built-in microphones** – some transmitters include a built-in microphone. The transmitter is usually worn on a strap around the teacher’s neck but there are also hand-held units that are designed to be pointed in the direction of the person speaking or passed around a group.

**Tie-clip and neck-strap microphones** – it’s often more comfortable for teachers to wear a transmitter on a belt or clipped onto their clothing. A microphone on a lead can then be used to pick up the sound of their voice. The microphone can be clipped to a tie or other clothing (tie-clip microphone) or worn on a cord around the neck (sometimes called a lavalier microphone). It should be worn 15cm to 20cm from the mouth.

**Directional microphones** – some radio aids have a choice of microphones which either pick up sounds equally from all directions (omnidirectional) or give preference to sounds from one direction (directional). Your child’s Teacher of the Deaf will be able to give you advice on the most appropriate microphone.

**Head-worn microphones** – these can be an effective option, as the microphone stays close to the mouth of the person speaking as they move their head.
Conference microphones – in school, children often spend time working in small groups. Some manufacturers have developed hand-held portable and conference microphones for situations like this.

Conference microphones usually sit in the middle of a table and pick up sounds from the surrounding area. They are designed to pick up all nearby sounds so they will also pick up unwanted background noise. Conference microphones can be easily connected to radio aid transmitters.

Hand-held microphones – a number of these may be used in a classroom and linked to radio aids and soundfield systems (see page 23). These are useful for group work and discussions as they can be passed around.

Batteries

Transmitters – some radio aid transmitters will have their own internal rechargeable battery which can't be removed by the user. These will have a mains power charger and the transmitter should have a full battery at the start of the school day.

Other radio aid transmitters use standard rechargeable batteries. These can sometimes be replaced by alkaline (non-rechargeable) batteries when charging hasn't been possible or if the rechargeable battery runs out of power unexpectedly.

Receivers

Body-worn and neckloop radio aid receivers will have either of the rechargeable battery types mentioned above.

Ear-level receivers are powered by the hearing aid that they're connected to. This means that when the receiver is connected, the hearing aid's battery will run down more quickly than normal.

Did you know?

A rechargeable battery can be recharged between 500 and 800 times: saving money and helping the environment.
Connecting radio aid receivers to hearing aids

There are two main ways to connect radio aid receivers to your child’s hearing aids.

**Direct input**

Most children’s hearing aids have direct audio input. This allows the electrical signal from a radio aid to be fed directly into the hearing aid, providing a consistent and high quality sound.

In most cases a direct input shoe, usually referred to as a shoe, is needed in order to use direct audio input on your child’s hearing aid. The shoe fits onto the bottom of the hearing aid, around the battery compartment. Pin connectors on the radio aid receiver fit into three small holes on the bottom surface of the shoe, connecting the receiver to the shoe.

**Getting direct input shoes**

Each hearing aid will need a specific kind of shoe and it’s best to talk to the professional working with your child to find out which product is most suitable. Shoes are usually provided by your child’s audiologist or Teacher of the Deaf.

If you are going buy a shoe yourself here are some features to be aware of to help you choose.

- Some hearing aids have more than one type of shoe available, depending on whether you want to attach an ear-level radio aid receiver or a direct input lead. Direct input leads plug into audio devices such as mobile phones, tablets or laptops. See [www.ndcs.org.uk/technology](http://www.ndcs.org.uk/technology) for more information.

- Shoes produced by a manufacturer may fit different hearing aids from their range.

- Different hearing aid models sometimes have similar sounding names, so make sure that the product you choose is suitable to use with your child’s hearing aids.
All NHS hearing aids have direct audio input, but your audiologist will need to activate a listening programme so your child can use it with a radio aid. The wearer may need to choose the direct audio input programme once it's activated, or the hearing aid may default to the radio aid setting when the shoe is fitted.

The default programme is particularly important for children who can't manage their own aids, as it makes sure that they're listening on the most appropriate programme.

You can set up the direct audio input programme to listen using the radio aid only (FM only) or to listen using the hearing aid microphone as well as the radio aid (M+FM). M+FM is often used to help young children to hear other children in the classroom and hear the teacher's voice clearly.

The way that your child's radio aid receiver connects to their hearing aid through direct input will differ depending on the type of receiver your child uses (either ear-level or body-worn).

**An ear-level receiver** will plug into the shoe attached to the hearing aid. This is compact and practical and many children prefer it because there are no wires so the system is more discreet.

If your child has a **body-worn receiver** this will connect to the hearing aid shoe using a direct audio input lead. If your child uses one hearing aid, there will be a single direct audio lead (monaural). If your child wears two aids, there will be two leads (binaural) in a ‘Y’ shape, connecting to both hearing aids.
**Neckloop receiver**

A neckloop is a wire that your child can wear around their neck. It can be used as an alternative to direct audio input and a radio aid receiver.

The child's hearing aid or implant is switched to the T programme (also called the T setting, telecoil or just T) or M+T programme (part microphone, part T setting) so they can hear sounds from the radio aid via the neckloop.

An audiologist can activate the T programme on your child's hearing aids or implants. Bone conduction hearing implants may require an adaptor.

Unlike a standard microphone programme, the T programme doesn't amplify sounds. Instead it picks up changes in magnetic fields from loop systems or neckloops, and converts these into sounds in the hearing aid or implant.

In most cases, the T programme won't automatically be set on your child's hearing aid or implant. You should ask the audiologist to set it up if your child wants to use a radio aid neckloop or any other loop system.

The T programme may be set up to listen using just the telecoil (T only) or to listen using the hearing aid microphone and the telecoil (M+T). M+T is often used when the wearer wants to hear sounds around them as well as from the loop system.

If your child's hearing aid only has the T programme, the hearing aid microphone will be switched off. This means that your child won't be able to hear their own voice or nearby sounds.

The quality of the sounds a child can hear when using a neckloop receiver with a radio aid can be affected by the following.

- The signal may become weaker or stronger if the position of the neckloop changes with your child's movements. It also depends on the position of the hearing aid or implant in relation to the neckloop.

- Electromagnetic interference – this is caused by unwanted magnetic fields that are produced by nearby electrical equipment such as fluorescent lights, TVs and computers. This can mean that your child picks up uncomfortable buzzing noises through their hearing aids.

Neckloop receivers are easy to set up and use. They are popular with children who like to wear the neckloop under their clothing and with children whose hearing aids don't have direct audio input, for example in-the-ear hearing aids.
Younger children using a neckloop

Neckloops aren’t always suitable for younger children for safety reasons and because they might not always be able to tell you about problems with quality of sound or interference. If your young child is using a neckloop, check it frequently to make sure it’s working properly.

Some younger children don’t have the T programme activated on their hearing aid in case it confuses them. Your child’s Teacher of the Deaf will be able to advise on whether a neckloop would be suitable.

If you’re considering a neckloop for your child it’s important that someone carries out a listening check using a loop listener or through your child’s hearing aid when switched to the T programme. This should be carried out in all of the rooms where the radio aid will be used.
Using a radio aid with cochlear implants and bone conduction hearing aids and implants

Using radio aids with cochlear implants is widely recommended.

“Now she can hear everything, even when the teacher turns around or she sits at the back of the class. She has gone up a level in every class.”

Cochlear implants usually have direct audio input like most hearing aids, allowing the electrical signal from the radio aid to be fed directly into the implant processor. The radio aid can be connected to the cochlear implant processor by using an ear-level receiver or a direct input lead.

If your child’s cochlear implant has a T programme, they could use a radio aid with a neckloop receiver which doesn’t require any extra accessories.

Ear-level receivers either attach to a socket in the base of the processor or to a connection on the rear of the processor. Your child’s auditory implant centre, audiologist or Teacher of the Deaf will recommend the correct type of receiver to you as this will depend on the processor model. Many children prefer to use ear-level receivers: they are more discreet and there are no wires to get in the way.

The alternative is to use direct input leads which connect the radio aid receiver to the implant processor. These cables are made specifically for each model of processor so they connect straight into the processor and you won’t need to use a shoe. However, you will need to make sure that you have the correct type of lead.

Some processors will need to be set up with the radio aid at the auditory implant centre. Others can be set up at school by a suitably trained professional. Your auditory implant centre or Teacher of the Deaf will be able to advise you.
Cochlear implants and radio aids cannot be checked or tested in the same way as hearing aids. You and your child’s teacher can check the radio aid by following the procedures described on page 31. For most cochlear implants, earphones are available that allow a parent or teacher to listen to the sound received from the radio aid. However, this only allows you to hear the sound from the radio aid before it’s processed, so you can’t check that the complete system is working properly.

Try to ask your child regularly how well they think the radio aid system is working. If your child can’t tell you about any problems, you or a teacher will need to look out for any changes in the way your child behaves or responds that may suggest there is a problem.

For more information about using a radio aid with your child’s cochlear implant, contact your implant team or contact our Freephone Helpline.

**Using radio aids with bone conduction hearing aids and implants**

If your child uses a bone conduction hearing aid or implant they will probably benefit from using a radio aid.

> When we got it she said: ‘Mummy do you always talk that loud?’ I knew that she would tell me if it worked or not and she said from day one it works. It’s brilliant.”

Many bone conduction hearing aids have direct audio input and can be connected to a radio aid in the same way as standard behind-the-ear hearing aids. Your child’s audiologist should set up the combined hearing aid and radio aid system for you.

Your child’s audiologist or Teacher of the Deaf will be able to provide information about the right receivers for your child’s implant.

Bone conduction hearing implants can be tested, but not in the same way as conventional hearing aids, so when a radio aid is first used the complete system should be set up by your child’s audiologist. A special listening device is available which allows a hearing person to check that the bone conduction hearing implant is working properly.

See [www.ndcs.org.uk/boneconduction](http://www.ndcs.org.uk/boneconduction) for more information on bone conduction hearing implants.
Using a radio aid without hearing aids or implants

Radio aids are usually used with hearing aids or implants. However, if your child has mild, moderate or unilateral hearing loss and doesn’t wear a hearing aid or implant, then they may benefit from a radio aid, especially if they have difficulty concentrating or picking out different sounds in the noisy conditions of a classroom.

A radio aid may also benefit a child with temporary hearing loss or a child who can’t wear a conventional hearing aid.

Radio aids might also be recommended for children with auditory processing disorder (APD), attention deficit hyperactivity disorder (ADHD) or other specific learning disabilities.

**Personal radio receivers**

Personal radio receivers consist of an all-in-one receiver and earphone and work in the same way as an ear-level radio aid receiver. They are worn just like a behind-the-ear hearing aid. The device receives the radio signals from the radio aid transmitter and converts them into sound. Because it produces an audio output, it’s easy to check that this device is working correctly. However, it should still be set up for you by a professional.

These products are designed to be used by people with only a mild to moderate hearing loss so they don’t produce a high volume output that could cause hearing damage.
“My son cannot wear a regular hearing aid, so it was suggested he tried [a personal radio aid receiver]. He loves it, he feels like a spy in James Bond.”

**Headphones**

Headphones can be connected to some body-worn or neckloop radio aid receivers. Before your child uses a radio aid in this way, their audiologist or Teacher of the Deaf should make sure the sound levels are right for your child. It may be a good idea to lock or limit the volume control so that young children can’t alter the sound level once it’s been set.

A wide range of headphones are available. The manufacturer of your radio aid may supply their own headphones or recommend suitable alternatives. The headphones should be lightweight so that they are comfortable to wear for a reasonable period of time.

**Portable soundfield systems**

A portable soundfield system is a radio aid receiver with an amplifier and a loudspeaker attached. This is all contained in a portable case, which your child can take from class to class and place on their desk.

For more information about soundfield systems see page 23.

**Did you know?**

Headphones can be plugged into body-worn radio aid and neckloop receivers. This is great if a child is unable to, or doesn’t want to, wear their hearing aids.
Special features

Mute switches

Mute controls are useful when a teacher is switching from speaking to the class to speaking to individuals or groups. If the teacher is saying something that your child doesn’t need to hear they can mute their microphone temporarily.

Different radio aids can be set up to do this in different ways. For example, sometimes it can be set so that the microphone is only activated when a button is pressed continuously (useful when using a pass-around microphone) others have a button that can switch the microphone off or on.

In a busy classroom, it can be difficult for a teacher to remember to use the mute switch, but it’s important they do otherwise your child may feel stressed by hearing more information than they need to.

Connecting to other sound sources

Most radio aid transmitters have an auxiliary input socket. This means the transmitter can be connected to devices including a TV, computer, media devices, electronic keyboard or equipment in a school language laboratory. This can be a very useful feature in classrooms or at home.

Connecting to recording devices

Radio aid manufacturers produce a wide range of leads with commonly used connectors. Some receivers have an audio output socket. This can be used to connect the radio aid to a recording device. Lessons or lectures can then be recorded so your child can take notes later on.
When we plugged it [radio aid] into the TV his face lit up as he was able to hear the television properly for the first time and not have it turned up full blast.”

Multi-talker networks and team teaching

Multi-talker networks allow multiple microphones to be linked to a single transmitter. This is particularly useful if there is more than one teacher or teaching assistant in the classroom. It can also be used with a pass-around microphone during classroom discussions.

Team teaching is the same but instead of having multiple microphones linked to one transmitter, there are two transmitters and the sound from two teachers’ voices is sent to the child’s receivers. The secondary transmitter can also be linked to an external audio device for example, a whiteboard.

External microphone input

Most radio aid transmitters have an external microphone input socket. This allows you to connect an external microphone, such as a conference microphone or directional microphone to help during group activities or other situations. A wide range of microphones are available (see pages 9–10).

Bluetooth

Some radio aid transmitters are fitted with Bluetooth technology. This makes it easy for your child to use the transmitter with a Bluetooth-enabled mobile phone to make voice calls. They could also use it to listen to sounds and music from a Bluetooth-enabled phone, laptop or tablet. These products are usually designed for use by teenagers and older children.

Control locks

Once a radio aid is set up for a young child to use, the controls shouldn’t be adjusted. Most radio aids have locks on the volume control and other controls.
Radio aid technologies

There are a number of radio aid technologies available. They all work well but have different ways of sending and receiving sound.

**Digital radio aid systems**

Digital radio aids transmit high frequency digital signals instead of analogue FM.

The advantages are that these radio aids are easier to set up, frequency management is far easier and in a school it's easier for teachers to cope with lots of children in different rooms wanting to use radio aids. Another benefit is that they minimise the chances of interference with other radio aids or external sources such as radio stations. Digital systems have been designed to give clearer sound, especially in noisy environments. They automatically adjust sound settings according to the input from the microphone and background noises. Manufacturers claim that digital radio aid systems give improved sound quality, especially in noisy situations, compared to FM radio aid systems.

Digital radio aid systems use the same digital technologies as the most up to date soundfield systems. This makes it easier to combine using them with soundfield and other sound sources such as music players, video, computers or interactive whiteboards.

A range of digital radio aid transmitters and receivers
Now there are no barriers to his concentration. He’s calmer and the other children are happier to interact with him.”

FM radio aid systems

Some systems use FM radio frequencies to transmit signals from the transmitter to the receivers. In order to work, the transmitter and receivers must be on the same frequency. Most radio aids allow you to change this frequency (like tuning a radio in to another station). In one classroom there’s no limit to the number of receivers which can pick up the signal from a radio aid transmitter, as long as they are all on the same frequency. When children in different classes want to use radio aids they will need to have them set on different frequencies – to avoid hearing the wrong information or getting interference.

FM radio aids have been known to receive unwanted signals, such as a local radio station or taxi company. This doesn’t happen very often, but if it does try changing the radio aid to another frequency. If this doesn’t solve the problem, contact your Teacher of the Deaf or local hearing impaired or sensory support service. If the problem continues, you should seek advice from the manufacturer.

Because all FM radio aids use the same group of frequencies, one manufacturer’s transmitter should work with another’s receivers and vice versa. However there are differences in the way that radio aid systems work, so if you have a transmitter and receiver that aren’t the same make and technology you may lose some of the functionality of the systems, for example you may not be able to use some of the features. Any mixed system should be fully tested by a Teacher of the Deaf or other professional by using a hearing aid test box (also known as a hearing aid analyser) before your child uses it.
Classroom soundfield systems and acoustics

Classroom soundfield systems shouldn’t be confused with radio aids, although they are designed for similar purposes. Soundfield is an increasingly popular system designed to improve listening conditions for all children in the classroom.

How do soundfield systems work?

A soundfield system includes a microphone worn by the teacher. This is linked to an amplifier by a wireless transmitter and allows the teacher to move around the room. Loudspeakers are fitted around the classroom, often on the walls or in the ceiling.

The soundfield system makes the teacher’s voice louder and clearer. It isn’t like a public address system: the aim is to produce a clear and consistent level of sound throughout the classroom rather than just increasing the volume. The teacher’s voice is made just loud enough to be heard above unwanted background noises. A soundfield system that is set up correctly should be discreet and the teacher shouldn’t notice a big difference when they’re speaking.

Soundfield systems can be separated into two different types:

• permanent fixed systems
• portable systems.
**Permanent fixed systems**

Permanent fixed systems are often found in school halls. Speakers are fitted around the room and are linked to a control centre, which can transmit sound from various devices – for example a microphone worn by a person speaking, a music system or a whiteboard.

These systems are sometimes fitted in classrooms, but to benefit a deaf child they’d need to be fitted in every classroom that the child uses and this could be expensive.

There are many companies that sell and install soundfield systems. Your child’s school should make sure that they use a company which has specific knowledge of the needs of deaf children. It may also be worth suggesting that they contact another school which has already been fitted with one of their systems or a Teacher of the Deaf to ask for their feedback on the service and quality of product.

**Portable systems**

These are more flexible than fixed systems as they can be moved around to wherever they are most needed. They’re also cheaper than fixed systems and easier to set up. Another advantage is that they are easier to replace as technologies change, as you won’t need to repair damaged walls or ceilings.

Some companies may offer trials of their soundfield systems, giving your child’s school an opportunity to try out different systems before deciding which is the most suitable.

**Who can it benefit?**

A good soundfield system should enable all students in a classroom to hear equally well, wherever they are seated. Most children who wear a hearing aid or implant will still need to use a personal radio aid.

The group most likely to benefit from soundfield are children with mild hearing loss, who may otherwise be given no extra support at school. There are a large number of children who fit into this category, including those who have temporary hearing loss, for example from glue ear.

A soundfield system could also benefit a child who has recently had a cochlear implant fitted and isn’t ready to use a radio aid system yet.

A soundfield system is also very useful for teachers. As well as helping them to avoid straining their voice, research has suggested that soundfield systems can improve discipline and concentration for all children.

**Can radio aids be used in classrooms with soundfield systems?**

Children who use radio aids can continue to use them in a classroom with a soundfield system. However, both devices must be set up correctly to work alongside each other. Teachers also need to know how to use the technology.
Did you know?

It’s sometimes possible to trial a soundfield system from manufacturers and retailers to see if it’s effective in your child’s school.

Will soundfield systems solve all the problems of poor acoustics (sound quality) in a classroom?

If it’s practical to improve the quality of sound in a classroom (for example, by lowering ceilings, changing wall coverings and adding carpeting) this should be the first step. Fitting a soundfield system in a room with very poor acoustics could make listening conditions more difficult, rather than improving them.

Detailed standards and guidelines on sound quality in schools are given in the Department for Education publication Building Bulletin 93: Acoustic design of schools. This is available at www.gov.uk/government/publications/bb93-acoustic-design-of-schools-performance-standards.

Creating good listening conditions for learning in education

Our Creating Good Listening Conditions for Learning in Education resources are designed to help a school or any other education setting to identify where deaf pupils might face difficulties with listening, for example, in the classroom, and how these environments can be improved. Often these improvements will be beneficial to all pupils in the school and can be made at a modest cost. Other improvements may require specialist assessment and are therefore more expensive.
Using a radio aid at home and during out of school activities

With pre-school children

Young babies are usually very close to their parents or being held during their earliest interactions and communication – gurgling, laughing and attempting speech. However, as they grow up and become mobile the distance between you and your child will increase, meaning they might find it more difficult to hear you.

Deaf children need to have good, one-to-one spoken language experiences with others and the listening environments in your home may be less than ideal. For these reasons, young children can benefit from using radio aids. However, you'll need to check with your local authority as some education services in the UK don't provide radio aids for pre-school children.

Feedback is the whistling sound sometimes produced when amplified sound from the hearing aid enters its microphone and causes a feedback loop. Feedback often happens when the hearing aid microphone is covered, which might happen when babies are lying in or against something.
When a hearing aid is set on the radio aid programme, its microphone will be switched off and your baby will only hear sounds coming from the radio aid transmitter. Switching off the microphone should reduce feedback, particularly in situations when whistling is an issue, such as when your baby is:

- lying in a cot
- being breast/bottle-fed
- cradled in your arms
- sitting in a car seat, pram or pushchair.

However, turning off the hearing aid microphone will mean that babies and young children can’t hear their own vocalisations, something that is important for their speech development. Also, young children won’t be able to experience different listening environments where they can develop important listening skills, such as singling out one speaker in a group, understanding speech in background noise, and localising sound (working out which direction and how far away a sound is).

Exposure to the incidental listening (for example, overhearing others’ conversation and learning from it) that comes from their environment is important to deaf children’s development. Therefore they need to move on from using the FM programme as soon as possible to an FM+M programme which allows the hearing aid’s microphone to work at the same time. This will mean that your child can hear other children and sounds as well as the primary speaker (such as a nursery teacher) through a radio aid at a clear and consistent level.

Situations when radio aids can be useful for deaf pre-schoolers include:

- nursery or pre-school environments
- story time/reading
- shopping
- in the park
- in a pushchair
- in the back seat of the car
- in a bike child seat
- learning to ride a bike.

“\[The first day…the nursery teacher was wearing it [radio aid], my daughter was in the other room washing her hands and the teacher was singing a song. My daughter came back in to the room singing the same song.\]”
Using a radio aid with school-age children

A radio aid can be useful at home and when out and about for school-age children.

“We gave it [radio aid transmitter] to the tour guide at the British Museum and my daughter’s whole face lit up because she heard all of the information and felt a real part of the tour. She loved it and felt included.”

Here are a few examples of when your child might find their radio aid helpful.

- To cut out background noise during a car, bus or train journey where listening conditions can be difficult.
- In busy, noisy places (for example, at the shops or in the park).
- Helping your child to take part in activities and clubs, even if the surroundings are noisy. It may be the first time that some activity or club leaders have used a radio aid, so you must give them clear guidance on how it works and when it’ll be useful. Most radio aids are well made and sturdy. However, they aren’t suitable for energetic sports and activities.
- A radio aid can be connected directly to a TV, computer or games console.

Even though it’s clear that a radio aid can be helpful at home or for out of school activities, some education services in the UK don’t provide radio aids to be used at home or allow children to take their radio aid out of school. If you want to use a radio aid at home talk to your child’s Teacher of the Deaf or educational audiologist. If your local education service won’t let you use the school radio aid at home you should ask them to put their reasons in writing. You can also contact our Freephone Helpline for support.

“At home he hasn’t been as tired or frustrated since having the radio aid system. We use it for out of school classes in skiing and cycling – it has made a tremendous difference as he no longer needs one-to-one skiing tuition and he can now ride ahead of us when on his bike.”

“She can hear people better through the sound of screaming children (at Brownies). She’s able to communicate more directly when surrounded by other people.”
Looking after your child’s radio aid system

“Ongoing training for all those involved is an important part of good management and use, [of radio aids] as is routine testing and monitoring of the equipment. The successful management and use of the system depends on shared ownership and partnership between the child, parents, professionals and across agencies.”

– Standards for the Use of Personal Radio Aids, the National Deaf Children’s Society 2017

Used with care, radio aids should last for several years. Any problems are most likely to be caused by accessories, such as leads and microphones as these take most of the wear and tear.

It’s important to check regularly that the radio aid is working well. You or a trained professional should carry out simple listening tests at agreed regular times. The frequency of these checks will depend on your child’s age and communication level as some children will be better than others at communicating any issues with the equipment. Full tests in a test box (also known as a hearing aid analyser) should be carried out by a trained person, both regularly and whenever there is any change to your child’s hearing aids, implant or radio aid equipment.

The checks you can do on the radio aid will depend on the model. We’ve provided some very general guidelines below, but for specific information about your child’s particular radio aid, talk to their Teacher of the Deaf or educational audiologist. You’ll also find useful information on the manufacturers’ websites.

For more information on how to look after your child’s radio aid system, watch our video at www.ow.ly/sslnU.
Daily checks for radio aids used with hearing aids

Before you start, check that the hearing aid is working normally by following the guidelines in our resource Hearing Aids: Information for families, and then follow the steps below:

1. Check the general condition of the radio aid, for example are there any cracks or dents, or is there damage to the leads or microphone?

2. If you’re using an FM radio aid check that the transmitter and the receiver are both on the same frequency. Radio aids from different manufacturers may use a number, letter or colour-coding system. It’s important to check that the transmitter and receiver match.

3. If you’re using replaceable batteries, check that they’re fitted correctly. If possible, examine batteries for splits, corrosion, cracks and damaged casings. If the batteries are damaged or show any signs of leaking, replace them.

4. Check the battery level indicator if there is one. Make sure that transmitters are fully charged every day before use.

5. Fit the receiver to your child’s hearing aid as you normally would.

6. Connect a stetoclip to the hearing aid. A stetoclip allows you to listen to a hearing aid to check how well it’s working. It’s important that you use a stetoclip with an attenuator, this will reduce the volume so that the sound is at a comfortable level for you to listen to.

7. If you have an adjustable attenuator, begin listening with the volume at its lowest level and gradually increase it.

8. Switch on the transmitter, receiver and hearing aid. Listen through the stetoclip. Gently pull the microphone lead on the transmitter. You shouldn’t hear any crackling noises (however, there will be some noise created by you handling the transmitter and its microphone). Gently squeeze the cases of the receiver and transmitter and listen for breaks in sound or unusual noises.

9. Turn on a radio, TV, or tablet and place the transmitter microphone next to the loudspeaker. Walk at least 4–5 metres away from the transmitter. This is so you don’t confuse the sounds you hear through the radio aid with those that you hear through the hearing aid’s microphone. Listen through the stetoclip and make sure you can hear in different parts of the room without a break in transmission or a drop in the sound quality. The sound from the transmitter should be clear and free from crackling. Gently flex and wiggle the connections on the receiver to listen for breaks in sounds or crackling.
"Using the stetoset to listen to my son’s radio aid was really easy. It reassured me that the equipment was working properly."

**WARNING!**

While checking the radio aids never listen to any sounds that are at a volume you find uncomfortable.

If you’re using a radio aid with a neckloop, gently pull and wiggle the neckloop and connection leads and listen for breaks in sounds or crackling.

If there are any problems, try replacing the batteries or microphone. If there are still problems, contact the person responsible for maintaining your child’s radio aid.

**Daily checks for radio aids used with cochlear implants**

If your child has a cochlear implant, you can’t listen to the sounds they’re hearing. However, you may be able to listen to the sounds being transmitted through the radio aid system before they’re processed by the cochlear implant. To do this you’ll need to get some special earphones from your child’s cochlear implant centre.

Different cochlear implants work in different ways. The cochlear implant team will show you how to use the earphones with your child’s cochlear implant. Once you have these earphones, you can carry out the checks below each day.

1. Check the general condition, for example are there any cracks, dents or is there damage to the leads or microphone?

2. Connect the earphones to the cochlear implant processor as your cochlear implant team has shown you. Check that the processor is working.

3. Connect the radio aid and switch on the transmitter, receiver and processor in the order that the cochlear implant team has told you.

4. If using an FM radio aid, check that the transmitter and the receiver are both on the same frequency. Radio aids from different manufacturers use either a number, letter or colour-coding system. It’s important to check that the transmitter and receiver match.

5. If you’re using replaceable batteries, check that they’re fitted correctly. If possible, examine batteries for splits, cracks, corrosion and damaged cases. If the batteries are damaged or show any signs of leaking, replace them.

6. Check the battery level indicator if there is one. Check that all components are fully charged before use.

7. Fit the microphone to the transmitter, if these are part of the radio aid system.
8. Listen through the earphones. Gently pull any leads on the transmitter. You shouldn’t hear any crackling noises (however, there will be some noise created by you handling the transmitter and its microphone). Gently squeeze the cases of the receiver and transmitter and listen for breaks in sound or unusual noises.

9. Turn on a radio, TV or tablet, and place the transmitter microphone next to the speaker. Walk at least 4–5 metres away from the transmitter. This is so you don’t confuse the sounds you hear through the radio aid with those that you hear through the cochlear implant headset microphone. Listen through the earphones and make sure you can hear at a consistent level when in different parts of the room. The sound from the transmitter should be clear and free from crackling. Gently flex and wiggle the connections on the receiver to listen for breaks in sounds or crackling. Be aware of the normal noises caused by handling the cochlear implant.

**Tips to share with your child’s teachers about using radio aids**

When using radio aids, you should:

- switch the transmitter on when talking to the whole class or group in which the deaf pupil is working
- remember to switch the transmitter off if the child leaves the room without it otherwise they’ll still be able to hear you
- wear the microphone about 15cm from the mouth
- the child can sit anywhere in the classroom, but help them to choose an appropriate place without unnecessary disturbances or distractions
- when using the radio aid, you should speak at a normal classroom level
- if using a soundfield system along with the radio aid, make sure both are working and are connected to each other
- test the range of the system with the child so you can be sure that they can always hear you
- switch the radio aid off, or mute the microphone, when having a conversation that the deaf pupil doesn’t need to hear (the signal can travel some distance and even through walls), when going on a comfort break or when leaving the classroom
- avoid standing in a noisy place, close to any noisy equipment or near an open window, as the microphone might pick up background noise and transmit this to the deaf pupil
- avoid letting the microphone knock against your clothing or jewellery
- remember to put equipment on charge at the end of the day
- remember not to go home wearing the radio aid transmitter (it’s surprisingly easy to do).
Know your rights –
getting a radio aid

Most radio aids are provided by the local authority (or the Education Authority in Northern Ireland) to children who need them.

If your child has been identified as having special educational needs (SEN) or additional support needs (in Scotland), the need for a radio aid may be specified in a statement of SEN (England, Wales, Northern Ireland), Education, Health and Care (EHC) plan (England) or a coordinated support plan (CSP) (Scotland), meaning that the authority has a legal responsibility to provide the equipment, ongoing maintenance and support.

If your child doesn’t have a statement, EHC plan or CSP the authority and education setting (which includes early years settings, schools, colleges and universities) still have an obligation to meet your child's needs. Under the Equality Act 2010 (or the Special Educational Needs and Disability (Northern Ireland) Order 2005 in Northern Ireland) the authority and education setting must make ‘reasonable adjustments’ to make sure what they offer is accessible to disabled pupils. If you live in England, Scotland or Wales, this includes providing auxiliary aids (which include radio aids) and means that all authorities and education settings are required to provide these to disabled pupils where needed, unless they can show that this would be unreasonable.

If you feel your child would benefit from a radio aid then you should speak to their teacher or the person responsible for coordinating the special or additional needs of children in your school (known in England as a special educational needs coordinator) or your child's Teacher of the Deaf.

You could also read our factsheet The Equality Act and Your Deaf Child’s Education in England, Scotland and Wales and our booklet Know Your Rights: Getting support from your local council (different versions are available for England, Wales, Scotland and Northern Ireland).
Young people in higher education – Disabled Students’ Allowances

Deaf students wanting to use a radio aid in higher education can use the specialist equipment part of the Disabled Students’ Allowance to buy the equipment.

Students apply for this funding through different bodies:

- Northern Ireland: Education Authority ([www.nidirect.gov.uk/articles/disabled-students-allowances](http://www.nidirect.gov.uk/articles/disabled-students-allowances))
- Scotland: Student Award Agency for Scotland ([www.saas.gov.uk](http://www.saas.gov.uk))
- Wales: Student Finance Wales ([www.studentfinancewales.co.uk](http://www.studentfinancewales.co.uk)).

Students are assessed for eligibility and this assessment will determine the amount of funding awarded. It’s often helpful to provide a letter from a Teacher of the Deaf in support of an application.

If a deaf student isn’t entitled to funding they may be able to loan a radio aid from their university or college. Some have their own equipment, so it would be worth checking this with the learning support team.

Students can also apply for funding for a radio aid through private trusts if no other source of funding is available.

For more information on Disabled Students’ Allowances go to [www.ndcs.org.uk/dsa](http://www.ndcs.org.uk/dsa).
At college, I can connect it [the radio aid] up to the computer so I can do music compositions. I had a lot of difficulty concentrating before, but now I can focus. Out and about in town my friends have been using it and it’s made a massive difference in communicating with them.”

Young people in work

A radio aid can be useful in the world of work, for example for communicating with colleagues face-to-face and for meetings. Access to Work provides advice and sometimes funding for disabled people to get support and equipment (including radio aids) at work. Not enough employers know about the funding they can get from this scheme, so if your child thinks they might be eligible they should talk to their employer.

For more information on how radio aids can be useful in the workplace visit www.ndcs.org.uk/technology.

For information on Access to Work go to www.ndcs.org.uk/accessstowork.

Buying privately

You can buy a radio aid yourself. For a full list of suppliers see page 38.

Most suppliers will sell equipment directly to the public. You won’t have to pay VAT on the radio aid if it’s bought by or for a deaf person. The supplier will send you a form to fill in so you’re not charged VAT.

Deaf children in independent schools

If your local authority doesn’t support your child at their independent school it may be possible for the school to buy in their services.

It may also be possible to use the services of a charity called the Ewing Foundation. Their services range from education consultants to specialist audiology technicians. They can help set up specialist equipment such as radio aids, advise on acoustics and soundfield systems and help your child's teachers to support your deaf child like a Teacher of the Deaf would do. For more information see www.ewing-foundation.org.uk.
Further information and support

If you want to know more, go to www.ndcs.org.uk/technology where you can find up to date information, product descriptions and user reviews. These pages are regularly updated and are a useful tool for helping you choose a product for your child. Alternatively call our Freephone Helpline.

We also have a wide range of information resources, including:

- How Technology Can Help
- Technology Impact Study 2012
- Hearing Aids: Information for families
- Cochlear Implants: A guide for families
- Understanding Your Child’s Hearing Tests
- Hearing technology for deaf children: radio aids (available on our YouTube channel www.ow.ly/sslnU)
- Quality Standards for the Use of Personal Radio Aids.
Technology Test Drive

“Our local authority has now provided our child with a radio aid. They weren’t going to provide it straight away, but because the radio aids we loaned from the National Deaf Children’s Society worked so well our local authority provided us with a radio aid straight away.”

You can try out radio aids through our Technology Test Drive loan service to help you decide which might be best for your child. You can loan a radio aid for up to three months, with the involvement of a professional (usually a Teacher of the Deaf) working with your child.

We have all the current radio aid systems in stock and can work with your child’s Teacher of the Deaf, or any other professional working with your child, to make sure that you’re borrowing the most suitable product.

You can use the equipment wherever you think it might benefit your child: at school, at home or during social activities.

The service is free to all parents and deaf young people who join us as members.

As well as radio aids, our Technology Test Drive has more than 80 different products that you could try out, ranging from alarm clocks to the latest digital streaming devices. Go to www.ndcs.org.uk/technology for more information and reviews from families.

“It gave us the chance to see the product in the flesh and test it out in different scenarios. Having a trial meant we could find out how user-friendly the product was and the benefits it could give to our children.”
Radio aid suppliers

Action on Hearing Loss
0333 0144525
www.actiononhearingloss.org.uk

Connevans Ltd
01737 247571
www.connevans.com or www.deafequipment.co.uk

The Ear Foundation
0115 942 1985
www.earfoundation.org.uk

Gordon Morris
01458 272121
www.gordonmorris.co.uk

Oticon Ltd
01698 283363
www.oticon.co.uk

PC Werth Ltd
020 8772 2700
www.pcwerth.co.uk

Phonak UK Ltd
01925 623600
www.phonak.co.uk

Some of the radio aid images that appear in this guide were kindly donated by some of the suppliers listed above.

“Whilst using the radio aid from the National Deaf Children’s Society he [my son] would come home from school and explain how his day was which he didn’t do before.”
The National Deaf Children’s Society is the leading charity dedicated to creating a world without barriers for deaf children and young people.

Freephone Helpline: 0808 800 8880 (voice and text)
helpline@ndcs.org.uk
www.ndcs.org.uk/livechat
www.ndcs.org.uk