IN PARTNERSHIP WITH National Deaf Children's Society

Assistive Listening Technology Working Group

We believe nothing should hold deaf children back. With the right support anything is possible for a deaf child.
– National Deaf Children's Society

Quality Standards for Assistive Listening Technology

Using wireless remote microphone systems to support easier listening

Contents

Acknowledgements

The Assistive Listening Technology Working Group would like to thank the National Deaf Children's Society for its valuable contribution to the creation of this resource.

Foreword

Hearing plays a fundamental role in children accessing the world around them. It supports the foundations for spoken language, literacy, and social relationships. Through language, children understand more about other people and themselves; they make sense of the world.

Research consistently highlights how infants typically acquire spoken language through listening, with the physiological foundations for language learning laid before children even leave the womb. After birth, hearing infants are exposed to incidental language in their home lives and can overhear conversations, whether they are in the cot, car seat or pushchair. This continues as children progress to the classroom, the school playground and various social settings. The world is accessible and always present.

While sound is the route to spoken language, deaf children and young people often navigate lived experience and learning in acoustically hostile environments, which compromises their access to language and communication. Hearing aids and implants, while increasingly sophisticated, cannot fully overcome the challenges posed by multiple-speaker situations, noise (unwanted sound) and distance. Assistive Listening Devices (ALDs) provide an answer to these challenges, being particularly effective in multiple-speaker scenarios and at greater distances, thereby providing enhanced opportunities for inclusion and language enrichment.

The Equality Act 2010 (and Disability Discrimination Act 1995 in Northern Ireland) mandates that reasonable adjustments be made to support deaf children through auxiliary aids. The Quality Standards, therefore, consider the use of ALDs as an example of this provision and a tangible requirement in meeting the needs of deaf children and young people as part of the Equality Act 2010.

The revised Quality Standards are based on the principle that every deaf child and young person should be considered a potential candidate for a wireless remote microphone system (wireless RMS) as part of their hearing care, starting at the earliest opportunity. Wireless RMS – when well-fitted, maintained and used – offer significant opportunities for language enrichment, both at home and school. This updated edition of the Quality Standards supports appropriate provision, fitting and use of wireless RMS. It is grounded in evidence, takes into account the equipment now available for use, and provides an unrivalled guide to best practices. Rigorous checking and evaluation are essential aspects of effective wireless RMS use for professionals involved in the care, education and support of deaf children and young people. These aspects are appropriately comprehensive in the standards.

Deaf children and young people of the modern population, just like their hearing counterparts, are looking at their lives through new lenses: they see the opportunities in rapidly advancing technology, which forms a fundamental part of their existence. They expect and deserve the professionals around them to continue to exploit the use of technology with enthusiasm and rigor. The opportunities for deaf children and young people to access the world around them through technology have never been greater.

I am delighted to introduce the revised Quality Standards into the public domain and reflect on the incredible opportunity and collective responsibility we have in making life more accessible for deaf children and young people. It is our collective responsibility to ensure technology and devices are used to their fullest potential, both in educational settings and at home. Professionals, parents, and caregivers alike will find the revised Quality Standards invaluable as they work together to ensure that deaf children and young people receive the best possible opportunities for language development and social engagement. By working together, we can ensure that all deaf children and young people (regardless of background or location) have maximum opportunities to thrive in the world around them.

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Background

The Assistive Listening Technology Working Group (ALTWG) comprises 150 members, with 45% from the education sector, 30% from the hearing technology industry, and 25% from the health sector and organisations supporting deaf children and young people and their families.

ALTWG (batod.org.uk/altwg) includes a diverse range of professionals from England, Northern Ireland, Scotland and Wales. Members include representatives from the British Association of Educational Audiologists (BAEA), the British Association of Teachers of Deaf Children and Young People (BATOD), charities, commercial organisations, the Ewing Foundation, local council sensory support services, manufacturers, the National Deaf Children's Society (NDCS), national health services, the Scottish Sensory Centre, and universities. ALTWG also has associate members in Europe and North America.

The group promotes best practice in the provision, management and use of Assistive Listening Devices or Technology (ALD/ALT) and works to ensure the quality of signal is protected in a rapidly developing technological landscape.

ALTWG was formed in 2004 to support the introduction of universal newborn hearing screening and the provision of digital hearing technology by the United Kingdom National Health Service. The principal aims of the group are:

- To promote the use of wireless remote microphone systems (wireless RMS) among children and young people.
- To promote the knowledge base about ALT, such as wireless RMS.
- To influence the policy framework for the provision of ALT.
- To influence the quality and consistency of ALT provision and practice.
- To raise awareness of the importance of a positive acoustic environment.

In response to evolving technology, the ALTWG's original 2008 guidance was updated in 2017. A core team reviewed and revised the document, incorporating feedback to produce this updated edition. ALTWG extends its gratitude to its members for their contributions and comments, which have culminated in this 2025 update. We particularly appreciate the support of the National Deaf Children's Society in producing this document.

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Introduction

We have used the terms 'deafness' and 'deaf' and not 'hearing loss' or 'hearing impairment' in these Quality Standards.

Wireless remote microphone systems (RMS) is a generic term that encompasses universal radio aids, including Phonak's Roger system, and proprietary microphones such as the Cochlear Mini Microphone 2+, the MED-EL AudioLink XT, and the Oticon EduMic.

Wireless RMS enhance speech understanding in challenging environments by addressing distance, reverberation and noise (unwanted sound). These systems consist of a microphone transmitter worn by the speaker and a receiver connected to or integrated within the user's hearing device. They transmit Digital Modulation (DM) radio signals via proprietary protocols within the 2.4 GHz Industrial, Scientific, and Medical (ISM) frequency band, or through standardised protocols such as Bluetooth®. Older wireless technology used Frequency Modulation (FM) or infrared transmission.

Wireless RMS have the potential to greatly enhance deaf children's listening experiences by making speech more audible in situations where distance, background noise and reverberation make listening difficult.

The following Quality Standards set out a common approach to the timely and appropriate provision of wireless RMS.

This resource is split into two parts:

- A set of **Quality Standards** relating to the use of wireless remote microphone systems – commonly known as radio aids
- A set of **Good Practice Guides** containing practical information and strategies to achieve these Quality Standards, which are available on the ALTWG website: batod.org.uk/altwg-quality-standards

Recommendations from this resource should only be implemented after full consultation with parents, carers, and children and young people as appropriate.

Infection prevention and control

Any interaction involving handling medical devices and associated equipment needs appropriate policies for infection prevention and control to be in place, including the provision of suitable personal protective equipment (PPE).[1]

[1] who.int/health-topics/infection-prevention-and-control

gov.uk/government/publications/health-protection-in-schools-and-other-childcare-facilities/preventing-and-controlling-infections

england.nhs.uk/national-infection-prevention-and-control-manual-nipcm-for-england/chapter-1-standard-infection-control-precautions-sicps

hse.gov.uk/ppe/index.htm

Useful resources from the British Association of Teachers of Deaf Children and Young People (BATOD)

BATOD MESHGuides

The Mapping Educational Specialist know-How (MESH) online resources aim to share information enabling education professionals to identify good practice, supported by practical evidence, in all aspects of education.

batod.org.uk/resources/meshguides-deaf-education

- **Assistive Listening Devices (ALD)**: radio aids and proprietary remote microphone systems – optimising listening opportunities meshguides.org/guides/node/873
- **Acoustics**: listening and learning meshguides.org/guides/node/138

Mapping Educational Specialist knowHow for the teaching profession

BATOD Audiology Refreshers

- **6.4. Assistive Listening Technology (ALT)**: radio aids and proprietary remote microphone systems batod.org.uk/resources-category/audiology-refreshers/6-hearing-technologies/6-4-assistive-listening-technology-alt-radio-aids-and-proprietary-remote-microphone-systems
- **4. Acoustics and physics of sound** batod.org.uk/resources-category/audiology-refreshers/4-acoustics-and-physics-of-sound

BATOD British Association of Teachers of Deaf Children and Young People

Specialist Deaf Curriculum Framework

The Specialist Deaf Curriculum Framework has been written to empower deaf children, young people and their families to build knowledge and make informed, independent decisions about their deafness – from identification through to adulthood.

batod.org.uk/resources-category/specialist-deaf-curriculum-framework

Who is this resource for?

This resource is designed for individuals who commission services for deaf children and young people, their families and the practitioners who collaborate with them. Its purposes are to:

- Provide realistic and attainable quality standards for health and education services to audit against.
- Describe best practices for the selection, fitting, management and evaluation of wireless remote microphone systems (RMS) for children.

The law

Under the Equality Act 2010, local authorities and education settings have a duty to make reasonable adjustments or accommodations to ensure deaf children and young people are not disadvantaged. This includes a specific duty to provide 'auxiliary aids' where needed, with wireless RMS often cited as an example.

Auxiliary aids and services are designed to ensure effective communication and equal access for individuals with disabilities. Examples of auxiliary aids include:

- accessible formats such as Braille or large print
- augmentative and alternative communication[2] technology[3]
- assistive listening technologies (ALT), like wireless RMS
- communication support workers
- real-time captioning services
- qualified sign language interpreters
- qualified specialist teachers.[4]

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[2] To learn about augmentative and alternative communication, go to the RCSLT website at rcslt.org/speech-and-language-therapy/clinical-information/augmentative-and-alternative-communication.

[3] To learn more about communication aids, go to the Sense website at sense.org.uk/information-and-advice/technology/communication-aids.

[4] To learn more about mandatory qualifications for specialist teachers, go to the GOV.UK website at gov.uk/guidance/mandatory-qualifications-specialist-teachers.

The Equality Act 2010 is the principal anti-discrimination legislation in Great Britain, encompassing England, Scotland and Wales. Northern Ireland continues to operate under the Disability Discrimination Act 1995. The Equality Commission for Northern Ireland has consistently called for legislative reform to harmonise and strengthen equality protections[5] in line with those in the rest of the UK.

Early intervention and collaborative working

Each UK nation has its own specific provisions and supplementary regulations. For example, the legislative frameworks governing children and young people with special educational needs or additional learning/support needs differ across England, Wales, Northern Ireland and Scotland. Despite these differences, all frameworks emphasise the importance of early intervention and multi-agency collaboration to support the needs of young people effectively.

Professionals across agencies must work together to ensure that hearing devices and wireless RMS are suitably fitted, used appropriately, and well-maintained. Effective communication ensures that all parties involved in the child or young person's care are well-informed and can collaborate to provide consistent and comprehensive support.

Currently, educational audiologists or Qualified Teachers of Deaf Children and Young People (QToDs) fit and manage wireless RMS. They collaborate with children and young people, their families, caregivers, and other professionals, including mainstream teachers, teaching assistants, and technicians. Effective fitting of the wireless RMS also requires the involvement of paediatric audiologists, allied health professionals, and auditory implant team staff.

For a wireless RMS to be effective, the individual hearing aid or auditory implant processors must be compatible with the system, and suitable settings must be applied as needed.

Seeking the deaf child or young person’s opinion is crucial for several reasons:

- **Personal experience:** The child or young person is the primary user of the Assistive Listening Device(s), so their feedback provides valuable insights into

[5] Sex Discrimination (Northern Ireland) Order 1976; Race Relations (Northern Ireland) Order 1997; Disability Discrimination Act 1995; Fair Employment and Treatment (Northern Ireland) Order 1998; Equality (Disability, etc.) (Northern Ireland) Order 2000.

how well the equipment is working in real-life situations, such as participating in music or language assessments and using access arrangements for exams.

- **Engagement and empowerment:** Involving the child or young person in the evaluation process empowers them and encourages active participation in managing their own hearing needs.
- **Tailored adjustments:** The child's or young person's feedback can guide necessary adjustments to the equipment or its settings, ensuring it meets their specific needs and preferences.
- **Emotional well-being:** Considering the child's or young person's opinion helps ensure they feel heard and supported, which can positively impact their overall emotional well-being and confidence.

Information sharing

Information provided to families must be unbiased, comprehensive, accessible, clear, and accurate (Kecman, 2019). Families should also be provided with information about wireless RMS from identification. Audiologists, speech and language therapists, Teachers of Deaf Children and Young People, and early interventionists are key information sources, so need access to upskilling and training in the full range of wireless RMS options.

The Quality Standards

1. Candidacy for receiving a wireless remote microphone system

QS 1 Every deaf child or young person should be considered as a potential candidate for a wireless remote microphone system – beginning with their initial hearing aid or auditory implant sound processor fitting.

QS 2 Providers should allocate a designated budget and establish clear accountability for funding wireless remote microphone systems.

2. Fitting and setting up wireless remote microphone systems

QS 3 The system must be configured to work with the child's or young person's individual hearing devices, ensuring that the wireless remote microphone system delivers the intended benefit.

QS 4 The child's or young person's listening response must be checked with the complete wireless remote microphone system in place to ensure it is functioning effectively and providing the expected advantage.

QS 5 Training and written information regarding the wireless remote microphone system – its settings and appropriate use – must be agreed upon and shared with the child or young person, their parents or carers, teachers, and all others involved in supporting them.

3. Managing and using wireless remote microphone systems

QS 6 A programme for optimising the use and management of the wireless remote microphone system should be agreed upon, documented, and reviewed at least annually.

QS 7 Subjective checks of the wireless remote microphone system must take place regularly.

QS 8 Electroacoustic checks must be performed regularly.

QS 9 There should be clear identification of roles and responsibilities regarding the management and use of the wireless remote microphone system.

4. Evaluating the effectiveness of wireless remote microphone systems for deaf children and young people

QS 10 Subjective and objective evaluations of a wireless remote microphone system must be conducted to determine its benefit.

QS 11 There must be close liaison between health and education teams, including the exchange of information relating to the use of the child's or young person's wireless remote microphone system.

1. Candidacy for receiving a wireless remote microphone system

The World Health Organisation (WHO) regards noise as an often-overlooked threat that can lead to various short- and long-term health issues (WHO, 2011). Disruptions in early childhood development and education due to noise can have lasting impacts on academic performance and overall health throughout life.

Research indicates that the listening environments in many pre-schools, schools and homes are often less than ideal for deaf children and young people. Studies have shown that these learners frequently spend a significant portion of their listening time in noisy environments (over a third of their day), which can impact their ability to communicate and learn effectively (Arfé et al., 2024; Cooper et al., 2024; Gheller et al., 2023; Simon et al., 2022; Wang & Brill, 2021).

Wireless remote microphone systems (wireless RMS) can significantly enhance spoken language development in deaf children and young people by improving access to speech in noisy environments, increasing parent-child interaction, enhancing learning opportunities, and providing consistent exposure to language.

QS 1 Every deaf child or young person should be considered as a potential candidate for a wireless remote microphone system as part of their hearing care – beginning with their initial hearing aid fitting, or when appropriate for those using auditory implant sound processors.

Health and education professionals should ask why a deaf child or young person shouldn't be a candidate for wireless RMS, instead of deciding who should be. A close working relationship between health and education teams is essential.

Hearing device selection and provision for children and young people must be conducted using evidence-based protocols and fitting algorithms. This process should be carried out by a paediatric audiologist with the necessary expertise, skills and knowledge so the hearing devices are compatible with wireless RMS.

The selection of hearing devices for infants and toddlers must also include features specifically designed for this age group, such as paediatric-sized ear hooks, tamper-proof battery doors, omnidirectional sound capture, and compatibility with remote-

microphone technology (British Society of Audiology, 2022; Joint Committee on Infant Hearing, 2019).

Omnidirectional settings for hearing devices are often better for young children (Ching et al., 2009; Gustafson et al., 2021) because they capture sound from all directions, aiding in the development of auditory and language skills. These settings help young children become aware of their surroundings, pick up incidental sounds, and overhear conversations, which are crucial for learning and social interaction. They also enhance safety by making children aware of potential dangers and provide a more natural listening experience. Additionally, omnidirectional settings are well-suited to dynamic environments like playgrounds and classrooms, ensuring children have the best auditory experience as they grow and learn.

It is important that children and young people are supported to understand how distance, environment and localisation affect sound while using their wireless RMS.

Research indicates that even very young children can gain significant benefits from using wireless RMS. For instance, a study commissioned by the National Deaf Children's Society and conducted by The Ear Foundation found that using wireless RMS with pre-school deaf children can improve hearing for speech in difficult listening conditions, increase parent-child interactions, and positively impact the family's well-being (Allen et al., 2017).

In quiet settings, such as one-on-one interactions at home, the benefits of wireless RMS are minimal.

Appropriate support and training are needed to ensure those in the child's environment can support the best use of remote microphone systems.

Contexts for candidacy and other factors for consideration can be found in the online **Good Practice Guides**: batod.org.uk/information/altwg-quality-standards.

QS 2 Providers should allocate a designated budget and establish clear accountability for funding wireless remote microphone systems.

In the UK at present, there is a split in provision between health and education service providers. Often, health services provide the hearing device, while education services provide the wireless RMS. This is unhelpful and can lead to inequalities of access to wireless RMS. However, there is a clear mandate to work in the best interests of children and young people, and joint commissioning is welcomed.

In England, the Children and Families Act 2014[6] places a duty on education and health services to jointly commission services for children and young people with special educational needs and disabilities (SEND). This legislation requires local authorities and health bodies to work together to provide the necessary support for children and young people with SEND.

In Scotland, the Education (Additional Support for Learning) (Scotland) Act 2004,[7] amended in 2009, requires education authorities to identify and provide for children and young people with additional support needs, which includes working with health services.

In Wales, the Additional Learning Needs and Education Tribunal (Wales) Act 2018[8] places duties on local authorities, health boards and other agencies to collaborate in supporting children and young people with additional learning needs.

In Northern Ireland, the Special Educational Needs and Disability (Northern Ireland) Order 2005[9] and the Special Educational Needs and Disability Act (Northern Ireland) 2016 outline the responsibilities of education and health services to work together to support children and young people with special educational needs.

Across the UK, government guidance universally emphasises the importance of early intervention. A full hearing care package, including a wireless RMS, should be put in place for each deaf child. This package should be reviewed regularly and should evolve as the child develops and their listening needs change.

[6] For information on the Children and Families Act, go to legislation.gov.uk/ukpga/2014/6.

[7] For more information of the Education (Additional Support for Learning) (Scotland) Act 2014, go to gov.scot/publications/manual-good-practice-special-educational-needs.

[8] For more on the Additional Learning Needs and Education Tribunal (Wales) Act 2018, go to childcomwales.org.uk/our-work/policy-positions/aln-policy-position.

[9] For more on the Special Educational Needs and Disability (Northern Ireland) Order 2005, go to education-ni.gov.uk/articles/special-educational-needs-legislation.

2. Fitting and setting up wireless remote microphone systems

The Assistive Listening Technology Working Group (ALTWG) recommends using appropriate hearing instrument test box verification (electroacoustic checks), and these are part of the **Good Practice Guides** (batod.org.uk/information/altwg-quality-standards). These checks are the starting point for setting up hearing aids, bone conduction hearing devices and auditory implant sound processors with wireless remote microphone systems (wireless RMS).

Research on electroacoustic measures for fitting wireless RMS to cochlear implant sound processors (Hamilton & Whyte, 2025; Nair et al., 2017; Schafer et al., 2013; Whyte, 2019) has produced adapted guidelines for the American Academy of Audiology (AAA, 2011a). This work, along with the latest international standards,[10] have informed the ALTWG verification protocols.

The protocols aim to make sure that the sound a person hears through their hearing device alone is very similar to the sound they hear when the device is connected to a wireless RMS. This is called electroacoustic transparency or 'balance'. More information can be found on the ALTWG website: batod.org.uk/information/altwg-quality-standards.

Electroacoustic checks are essential to make sure hearing devices and wireless RMS work well together. Sometimes, they don't automatically provide balanced sound, and these tests help find and fix those issues. Common issues include blocked microphone covers or faulty connections. Keeping a record of how the system performs when it's working properly (baseline measures) helps spot performance deviations. To confirm everything is working is it should, it's also important to get user feedback and use speech-in-noise tests.

There should be consultation between health and education professionals and the deaf child or young person to ensure that the wireless RMS is compatible with their hearing device, and to assess whether the system is suitable in meeting the child's or young person's needs. Practicalities that must be addressed before setting up the system include:

- Choosing hearing devices that are compatible with wireless RMS.

[10] BS EN 60118 – Electroacoustics. Hearing aids. https://doi.org/10.3403/BSEN60118

- Sharing details of the set-up and features of hearing devices, such as sound processing strategies, features and settings. For example, this might include the sound mixing ratio for wireless accessories like wireless RMS.

QS 3 The system must be configured to work with the child's or young person's individual hearing devices, ensuring that the remote microphone signal delivers the intended benefit.

- Check all individual components of the equipment before setting up the system.
- Follow the guidelines and procedures in the **Good Practice Guides**: batod.org.uk/information/altwg-quality-standards.
- Make a note of any required settings and keep a copy of the results for baseline reference. Send copies to other relevant professionals.

QS 4 The child's or young person's listening response must be checked with the complete wireless remote microphone system in place to ensure it is functioning effectively and providing the expected advantage. Check that speech is audible, clear and intelligible through the remote microphone, both at close range and at a distance greater than three metres.

- Use close observation and select a listening task appropriate to the child's or young person's developmental stage. Seek feedback directly from the child or young person.
- Where a child or young person is unable to respond to a listening task, administer an alternative appropriate task to establish the sound quality they are experiencing.

QS 5 Training and written information regarding the wireless remote management system – its settings and appropriate use – must be agreed upon and shared with the child or young person, their parents or carers, teachers, and all others involved in supporting them.

- As part of the fitting process, a suitably qualified professional should teach the key participants how to use the wireless RMS and conduct basic troubleshooting.
- Review this training when there is a change of hearing device or setting, if any part of the wireless RMS is repaired or replaced, or if new staff are involved.
- Information should include detailed practical instructions and be available in accessible formats, such as written instructions with images or subtitled instructional videos, like those produced by the manufacturers and suppliers.

3. Managing and using wireless remote microphone systems

Those who provide children and young people with wireless remote microphone systems (wireless RMS) have a duty of care to ensure that, as far as possible, this equipment is always used appropriately and functions effectively.

This section focuses on the important practical steps needed to manage and use these systems every day. When used correctly, they can help users of all ages get the most benefit in a variety of environments and situations.

Ongoing training for everyone involved is a crucial part of good management and use, as is routine testing and monitoring of the equipment. The successful management and use of the system depend on shared ownership and partnership between the deaf child or young person, their family, professionals and other agencies. There should be a designated person with responsibility for overseeing this.

The benefit of wireless RMS for deaf children and young people is highly dependent on understanding how to use the system correctly. Its success also relies on the sensitivity and positive attitudes of all those involved (McCracken et al., 2012).

QS 6 A programme for optimising the use and management of wireless remote microphone systems should be agreed upon, documented, and reviewed at least annually.

- Provide ongoing training programmes for all individuals involved in using the wireless RMS. This training should accommodate evolving needs, changes in equipment, staffing, and the various contexts in which the technology is used.
- Establish clear targets with the deaf child or young person for developing skills to effectively use and manage the equipment.
- Record the child or young person's understanding of the equipment, along with their level of independence in operating it.
- Support families in using wireless RMS beyond the education setting, including at home and during extracurricular or out-of-school activities.

QS 7 Subjective checks of wireless remote microphone systems must take place regularly.

- Perform regular listening checks of the wireless RMS, both with and without the hearing device. When performing checks, use appropriate tools such as a stetoclip[11] for hearing aids, monitor earphones for cochlear implants, listeners for bone conduction devices, or a dedicated headphone set or receiver checker[12] for the wireless RMS.
- For infants, pre-school-aged children, and those with additional needs, checks should be conducted more frequently, for example daily listening checks for children in the early years.
- Check the child's wireless RMS is working with other systems in use, such as soundfield systems.

[11] For more information about stetoclips, visit the Connevans website at: connevans.co.uk/catalogue/180/Stetoclip-hearing-aid-listeners.

[12] For more information and an example of a receiver audio checker, visit the Connevans website at connevans.co.uk/product/5103338/3PCHECK1/Phonak-Receiver-Audio-Checker.

Use of wireless RMS with soundfield systems

Each nation of the UK has legal statutory building regulations and design standards.[13] The acoustic conditions and sound insulation of each classroom or other space must be suitable, considering the nature of the activities that normally take place there. In a school with a good acoustic environment, people will experience:

- good sound quality, enabling them to hear clearly, understand and concentrate on their activities
- minimal disturbance from unwanted noise, such as from activities in adjacent areas, teaching equipment, heating and ventilation systems, or road traffic.

Most deaf children and young people who wear hearing devices need a superior signal-to-noise ratio (SNR) of 15dB to 20dB provided by wireless RMS.

Soundfield systems are increasingly popular for improving listening conditions for all children and young people in education settings. They provide a consistent sound level from the primary source (usually the teacher) throughout the space, and make sounds approximately 10dB louder than the minimal background noise.

However, a soundfield system does not alleviate the difficult listening conditions created by high reverberation levels or excessive background noise. These issues should be addressed before introducing soundfield systems. See references to resources on acoustics in the introduction of this document.

There can be numerous advantages when a wireless RMS is combined with a soundfield system. However, such systems must be regularly and sensitively evaluated to ensure optimal use and benefit. It is essential to select and set up the equipment to ensure that the performance of the wireless RMS is not compromised (American Academy of Audiology, 2011b). You should also seek the deaf child's or young person's opinion and feedback.

[13] See BATOD's information about acoustic standards at batod.org.uk/resource/4-4-acoustic-standards-legislation-and-guidance.

QS 8 Electroacoustic checks must be performed regularly.

- Conduct regular hearing instrument test box checks to compare the frequency response curves with the baseline settings established during the initial set-up.
- Checks should be done at least once a year. Checks should be done more often for younger children, those with additional needs, or when there are changes to the hearing devices or system.

QS 9 There should be clear identification of roles and responsibilities regarding the management and use of wireless remote microphone systems.

- Local authorities, in partnership with education providers, must provide an accessible written policy, detailing roles, responsibilities and procedures for managing wireless RMS.
- The service policy should include plans for infection prevention and control, as well as the calibration, upgrading and planned replacement of hearing instrument test boxes and associated equipment.
- The service policy should cover replacements, loans and upgrades of remote microphone systems.
- Detailed records of equipment, settings, and frequency response curves should be maintained for each child or young person, along with accurate personal information. This should be recorded and stored in accordance with legislation for data protection, privacy, data use and access.
- Clear routines and procedures for maintaining equipment should be established.
- Clear information should be provided on how children and young people can have access to remote microphone systems in all aspects of their lives, including in education settings, at home, and during out-of-school and social activities. Potential loss, damage, or insurance issues should not be a barrier to them using the equipment in these ways.

4. Evaluating the effectiveness of wireless remote microphone systems for deaf children and young people

Evaluation is an important part of both fitting and using a wireless remote microphone system (wireless RMS). Using a standardised and systematic approach to evaluation helps identify how well the system is working for each child or young person.

Speech testing in quiet and simulated noise is a commonly used evaluation procedure. Each speech test has its own standardised format and scoring system. To get meaningful results, enough data needs to be collected to stay within the test's confidence bands.

For more detailed guidance, see the **Good Practice Guides**: batod.org.uk/information/altwg-quality-standards.

QS 10 Subjective and objective evaluations of a wireless remote microphone system must be conducted to determine its benefit.

Both subjective and objective measures are important for a comprehensive assessment.

- Objective tests should be conducted regularly, while subjective tests should be conducted more frequently. For example, listening checks in the early years should be conducted daily.
- Observation and questionnaires are crucial. The views of everyone involved should be gathered, including those of parents and the deaf child or young person. The child or young person should understand the purpose of the wireless RMS.
- The professional with day-to-day responsibility for the system should collate and share the findings with the child or young person, parents and all relevant professionals, including paediatric audiologists. Where appropriate, the results should inform an individual management plan.

The **Good Practice Guides** have more information on suggested procedures, such as speech-in-noise evaluation and the equipment required to perform these tests: batod.org.uk/information/altwg-quality-standards.

QS 11 There must be close liaison between health and education teams, including the exchange of written information relating to the use of the child's or young person's wireless remote microphone system.

- Liaison should cover all stages, from candidacy through to evaluation.
- As the child matures, the need to change the amplification package will impact both health and education teams. Close liaison will ensure the child's or young person's wireless RMS remains optimal.
- Joint training sessions provide an opportunity to share this information. They will also encourage closer liaison and a better understanding of the distinct roles of staff within a comprehensive hearing device fitting service.
- There should be clear plans for the transition of young people from paediatric to adult services (Willis & McDonagh, 2018).

Conclusion

Effective collaboration between health, education, and children's services is essential to the successful evaluation and implementation of wireless remote microphone systems (wireless RMS).

wireless RMS, when used effectively, can improve listening in acoustically challenging environments for individuals of all ages, from pre-school children to adults. To ensure optimal benefit, these systems must be correctly fitted, appropriately used, and consistently managed. This is best achieved through active consultation with users and close, ongoing collaboration between health and education professionals.

Joint training sessions offer valuable opportunities to update knowledge, share best practices, and strengthen collaborative approaches, ensuring coherence and productivity across services.

We hope these Quality Standards will promote further development and support the delivery of best practice. Our goal is to ensure that every deaf child and young person has the best possible access to communication, learning and social interaction.

References

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Glossary of terms and abbreviations

2.4 GHz | A specific frequency band (2.4 gigahertz) commonly used for wireless technologies and Wi-Fi networks. This band is known for providing a wider range and better penetration through walls compared to the 5 GHz band. However, it can also be more prone to interference from other devices, like microwaves, baby monitors and Bluetooth devices.

Acoustic environment | All the sounds in a place. It includes things like birds singing, cars driving by, people talking, or wind blowing through the trees. All these sounds together make up the 'soundscape' – like a picture made of sounds.

Algorithm | A precise rule (or set of rules) specifying how to fit hearing devices.

Assistive Listening Devices (ALD) or Assistive Listening Systems (ALS) or Assistive Listening Technology (ALT) | Devices or tools that help people who find it hard to hear. They make sounds louder and clearer, especially in noisy places like classrooms, busy streets or big halls.

Audible | A sound that is perceptible – that is, it can be heard by the human ear because it is either loud enough or within the frequency range that humans can detect.

Audiologist | A healthcare professional who specialises in identifying, assessing and managing hearing and balance disorders. They provide treatment, support and advice to help improve auditory health and enhance quality of life.

Auditory brainstem implant (ABI) | Device which restores some level of hearing to individuals who do not have a functioning hearing (auditory) nerve.

Auditory implant | A medical device that is surgically placed to support improved hearing. These devices work by sending sound signals directly to parts of the ear, to the hearing nerves and on to the brain. Types of auditory implants include auditory brainstem implants, bone conduction implants, cochlear implants, or middle ear implants.

Auracast™ | An enhanced Bluetooth® Low Energy (LE) technology for broadcasting audio to multiple listeners over distances of up to around 100 metres. Mains powered Auracast™ public transmitters will send a one-way audio broadcast with a larger coverage area.

Auxiliary aid | An auxiliary aid is a type of support, typically a piece of equipment, technology or person, that helps someone with access needs.

Balance or electroacoustic transparency | A system is considered balanced or electroacoustically transparent when the output of the hearing device, in combination with the remote microphone, closely matches that of the hearing device alone – typically within a margin of 3dB.

Bluetooth® | A **universal** short-range wireless communication technology used for exchanging data over distances of up to approximately 10 metres. It operates within the **2.4 GHz** Industrial, Scientific and Medical (ISM) frequency band. There are two types of conventional Bluetooth® technology:

- Classic – optimised for continuous, high-throughput data streams such as audio, including music streaming, media playback, and phone calls
- Low Energy (LE) – designed for intermittent data transfer with minimal power consumption, making it ideal for devices such as hearing devices and smartphone app connectivity.

A third variant, **Auracast™**, is currently under development. It introduces broadcast audio capabilities, enabling one-to-many transmission. This has the potential to transform public audio accessibility.

Bone conduction hearing device or **bone anchored hearing aid** | A hearing device that transmits sound to the cochlea through the bones of the user's skull.

Bone conduction hearing implant (BCHI) | A device for patients who cannot use regular hearing aids, a bone conducting hearing implant may provide a better solution to their hearing loss.

Braille | A tactile system for reading and writing. It consists of up to six raised dots arranged in a two-by-three grid, with each pattern representing a letter, number, or symbol. These dots are read by feeling them with the fingertips to interpret the text.

British Sign Language (BSL) | A visual language used by Deaf people in the UK. BSL is not a direct translation of English; it has its own unique grammar, syntax and vocabulary. Communication is conveyed through hand gestures, facial expressions and body language. BSL is legally recognised as a language in England, Scotland, and Wales

under the British Sign Language Act 2022. The Act does not extend to Northern Ireland, where equality law is devolved and both British and Irish Sign Language (ISL) are used.

Clarity | Refers to the quality and distinctness of sound, particularly how easily speech or audio can be heard and understood.

Cochlear implant (CI) | A cochlear implant is a surgically implanted electronic device that provides a sensation of sound to individuals with severe to profound deafness. It bypasses damaged parts of the inner ear and stimulates the auditory nerve directly, allowing the brain to interpret electrical signals as sound.

Deaf | The term 'deaf' in this document refers to all types of deafness from mild to profound. This includes unilateral (one-sided) deafness and temporary conditions such as glue ear.

Deafness | Deafness can be described by hearing levels.[14] Deafness means an issue somewhere along the hearing pathway – this could be in the outer ear, middle ear, inner ear, auditory nerve, or even the auditory processing areas of the brain.

Digital hearing devices | These work by converting sound waves into digital signals, which can be processed and customised to the person's hearing needs.

Digital Modulation (DM) | A method of converting sound into digital data and encoding that information onto a carrier signal for transmission.

Educational audiologist | An educational audiologist brings a unique blend of knowledge, skills and experience to the field of deaf education. Typically, an educational audiologist is already a qualified and experienced Teacher of Deaf Children and Young People (QToD) or a clinical audiologist before undertaking a Master's degree or Postgraduate Diploma in Educational Audiology.

Electroacoustic | Refers to a sound signal transferred from electrical to acoustic form or from acoustic form to an electrical form.

Electroacoustic transparency or balance | A system is considered electroacoustically transparent or balanced when the output of the hearing device, in combination with the

[14] See BATOD's description of deafness at batod.org.uk/resource/2-1-describing-deafness

remote microphone, closely matches that of the hearing device alone – typically within a margin of 3dB.

Fitting | Fitting refers to the process of selecting and adjusting a hearing device to suit a person's hearing needs. It includes choosing the appropriate device, **programming** it based on hearing test results, and making sure it feels comfortable and works well in everyday situations.

Frequency | The rate that sound or other waves vibrate at.

Frequency Modulation (FM) | A method of sending information using radio waves.

Hearing | The ability to detect or perceive sound. But hearing is more than just detecting sound – it's about making sense of it. Conventionally, auditory development progresses through four key stages:

- Detection – the ability to hear the presence or absence of sound. This is the foundation of all listening skills.
- Discrimination – the ability to tell whether two sounds are the same or different.
- Identification – recognising and labelling sounds or words, such as pointing to a picture or repeating a word heard.
- Comprehension – understanding the meaning of what is heard, this includes following instructions, answering questions, and engaging in conversation.
- Programming hearing devices supports this progression by ensuring that sound is delivered in a way that allows the listener to move through these stages – from simply hearing a sound to fully understanding spoken language.

Hearing device | A generic term that includes hearing aids, bone conduction devices, and implant sound processors.

Hearing instrument test (HIT) box or test box | This specialised equipment is used to assess the performance of hearing devices in a controlled setting. It checks that the device is functioning correctly; measures the sound output using a test microphone and coupler that simulates the human ear; identifies faults such as distortion or weak amplification; allows comparison of different settings or programmes; and provides documentation for clinical records.

Infrared sound transmission | A wireless method of sending audio signals using infrared light waves (the same type of light used in TV remote controls). The sound is converted into a signal and transmitted via invisible infrared light to a receiver. While this technology is used less frequently today, it can still be found in venues such as cinemas and theatres. It provides private audio to the listener but requires a direct line of sight between the transmitter and receiver and operates only within a limited range.

Intelligible | Intelligible speech refers to spoken language that is clear enough to be understood by a listener. It means the words are pronounced, paced and articulated in a way that allows the listener to recognise and make sense of them. In audiology and speech-language contexts, speech intelligibility is often used to describe how well someone can understand speech, especially in challenging listening environments like noisy rooms or when using hearing devices.

Listening | Listening is the active process of paying attention to sound. It involves not just hearing but also focusing on and making sense of what is heard. Good listening means understanding the meaning behind the sounds or speech, which may include recognising words, interpreting tone and responding appropriately. Listening is a skill that develops over time.

Middle ear implant (MEI) | A hearing device particularly useful for individuals with conductive or mixed deafness (conductive and sensorineural) who do not benefit from or cannot tolerate traditional hearing aids.

Mixing ratio | Refers to the balance between two audio inputs – typically the sound picked up by the hearing device's own microphone (mic) and the sound received from an external source, such as a remote microphone or Bluetooth audio. The mixing ratio controls how much of each sound source the listener hears. For example, a 50:50 or 1:1 mixing ratio is intended to provide an equal blend of the hearing aid microphone and the external microphone and is recommended for children and young people. A 30:70 or 20:80 ratio would mean the external mic is louder than the hearing device mic, which can be helpful in noisy environments and can be preferred by adults. These should be used with caution as speech and environmental sounds will be reduced, for example, alerts, warnings, or vehicle and machinery sounds will be less audible.

Monitor earphones | A device that allows someone to listen to the sound being picked up by a hearing device's microphone. This helps check sound quality and ensure the device is working correctly.

Noise | Any unwanted sound.

Physiological | In the context of deafness, physiological refers to the biological or physical processes within the ear and auditory system that are involved in hearing.

Programming | Programming refers to setting up a hearing device to meet an individual's hearing needs. An audiologist uses a computer to adjust the sound settings based on the person's unaided hearing levels. The aim is to ensure that speech and everyday sounds are clear, comfortable and appropriate for the listener. For cochlear implants, programming involves fine-tuning the external sound processor (worn behind the ear) after surgery. The audiologist adjusts how the implant sends signals to the hearing nerve based on the user's hearing responses and comfort levels. This process may require multiple sessions over the first year to achieve optimal results. Children are typically reviewed annually thereafter until adulthood, then every 5 years in the UK.

Proprietary | Relating to a particular manufacturer or company.

Protocol | In the context of hearing device fitting and verification, a protocol refers to a structured, evidence-based set of algorithms or procedures that audiologists follow to ensure hearing aids are selected, fitted and verified effectively and safely for everyone. In relation to hearing instrument testing or test box procedures, a protocol denotes a systematic, evidence-based approach used by educational audiologists and Qualified Teachers of Deaf Children and Young People (QToDs) to assess the performance and functionality of hearing devices under controlled conditions.

Qualified Teachers of Deaf Children and Young People (QToD) | These are specialist teachers who provide tailored education and support for deaf children and young people and their families. They work across a range of educational settings and often support families in the home. Their role includes assessing individual needs, monitoring progress, offering expert advice and training, and collaborating closely with other professionals and agencies to ensure that each child's educational and communication needs are fully met.[15]

Receiver | A device that captures and processes audio signals transmitted from a corresponding **transmitter**. It forms part of a wireless communication system,

[15] See BATOD's information about training as a Teacher of Deaf Children and Young People: batod.org.uk/information/training-as-a-teacher-of-deaf-children-and-young-people

converting the received signal into sound or data for the user. Receivers are commonly used in applications such as Assistive Listening Systems, wireless microphones, and **Bluetooth®** audio streaming.

Remote microphone | A device that sends audio signals wirelessly to a compatible **receiver**. It converts sound or data into a signal suitable for transmission over a specific frequency or protocol, such as **Bluetooth®**, **DM** or **FM**. **Transmitters** are commonly used in **Assistive Listening Systems**, hearing technology, and wireless audio setups to deliver sound from a source (e.g. microphone, TV or phone) to a listener's device.

Reverberation | Refers to the persistence of sound in an **acoustic environment** after the original sound source has stopped, caused by sound waves reflecting off surfaces such as walls, ceilings and floors. In classrooms or other learning environments, excessive reverberation can significantly degrade speech **clarity**.

Signal-to-noise ratio (SNR) | SNR is a measure that compares the level of a desired signal (such as a teacher's voice) to the level of background noise in an environment. It is typically expressed in decibels (dB). In classrooms, a higher SNR means the speech signal is much clearer than the surrounding noise, making it easier to understand. For example, an SNR of +15 dB means the teacher's voice is fifteen decibels louder than the background noise. For deaf children and young people, a high SNR is critical. Even small amounts of background noise can significantly interfere with their ability to understand speech, especially when using hearing devices or implants. Research suggests that while normally hearing children may manage with a +6 dB SNR, deaf children require +15 dB to +20 dB SNR to support speech understanding.

Sound processors | The external component of an auditory implant system – such as a cochlear implant or bone conduction implant – that captures, processes and transmits sound to the internal implant.

Soundfield system | An amplification technology designed to evenly distribute a speaker's voice throughout a room, typically a classroom. It uses a **remote microphone** worn by the speaker (e.g. a teacher) and one or more loudspeakers placed strategically around the room to ensure that all listeners – regardless of where they are seated – receive an improved audio signal.

Stetoclip | A device used to listen to a hearing device's audio output directly. It helps check whether the device is functioning properly. A test rod can be used with bone conduction hearing devices. Monitor earphones with adapters can be used with

cochlear implant sound processors. They only allow access to the initial mic output (not the processed signal).

Streaming | Transmitting audio directly from a device (e.g., phone or tablet) to a hearing device or implant.

Transmitter | A device that sends audio signals wirelessly to a compatible **receiver**. It converts sound or data into a signal suitable for transmission over a specific frequency or protocol, such as **Bluetooth®**, **DM** or **FM**. Transmitters are commonly used in **Assistive Listening Systems**, hearing technology, and wireless audio setups to deliver sound from a source (e.g. microphone, TV or phone) to a listener's device.

Universal | Describes technology – such as a receiver – that is compatible with a wide range of hearing devices, regardless of brand or manufacturer. Universal devices are designed to work across multiple platforms, offering flexibility and ease of integration in diverse audiological settings.

Validation | The process of ensuring that a device provides a benefit. Validation assesses the patient's subjective experience with the hearing device using speech discrimination testing and post-fitting questionnaires.

Verification | A technical process that ensures the hearing device is functioning as intended and meeting prescribed targets.

Further information and useful links

General information about deafness and hearing loss

- NHS information about hearing loss: nhs.uk/conditions/hearing-loss
- World Health Organisation facts about deafness and hearing loss: who.int/news-room/fact-sheets/detail/deafness-and-hearing-loss

Resources from other organisations

- Assistive Listening Technology Working Group (ALTWG) Good Practice Guides: batod.org.uk/information/altwg-quality-standards
- British Academy of Audiology resources on paediatric support: baaudiology.org/professional-information/baa-paediatric-support
- British Association of Teachers of Deaf Children and Young People (BATOD) resources: batod.org.uk/resources
    - Audiology Refreshers: batod.org.uk/resources-category/audiology-refreshers
    - Deaf Education MESHGuides: batod.org.uk/resources/meshguides-deaf-education
    - Specialist Deaf Curriculum Framework: batod.org.uk/resources-category/specialist-deaf-curriculum-framework
- British Society of Audiology paediatric audiology guidance: thebsa.org.uk/guidance-and-resources/current-guidance/?subject=paediatric-audiology
- Ewing Foundation resources: ewing-foundation.org.uk/resources
    - Compressed Babble – for speech-in-noise testing: ewing-foundation.org.uk/resources/compressed-babble
    - Listening Resources: ewing-foundation.org.uk/resources/listening-resources
    - Listening to Learn booklet: ewing-foundation.org.uk/resources/listening-to-learn-guide
- National Deaf Children's Society: ndcs.org.uk
    - Causes, types and signs of deafness: ndcs.org.uk/advice-and-support/all-advice-and-support-topics/causes-types-and-signs-deafness

- Creating good listening conditions: ndcs.org.uk/advice-and-support/all-advice-and-support-topics/education-and-learning/creating-good-listening-conditions
- Creating a good communication environment as an educator: ndcs.org.uk/advice-and-support/all-advice-and-support-topics/education-and-learning/education-professionals/creating-good-communication-environment-educator
- Education and learning: ndcs.org.uk/advice-and-support/all-advice-and-support-topics/education-and-learning
- Specialist assessments for deaf children and young people: ndcs.org.uk/advice-and-support/all-advice-and-support-topics/education-and-learning/education-professionals/specialist-assessments-deaf-children-and-young-people
- Technology in education: ndcs.org.uk/education-professionals/technology-education
- Downloadable and print resources. The following are available to order, print or download for free from the National Deaf Children's Society's bookshop (Shopify).
  - Cochlear implants: A guide for families: ndcs-bookshop.myshopify.com/products/cochlear-implants-a-guide-for-families
  - Hearing aids: Information for families: ndcs-bookshop.myshopify.com/products/hearing-aids-information-for-families
  - How radio aids can help: ndcs-bookshop.myshopify.com/products/how-radio-aids-can-help
  - Social story: Radio aids: ndcs-bookshop.myshopify.com/products/social-story-radio-aids

National links

- Find your local council: gov.uk/find-local-council
- UK Local Authority web pages: uk-air.defra.gov.uk/links?view=la
- National Sensory Impairment Partnership (NatSIP): natsip.org.uk
- Northern Ireland – The Education Authority Sensory Service: eani.org.uk/pupil-support-services/sensory-service

- Scotland –
    - Scottish Sensory Centre Resources: ssc.education.ed.ac.uk/resources/index.html
    - Getting it right for every child (GIRFEC): gov.scot/policies/girfec/girfec-resources
    - The General Teaching Council for Scotland: gtcs.org.uk
- Wales – Support for children and young people with hearing impairment in educational settings: gov.wales/sites/default/files/publications/2024-04/191209-support-for-children-and-young-people-with-hearing-impairment-in-educational-settings.pdf

Professional forums

- DeafEducationUK Forum (formerly QToD forum): batod.org.uk/about-us/tod-email-forum
- d/Deaf Teachers of Deaf CYP (Facebook group): facebook.com/groups/Deafteachers/?locale=en_GB
- Heads of Sensory Services (HoSS) email forum: natsip.org.uk/si-forums/273-about-hoss
- ScotDeaf-Forum: ssc.education.ed.ac.uk/resources/deaf/deafforum.html
- SI Forums UK: siforums.org.uk

Relevant organisations

- Academy for Health Care Science (AHCS): ahcs.ac.uk
- Acoustical Society of America (ASA): acousticalsociety.org
- ADHD UK: adhduk.co.uk
- American Academy of Audiology (AAA): audiology.org
- American Speech-Language-Hearing Association (ASHA): asha.org
- Association of Noise Consultants: association-of-noise-consultants.co.uk
- Assistive Listening Technology Working Group (ALTWG): batod.org.uk/information-category/assistive-listening-technology-working-group/altwg
- Audiology Online: audiologyonline.com

- Auditory Verbal UK (AVUK): avuk.org
- Bluetooth Special Interest Group: bluetooth.com
- British Academy of Audiology (BAA): baaudiology.org
- British Association of Audiological Physicians (BAAP): baap.org.uk
- British Association of Educational Audiologists (BAEA): educational-audiologists.org.uk/index.php
- British Association of Paediatricians in Audiology (BAPA): bapa.org.uk
- British Association of Teachers of Deaf Children and Young People (BATOD): batod.org.uk
- British Cochlear Implant Group (BCIG): bcig.org.uk
- British Deaf Association (BDA): bda.org.uk
- British Society of Hearing Aid Audiologists (BSHAA): bshaa.org
- British Society of Audiology (BSA): thebsa.org.uk
- CALL Scotland: callscotland.org.uk
- Canadian Acoustical Association (CAA): jcaa.caa-aca.ca/index.php/jcaa
- Canadian Academy of Audiology: canadianaudiology.ca
- CaptionConnect: captionconnect.com
- Chime: chime.ie
- Cochlear Implanted Children's Support Group: cicsgroup.org.uk
- College of Physicians and Surgeons of Cardiff (CPSC): cpscardiff.org.uk
- Contact: contact.org.uk
- Craniofacial Society of Great Britain and Ireland: craniofacialsociety.co.uk
- Deaf Action: deafaction.org
- Deafblind UK: deafblind.org.uk
- Deaf Choices UK: deafchoicesuk.com
- DELTA: deafeducation.org.uk
- Down's Syndrome Association: downs-syndrome.org.uk

- Educational Audiology Association: edaud.org
- Elizabeth Foundation: elizabeth-foundation.org
- ENT UK (ENT surgeons): entuk.org
- European Acoustics Association: euracoustics.org
- European Federation of Associations of Teachers of the Deaf: feapda.eu
- European Federation of Audiology Societies: efas.ws
- European Hearing Instrument Manufacturers Association: ehima.com
- European Union of Hearing Aid Acousticians: euha.org/en
- Ewing Foundation: ewing-foundation.org.uk
- General Medical Council (GMC): gmc-uk.org
- Genetic Alliance UK: geneticalliance.org.uk
- Health and Care Professions Council (HCPC): hcpc-uk.org
- Headlines: headlines.org.uk
- Hear Together: heartogether.org.uk
- Hearing Link: hearinglink.org
- Hearing Loss and Deafness Alliance: hearinglossanddeafnessalliance.com
- International Society of Audiology (ISA): isa-audiology.org
- Manchester Centre for Audiology and Deafness: sites.manchester.ac.uk/mancad
- National Association of Australian Teachers of the Deaf (NAATD): naatd.com.au
- National Association for Special Educational Needs (NASEN): nasen.org.uk
- National Autistic Society: autism.org.uk
- National Cochlear Implant Users Association UK: nciua.org.uk
- National Council for Special Education: ncse.ie
- National Deaf Children's Society (NDCS): ndcs.org.uk
- National Portage Association: portage.org.uk
- National Sensory Impairment Partnership (NatSIP): natsip.org.uk

- Rare Disease UK: geneticalliance.org.uk/campaigns-and-research/rare-disease-uk
- RG Sound Solutions: rgss.co.uk
- Roberts Audio Solutions: robertsaudiosolutions.co.uk
- Royal Association for Deaf People: royaldeaf.org.uk
- Royal College of General Practitioners Deafness and hearing loss toolkit: elearning.rcgp.org.uk/mod/book/view.php?id=12532
- Royal College of Speech and Language Therapists (RCSLT): rcslt.org
- Royal College of Surgeons of Edinburgh: rcsed.ac.uk
- Royal College of Surgeons of England: rcseng.ac.uk
- Royal College of Physicians and Surgeons of Glasgow: rcpsg.ac.uk
- Royal College of Surgeons in Ireland: rcsi.com
- Royal National Institute of Blind People (RNIB): rnib.org.uk
- Royal National Institute for Deaf People (RNID): rnid.org.uk
- Royal Society for Blind Children (RSBC): rsbc.org.uk
- Scope: scope.org.uk
- Sense: sense.org.uk
- Sight and Sound Centre (Great Ormond Street Hospital): gosh.nhs.uk/wards-and-departments/wards/the-sight-and-sound-centre
- SignHealth: signhealth.org.uk
- SignWow: signwow.co.uk
- Special Needs Jungle: specialneedsjungle.com
- Swan UK: geneticalliance.org.uk/support-and-information/swan-uk-syndromes-without-a-name
- Tinnitus UK: tinnitus.org.uk
- Treacher Collins Family Support Group: treachercollins.org.uk
- UK Council on Deafness: ukcod.org
- Usher Kids UK: usherkidsuk.org

Qualifications for teachers of children and young people who are deaf

UK

- England and Wales course providers:
    - Mary Hare courses in partnership with Liverpool John Moore University: maryhare.org.uk/professional-courses/postgraduate-courses/ma-pg-dip-ed-studies-teacher-of-the-deaf
    - University of Birmingham: birmingham.ac.uk/study/postgraduate/subjects/teacher-education-courses/deaf-education-ma
    - University of Leeds: courses.leeds.ac.uk/d329/deaf-education-teacher-of-the-deaf-qualification-ma
    - University of Manchester: manchester.ac.uk/study/masters/courses/list/11972/msc-pgdip-deaf-education
- Scotland
    - Qualifications for teachers of hearing and visually impaired children and young persons: guidance: gov.scot/publications/guidance-appropriate-qualifications-teachers-children-young-persons-hearing-impaired-visually
    - Teachers of children and young people who are blind or partially sighted, deaf, or deafblind: guidance – consultation (closed July 2025): gov.scot/publications/guidance-appropriate-qualifications-teacher-competencies-teachers-children-young-people-blind-partially-sighted-deaf-deafblind
    - Course provider – University of Edinburgh: education-sport.ed.ac.uk/study/postgraduate-taught-degrees/inclusive-education/deaf-learners

Ireland

Visiting Teachers for Children and Young people who are Deaf/Hard of Hearing or Blind/Visually Impaired: ncse.ie/visiting-teachers

Causes of deafness

Causes of deafness can be:

- **Age-related**: e.g. presbycusis
- **Environmental**: e.g. noise-induced hearing loss, earwax build-up
- **Medical**: e.g. ear infections, Ménière's disease, labyrinthitis, ototoxic medications
- **Genetic**: e.g. congenital conditions
- **Physical trauma**: e.g. perforated eardrum, head trauma, tumours, foreign bodies

Some common causes or conditions associated with deafness:

- Cholesteatoma: nhs.uk/conditions/cholesteatoma
- Congenital cytomegalovirus (cCMV): nhs.uk/conditions/cytomegalovirus-cmv (see also eoeneonatalpccsicnetwork.nhs.uk/neonatal/downloads/congenital-cytomegalovirus-guideline)
- Deafblindness: nhs.uk/conditions/deafblindness
- Glue ear: nhs.uk/conditions/glue-ear
- Labyrinthitis: nhs.uk/conditions/labyrinthitis
- Ménière's disease: nhs.uk/conditions/menieres-disease
- Meningitis: nhs.uk/conditions/meningitis
- Otosclerosis: nhs.uk/conditions/otosclerosis
- Tinnitus: nhs.uk/conditions/tinnitus

Hearing devices

- General information about hearing aids and implants
- NHS information: nhs.uk/tests-and-treatments/hearing-aids-and-implants
- National Deaf Children's Society information: ndcs.org.uk/advice-and-support/all-advice-and-support-topics/hearing-aids-implants-and-assistive-technology/hearing-aids-and-implants
- Types of hearing implants: cuh.nhs.uk/our-services/emmeline-centre-for-hearing-implants/resources/emmeline-centre-resources/types-of-hearing-implants

- Bone conduction hearing devices: ais.southampton.ac.uk/bone-conduction-hearing-devices
- Cochlear implants overview: usaistrainingportal.soton.ac.uk/an-overview-of-cochlear-implants
- Middle ear implants: ais.southampton.ac.uk/middle-ear-implant-programme
- UK implant centres: bcig.org.uk/groups/implant_centre

Hearing technology manufacturers and providers

- NHS supply chain for hearing aids, batteries, custom ear moulds and hearing aid accessories: supplychain.nhs.uk/product-information/contract-launch-brief/hearing-aids-and-custom-ear-moulds
- Bernafon: bernafon.co.uk/products/hearing-aids
- GN ReSound UK Ltd: resound.com/en-gb
- GN Danalogic: danalogic.co.uk
- Hear Glue Ear: hearglueear.co.uk
- Oticon Limited: oticon.co.uk/hearing-aid-users
- Philips: philips.co.uk/c-e/hs/hearing-aids.html
- Phonak UK: phonak.com/en-uk
- Puretone Ltd: puretone.net
- Sivantos Limited (Signia): signia.net/en-gb
- Starkey Laboratories Limited: starkey.co.uk
- Unitron: unitron.com/uk/en_gb/products.html
- Widex: widex.com/en-gb
- Advanced Bionics: advancedbionics.com/gb/en/home
    - Rehabilitation: advancedbionics.com/gb/en/home/communities/2/resources
    - Listening Room: thelisteningroom.com
    - Apps: advancedbionics.com/gb/en/home/communities/2/ab-apps
    - ListenFit: advancedbionics.com/gb/en/home/explore/ab-technologies-innovations/ab-listenfit

- Cochlear: cochlear.com/uk/en/home
    - Rehabilitation: cochlear.com/uk/en/home/ongoing-care-and-support/rehabilitation-resources
    - Nucleus Smart App: cochlear.com/me/en/campaign/nucleus-smart-app
    - Baha Smart App: cochlear.com/us/en/professionals/products-and-candidacy/software-and-connectivity/apps/baha-smart-app
- MED-EL: medel.com/en-gb
    - BeHeard: beheardbymedel.com
    - Rehabilitation: medel.com/en-gb/support/rehabilitation
    - Apps: medel.com/en-gb/hearing-solutions/apps
    - ReDi: blog.medel.com/tips-tricks/meet-redi-the-new-listening-training-partner-for-cochlear-implant-users
    - Hearpeers: hearpeers.medel.com/en_gb
- Oticon Medical: oticonmedical.com/uk
    - Ponto Care App: oticonmedical.com/uk/app/ponto-care

Accessory providers

- BAHA Accessories UK: bahaaccessoriesuk.com
- Connevans: connevans.co.uk
- Hearing Aid Accessories by Manufacturer: connevans.co.uk/catalogue/23850754/Hearing-Aid-Accessories-by-Manufacturer
- My Hearing Aid: connevans.co.uk/catalogue/10888618/My-Hearing-Aid
- My Bone Conduction Hearing Aid: connevans.co.uk/catalogue/15369175/My-Bone-Conduction-Hearing-Aid
- My Cochlear Implant: connevans.co.uk/catalogue/15369176/My-Cochlear-Implant
- FM Hearing Systems: fmhearingsystems.co.uk
- Gordon Morris: gordonmorris.co.uk
- Hearing Aid Accessories: hearingaidaccessories.co.uk

- Aspen Associates radio aid insurance: aspenassociates.co.uk
- Personalising hearing devices (National Deaf Children's Society): ndcs.org.uk/advice-and-support/all-advice-and-support-topics/hearing-aids-implants-and-assistive-technology/hearing-aids-and-implants/decorating-hearing-aids-and-implants
- Frelie: frelie.co.uk/shop
- HEAROES: hearoes.co.uk
- Malinka: malinka.me.uk
- SmartEAR: smartear.eu

Hearing instrument testing – guidance and equipment

- Guidance: batod.org.uk/resource/6-6-test-box-measures
- Audioscan: audioscan.com
- Auditdata HIT box: auditdata.com/audiology-solutions/measure/hearing-instrument-fitting/hearing-instrument-testing/hit-box
- Frye Electronics: frye.com/wp
- Interacoustics Affinity: audioscan.com
- Natus Aurical: natus.com/sensory/aurical

Digital speech testing

- Soundbyte Solutions: soundbytesolutions.co.uk/products

Sound level meters

- Class 1 and Class 2 guidance: connevans.co.uk/catalogue/186/Sound-level-meters
- Casella: products.casellameasurement.co.uk
- Castle: castleshop.co.uk/technical-safety/sound-measurement/sound-level-meters
- Cirrus Research: cirrusresearch.com/products/sound-level-meters
- Hottinger Bruel & Kjaer: hbkworld.com/en/products/instruments/handheld/sound-level-meters

- Studio Six Digital: studiosixdigital.com/audiotools-modules-2/the-audiotools-platform
- Svantek: svantek.com

UK government and healthcare services

- Services and information: gov.uk/government/organisations
- GOV.UK: gov.uk
- GOV.SCOT: gov.scot
- GOV.WALES: gov.wales
- Northern Ireland Executive: northernireland.gov.uk
- Newborn hearing screening programme: gov.uk/health-and-social-care/population-screening-programmes-newborn-hearing
- NHS England: england.nhs.uk
- NHS Scotland: scot.nhs.uk
- NHS Wales: nhs.wales
- Health and Social Care Northern Ireland: hscni.net
- All-Party Parliamentary Group on Artificial Intelligence: bicpavilion.com/about_pavilion/appg-artificial-intelligence
- All-Party Parliamentary Group on British Sign Language: bda.org.uk/project/our-work-in-government
- All-Party Parliamentary Group for Assistive Technology: policyconnect.org.uk/appgat
- All-Party Parliamentary Group on Deafness: rnid.org.uk/get-involved/campaign-with-us/the-all-party-parliamentary-group-on-deafness
- All-Party Parliamentary Group for Education: educationappg.org.uk
- All-Party Parliamentary Health Group: policyconnect.org.uk/aphg

Proprietary wireless remote microphone systems

- Bernafon SoundClip-A: bernafon.com/products/accessories/368542/soundclip-a

- Cochlear Mini Mic 2+: cochlear.com/uk/en/home/products-and-accessories/our-accessories/true-wireless-devices
- GN ReSound Micro Mic: resound.com/en/hearing-aids/accessories/micro-mic
- GN ReSound Multi Mic: resound.com/en-gb/hearing-aids/accessories/multi-mic
- Oticon ConnectClip: oticon.com/solutions/accessories/connectclip
- Oticon EduMic: oticon.com/support/how-to/use-edumic
- Signia StreamLine Mic: signia-pro.com/en-gb/chargers-and-accessories/streamline-mic
- Starkey wireless accessories: starkey.co.uk/hearing-aids/accessories/wireless-accessories

Phonak Roger system

- Phonak Roger firmware upgrader: phonak.com/en-uk/hearing-devices/microphones/roger-upgrader
- Phonak Roger receivers: phonak.com/en-uk/hearing-devices/microphones/roger-receivers
- Phonak Roger microphones: phonak.com/en-uk/hearing-devices/microphones/roger-for-education
- Phonak PartnerMic: phonak.com/en-uk/hearing-devices/accessories/partnermic
- Phonak Roger Clip-On Mic: phonak.com/en-int/hearing-devices/microphones/roger-clip-on-mic
- Phonak Roger Clip-On Mic: phonak.com/en-int/hearing-devices/microphones/roger-clip-on-mic
- Phonak Roger Pass-around: phonakpro.com/content/dam/phonakpro/gc_hq/en/products_solutions/pediatrics/documents/reference_sheets/reference_sheet_btbtc_roger_pass-around_in_classroom.pdf
- Phonak Roger On: https://www.phonak.com/en-int/hearing-devices/microphones/roger-on
- Phonak Roger Select: phonak.com/en-int/hearing-devices/microphones/roger-select

- Phonak Roger Table Mic: phonak.com/en-int/hearing-devices/microphones/roger-table-mic
- Phonak Roger Touchscreen Mic: phonak.com/en-int/hearing-devices/microphones/phonak-roger-touchscreen-mic

Captioning

- CaptionConnect: captionconnect.com
- Caption.Ed: caption-ed.com
- Speaksee: speak-see.com
- XRAI: xrai.glass

Acoustics and soundfields

- Connevans Soundfield: connevans.co.uk/catalogue/12/School-Soundfield
- Ecophon: ecophon.com/uk
- Phonak Roger SoundField: phonakpro.com/il/en/products/wireless-accessories/roger-dynamic-soundfield/overview-roger-soundfield.html
- RG Sound Solutions: rgss.co.uk
- Roberts Audio Solutions: robertsaudiosolutions.co.uk
- Simple Acoustics: simpleacoustics.uk
- The Woolly Shepherd: woollyshepherd.co.uk