ACCORD

OCTOBER 2022

The Official Journal of the Australian College of Audiology (ACAud)

Australian College of Audiology

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[1] Data on file at Oticon Medical
[2] Data on file at Oticon Medical – Clinical study BC109

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Contents

OCT 2022

Acknowledgement of Country

The Australian College of Audiology acknowledges the Traditional Owners of this Country and their continued connection to the lands, waters, and communities.

AC*Aud* members would like to pay their respects to the Traditional Custodians for their resilience and strength of Elders past, present, and future.

Our members are honoured to take the journey together with our Aboriginal and Torres Strait Islander colleagues, clients, and patients to reach the goal of achieving Better Hearing and Education in Ear Health for all families, communities, and future generations.

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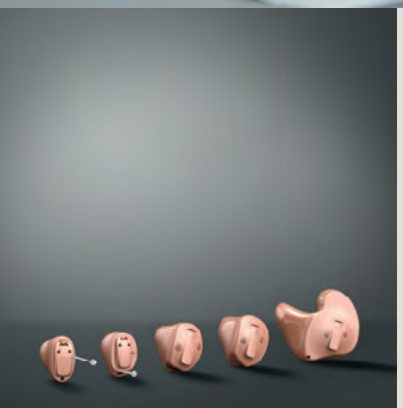

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* Rumley et al., 2022. Oticon Own evidence. Oticon Whitepaper. Oticon Own 1 vs Opn 1 dual microphone hearing instrument.
** MoreSound Intelligence is available in Oticon Own 1, 2 and 3. Benefit may vary depending on technology level and style chosen.
*** Rumley et al. (2022). Oticon Own evidence. Oticon Whitepaper. Oticon Own 1 with dual microphones, MSI ON vs OFF. Benefit may vary depending on individual MSI settings.

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life-changing **technology**

AC*Aud* Chair's Report

Dear Members,

This last quarter for AC*Aud* has certainly been eventful. After a successful recruitment process, we were fortunate enough to welcome Jane Hedger as AC*Aud*'s Inaugural CEO. Although new to the field of hearing, Jane's wealth of knowledge and business acumen has already proved invaluable, and members will benefit from the positive changes to come.

Mark Paton represented AC*Aud* on the Teleaudiology Working Party which has completed its objective - with the Teleaudiology Guidelines recently been released. Teleaudiology is a wonderful opportunity for delivering hearing services especially to those who may be restricted in being able to attend a clinic in person and offers improved flexibility to both the consumer and the clinician.

Our recent SGM was held, and the membership has supported all recommended changes. This will result in streamlined business processes and registration of AC*Aud* as a Not for Profit with the Australian Charities and Not for Profit Commission (ACNC). This will allow AC*Aud* to investigate eligible grants that we have otherwise been unable to access. The updated constitution is now available on our website. We will soon start to undertake the process of moving our current By-Laws to Policy documents. Prior to the implementation, membership will be asked to provide their feedback on the proposed documents, and I encourage you each to have your say in your organisation.

As we near our AGM, nominations will have closed for Director positions on the Board and elections have been called. You can find out about the upcoming AGM on the AC*Aud* website.

While you're on the AC*Aud* website please update your details for the Member Directory. You can find the Member Directory on the Homepage, just scroll down to the ACCESS DIRECTORY button. For more information on how to update your member details, please see page 48 of this edition of ACCORD.

Opportunities to nominate to become a sub-committee member will soon be opened for any member who would like to contribute in a more focused capacity. I again encourage each of you to put up your hand if you would like to assist your organisation in its growth and development. You have more than you know to offer, and members involvement is very much appreciated and needed.

I have absolutely loved my first year as Chair of the Board of AC*Aud* and would like to personally thank each of the Board members for their hard work, diligence, and selfless giving of their time.

Marguerite Rushworth
Chair AC*Aud*
Email: marguerite.rushworth@acaud.org

AC*Aud* CEO Report

Dear Members,

I'm very excited to have joined AC*Aud* and to be working with our very committed Board and Members to grow the organisation. This first couple of months has been a whirlwind of people and activity. I've had a long career in Health and been on the Board of member-based organisations for many years, but I'm completely new to Audiology so I'm on a steep learning curve to get to know all the acronyms! For those of you who have been so patient with me and answered my many questions – thank you.

My first task has been a deep dive into the Secretariat to understand our governance processes and the services we provide for our Members. I am completely in awe of our team in the office. Sandra, Kelley, Tanu and Tonya are all part-time and manage to juggle the constant stream of phone calls and emails from Members with professionalism and care. The volume of enquiries is mind-boggling and as we are working to map them into a database, we are discovering that there are in fact a lot of different questions and scenarios that need to be accommodated.

AC*Aud* recently held a Special General Meeting to successfully update our Constitution. The latest version is on our website if you are looking for a little light reading. As a result of that, we are now developing a suite of organisational policies and procedures that will help guide Members and the Board as we grow and adapt to the changing social and healthcare landscape. The Board and I have also begun the preliminary ideation on our next Strategic Plan and this work will continue over the next six months.

You may have noticed some changes in the Member Portal. We are creating new resources, policies and information that are for the benefit of Members only and the portal will be the go-to place for Members to find this. We want to ensure that you are getting value from the work that our Board Directors undertake across the industry and in partnership with the other PPBs and various stakeholders. We'll be asking Members what is important to you and where you need additional assistance and resources when we undertake our annual survey.

You should have all received your membership certificate by now, so it's a good time to swap out the old one and make sure you have the current one on display in your practice. If yours has gone astray – or you haven't updated your address in the Member Portal – please email the Secretariat and we'll organise a replacement.

The world continues to be a challenging operating environment. Covid is still significantly impacting workforce supply and economic pressures are affecting consumer spending and decision-making. Your work in helping people achieve better hearing health continues to be critical for those whose quality of life is affected by hearing loss. Over the next couple of months, the Board and I will be taking the opportunity to advocate with governments and relevant bodies to support all hearing health professionals and promote advancement of the industry.

Jane Hedger
CEO AC*Aud*
Email: Jane.Hedger@acaud.org

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Editor's Letter

Welcome to the October issue of ACCORD. It's another packed edition for you to enjoy! This month we feature new device technology with many interesting articles provided by manufacturers. Here you will be able to read about the latest research into technology and different devices available to augment your clients' hearing journey.

The last few months we've seen a pulling back on Covid restrictions both in our everyday lives, travel rules and clinical guidelines. This has come as a welcome relief as we see the pandemic easing and allowing everyone to get back to business and enjoying freedoms. Clinical care is still taking place with mask wearing and diligent infection control procedures, and with many lessons learnt from the last two years. To that end we have seen the rise of Teleaudiology and how this technology can improve and assist in service delivery. On page 19 you will find an excellent article on the Teleaudiology Guidelines, authored by Frances Lockhart, Bec Bennett and our very own Mark Paton. You can also find a link to the Australian Teleaudiology Working Party's research article on page 48.

We had many entries for our first CEP magazine quiz. All entries with at least 75% of answers correct gain 1 CEP point. Completing the quiz and submitting the correct answers will earn you 1 CEP point and the opportunity to win this edition's prize, generously donated by AUDEARA – a set of headphones (don't miss the article by Audeara's Research Audiologist, Ian O'Brien, on streamed music, p 22).

This edition's quiz can be found on page 35. The answers to the June 2022 ACCORD CEP Quiz are below and it gives me great pleasure to announce Kamilulla Shariff as the winner!

I hope you enjoy this issue of ACCORD and don't forget to send in your CEP quiz answers!

Yours in hearing

Janette Brazel, Editor ACCORD

Competition: June 2022 CEP Quiz

Winner: **Kamilulla Shariff**

Prize: Books – Welcome to Country by Marcia Langton & Relationship-Centred Consultation Skills for Audiologists: Remote and In-person Care by Brian Taylor

June 2022 CEP Quiz Answers

1. In the new Complaints Procedure, who can the Ethics Officer refer to when the complaint involves a possible breach of the criminal law?

A. Appropriate law enforcement body

2. AC*Aud*'s Head Office is situated on the land of the...

A. Turrbal and Yuggera Nation.

3. What date will the changes to recording client consent on the new HSP portal take effect?

A. 1 July 2022

4. Who has started a project to identify barriers to access or culturally and linguistically diverse (CALD) clients?

A. Soundfair

5. What Recommendations of the Hearing Services Program Review is the HHSA urging government to accept?

A. Recommendations 5 and 15

6. Which checklist screens for listening skills development?

A. PLUM

7. HAPEE stands for?

A. Hearing Assessment Program – Early Ears

8. What age group does the Hear Our Hearts Ear Bus program cater for?

A. 6 months to 18 years

9. Who does TAFE NSW partner with to deliver the EarTrain face-to-face workshops?

A. Hearing Australia

10. Who won the Inaugural AC*Aud* Member Award – Clinician of the Year?

A. Luke Halls

Ethic's Review Committee (ERC) Chair Update

By Sandra South Ethics Officer

We are honoured to **welcome Claire Hewat** as the new ERC Chairperson. Claire qualified as a Dietitian at the University of Sydney and has had a long career in the profession achieving the status of Advanced Accredited Practising Dietitian. For over 20 years Claire has been in senior executive roles as a Director of Community and Allied Health in South-Western Sydney and CEO of Dietitians Australia (14 years) and Allied Health Professions Australia (4 years). She has served as a director on four national and one international board including the National Alliance of Self-Regulating Health Professions (NASRHP). Claire has extensive experience in professional recognition and accreditation practices and is currently an Association Advisor with *Associations Forum.*

Thank you and farewell to Dominique Saunders. Dominique joined as inaugural Chairperson of the ERC in 2018 and helped to establish the ERC as an independent voice on ethical and professional conduct issues for our members. Dominique's passion for both social and natural justice shone through in this role. Building on her experience as chief legal adviser at AHPRA, she set a tone of an educative and preventative approach to the handling of complaints, with a focus on informal resolution of matters wherever possible and an understanding of the day-to-day pressures many of our members face. Dominique has fearlessly advocated for members and their clients on sector issues towards Government and the Boards of AC*Aud* and AudA. The ERC members and I, as Ethics Officer, appreciated Dominique's compassionate and steadying leadership style and ability to draw on her wealth of knowledge to find a workable solution to any issue.

As the Ethics Officer, I am here to provide information and support on ethical queries and concerns relating to hearing service provision by audiologists and audiometrists to anyone who wants or needs it. Members often call me to talk through a situation in their clinical practice that is concerning them, from differences of clinical opinion with a colleague to a debrief after a challenging client escalation. Through talking through your concerns, I hope to not only provide you with immediate support but also help you to think through your options for next steps. Talking through a difficult client interaction can also help you prepare should the client go on to make a complaint against you.

You do not need to give your name of professional membership affiliation to talk to me and you can remain anonymous. However, if you provide details that lead me to believe that someone might be at significant risk of harm, I may need to proceed with lodging a complaint without your consent based on the information you have provided.

To date, over 95 % of the complaints made to the ERC have been resolved informally through a dialogue between the complainant, respondent, myself as the Ethics Officer, and ERC Chair (when required) without the need to proceed to a formal Hearing and Investigation. The ability to resolve a complaint informally has relied upon the cooperation and professional conduct of the respondent members. Members have shown professionalism and maturity in reflecting on their conduct and where miscommunications or misunderstandings with clients may have arisen. Members have thought about how they can improve their practice and learn from the experience, including those members with decades of experience. This has left the complainants feeling heard, that their concerns were taken seriously and that their complaint had led to a change for the better.

However, on very rare occasions, it has not been possible to engage in the mutually respectful and professional dialogue with members required for informal resolution and there has been a need to proceed to a formal Hearing and Investigation. On other occasions, I have consulted with the ERC and we have agreed that the clinical complexity of the matter or potential risk required a formal Hearing and Investigation.

Hearing Services Program (HSP) News

2022 Provider Self-Assessment

The Australian Government Hearing Services Program (program) provides government subsidised hearing services for eligible Australians. In 2021-22, over 1.5 million services were delivered to over 811,000 clients.

To support quality services for program clients and appropriate use of Australian Government funds, providers are required to ensure they comply with the program's legislative and contractual requirements.

The Self Assessment Tool (SAT) assists providers to review their policies and procedures and reduce the risk of non-compliance. Areas covered by the SAT include questions relating to practitioner qualifications, policies and procedures, client records management, and service and claiming requirements.

The 2022 SAT will be released in October 2022 and providers will have two months to complete the online questionnaire.

Further information about the SAT is available at www.hearingservices.gov.au.

Common Program Compliance Issues

Many compliance risks can be prevented with good policies and procedures and record keeping. To help prevent common issues found through compliance monitoring activities, providers are reminded to:

- ensure client goals are discussed and documented at assessment and client review services and evaluated at fitting follow-up services
- provide a correctly completed device quote to the client prior to supplying any device(s)
- ensure that fittings with follow-up are not claimed until the follow-up service has been successfully completed
- ensure the correct evidence for lost or damaged beyond repair is recorded on the client record
- only claim for relocated maintenance when the client has consented to relocate, is aided and is on a current maintenance agreement with their previous provider
- ensure program approval is obtained prior to delivering revalidated services
- keep detailed case notes for continuity of care and to substantiate services.

For further information please refer to the Schedule of Service Items and Fees which outlines the service and evidence requirements, available via the program website.

Membership good news

Greetings from the Secretariat!

Spring has arrived and we are looking forward to some warmer weather, we are sending a warm hello to all of you from the Secretariat!

The Secretariat welcomes our new CEO, Jane Hedger, we look forward to working with and supporting Jane. We also welcome Tanu and Tonya who are assisting us at the Secretariat. We endeavour to provide you with the finest support, help and assistance. We thank you for your Membership and your continued support of the Australian College of Audiology.

All the very best,

Sandra & Kelley

Contact the ACAud Secretariat

P: (07) 3839 1622 M: 0429 357 375
Email acaud@acaud.org

Congratulations

To our New Full / Ordinary Members!

Rose Dam Won Choi	Petrina Shepherd	Megan Ellmaker	Yvette Just
Calya Judd	Vamil Kaur	Aaron Jacobs	Sajna Sameer
Preetha Sargunum	Aijisha Kizhakumtala	Jennifer Tomsia	

ACAud Continuing Education Program

All members are required to participate in the Continuing Education Program (CEP)

The current CEP cycle runs from **1 May 2021 to 30 April 2023**. In each CEP cycle, members will be required to collect:

- **50 points** for Full Members, Associate Members and Fellows *(or pro rata)*
- **25 points** for Student Members *(or pro rata)*

During this CEP cycle Full Members and Associate Members will be required to attend a mandatory conference (where more than 80% lecture attendance is required). If a Full Member joins after the AC*Aud* mandatory conference has been held the member will be exempt from this requirement in that CEP cycle.

Any member that joins after a CEP cycle has commenced will only be required to obtain CEP points on a pro rata basis. For example, a Full Member that joins AC*Aud* on 1 May 2022 will only be required to obtain 25 CEP points.

Up-coming CEP Workshops/Webinars

October 2022

Oticon: Life-changing technology educational seminars

November 2022

Victoria: Cerumen Management 101

Any time

Phonak: Lumity Platform Webinar
Oticon: From impression to life-changing solution
Soundfair: How to become a more than just ears Audiologist: applications of CBT for audiology (course open from October 17 with online participation from November)

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Are you interested in learning more about 60/60 referral guidelines, cochlear implant candidacy or about cochlear implant surgery?

Register now

This content is intended for Australia and New Zealand audiences. This is intended for health professionals. If you are a consumer, please seek advice from your health professional about treatments for hearing loss. Outcomes may vary, and your health professional will advise you about the factors which could affect your outcome. Always follow the directions for use. Not all products are available in all countries. Please contact your local Cochlear representative for product information.

HBA: Representing Small Business in the Hearing Health Sector Alliance

By Jane MacDonald CEO HBA

I represented member businesses of the Hearing Business Alliance (HBA) at the Hearing Health Sector Alliance meetings in Canberra in early August. This prompted me to reflect on the work of the HHSA, the expansion in the number of member organisations and how much I value representing the views of small business providers within this space.

HBA was a member of the Committee for the *Roadmap for Hearing Health*, convened by Minister Ken Wyatt. In 2019, the Council of Australian Governments endorsed this 'Roadmap' to improve the lives of the millions of Australians living with hearing loss and ear health conditions. The 'Roadmap' contains more than 140 recommendations. Government can't work with 140 recommendations - it needs these prioritised and it's crucial the hearing health sector is part of the decision-making and is there to lobby for allocation of adequate resources and funding.

Mindful of this, in May 2019 representatives of eight national organisations met in Canberra to discuss the formation of a Hearing Health Sector Alliance, to drive the Roadmap for Hearing Health, and to be a unified body Government could approach and converse with. It was decided that the HHSA would include membership across the four constituencies of Consumers, Professionals, Research, and Industry. HBA is proud to be the representative for small-medium independent businesses within the HHSA.

Our initial photo, taken with the Parliament House backdrop represents where we saw the Alliance's potential - dark storm clouds behind, and a bright future ahead- hence all the squinting!

Today, the HHSA is comprised of 17 national organisations within the four constituencies. This expansion is reflected in the photo taken at the most recent HHSA meeting in Canberra in early August. Member organisations now include:

Industry: Hearing Business Alliance*, Hearing Care Industry Australia*, Hearing Aid Manufacturer and Distributor Association of Australia

Researchers: Ear Science Institute Australia*, National Acoustic Laboratory*, Macquarie University, University of Melbourne, University of Queensland

Consumers: Deafness Forum*, First Voice*, Soundfair

Professionals: Audiology Australia*, Australian College of Audiology*, Australasian Society of Otolaryngology Head and Neck Surgeons, Hearing Aid Audiology Society of Australia, Indigenous Allied Health Australia, Speech Pathology Australia

** Denotes Executive Members*

The HHSA has been successful in prioritising certain recommendations of the Roadmap for Hearing Health, which has resulted in securing Government funding for those initiatives, and at the most recent meeting, we worked together towards condensing the 140+ Roadmap recommendations into a 1-page table that Government could use as a blue-print of priorities.

The Department of Health has recognised the value of working with the HHSA, and in the 2020 Regulation Impact Study, *'Ensuring a Sustainable Hearing Services Program'*, pg 30, said *"It is important to note that the Hearing Services Program has an extensive interaction with many of the key bodies in the hearing sector. The Hearing Health Sector Alliance (HHSA) is the main peak body for the sector. Regular engagement occurs between the Hearing Health Sector Alliance and the Department of Health. There has also been extensive engagement with the Hearing Health Sector Alliance on work to progress key priorities from the Hearing Health Roadmap which are being funded by Government as part of the renewal of hearing services."* It is beneficial that the Industry Constituency includes small business and big business providers, as well as manufacturers and that we work cooperatively. I'm very happy that HBA was re-appointed as an Executive member for the next twelve months. The eight members of the Executive attend additional meetings to facilitate the running of the HHSA.

Kate Carnell, the inaugural Small Business Ombudsman, has written *"Small Business is the Engine Room of the Economy & the Heart of Our Community."* I think this is particularly true, as small businesses, especially those in rural areas, often deliver additional clinical services not offered by their larger counterparts. These include important services like paediatric & neonatal diagnostics, vestibular assessments, electrophysiological assessments, tinnitus counselling, wax management, and services within local hospitals, local Aboriginal and Torres Strait Islander organisations and local Residential Aged Care Facilities. It is important small business has a voice and I look forward to continuing to provide that voice for HBA members.

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Better Hearing now more effortless than ever with Evolv AI

Starkey
Hear better. Live better.

Starkey are leading the industry by reinventing the hearing aid with the launch of Evolv AI earlier this year in Australia. These devices provide an unprecedented level of sound quality which they combine with artificial intelligence (AI) to provide further health benefits. The new Evolv AI range is the most advanced line of hearing technology that has ever been launched by the company and there have been some further updates made recently including enhanced 2-Way Audio allowing patients to hear and connect effortlessly with hands-free conversations on selected devices.

There are new product styles, so they now have a complete hearing aid family to suit most hearing needs and types of losses. These range from being custom crafted that are worn in the ear canal (with one option being so small it is virtually invisible), to more powerful products suitable for those with more severe hearing losses.

Using ground-breaking technology Starkey creates an "effortless" experience for the hearing aid wearer, as speech audibility and intelligibility increases, which reduces listening effort and associated fatigue. Hearing loss is more prevalent than some other serious health conditions and can have physical, social and mental health consequences if left untreated. People can be at a greater risk of a fall; they may retreat socially if daily conversations become too difficult and that disconnection can lead to loneliness and isolation.

Starkey's hearing aids, which use direct to smartphone wireless connectivity, have features that assist in all these areas. Their Edge Mode feature, where simply tapping the device can change sound quality settings; Fall Detection & Alerts, where loved ones can be notified if the embedded sensors detect a fall; and the convenience of connectivity are all options.

The Evolv AI range's impressive list of features includes the new 2-Way Audio, allowing for hands-free phone chats using selected devices. They've got rechargeable options; can stream music; set reminders; and translate almost 30 languages in real time. The hearing aids can also track physical activity and social engagement, creating a daily wellness score which encourages better physical and cognitive health.

The Evolv AI range is giving people with hearing loss an 'effortless' hearing experience, which makes life a lot better overall for their wearers.

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Commonly asked questions about cochlear implants

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Cochlear implants are a well-established and proven treatment option for people suffering moderately severe-to-profound sensorineural hearing loss who receive little or no benefit from hearing aids. Despite being a cost-effective method of treatment for these types of hearing loss, **less than 10% of eligible adults who could benefit from a cochlear implant get one.**[1,2]

1 Is a cochlear implant suitable for my client?

There is robust published research on a screening tool for cochlear implantation, leading to the development of the 60/60 cochlear implant referral guidelines.*[3,4] **More than 90% of candidates who qualified for a cochlear implant met the 60/60 referral guidelines.**[3] If your client has a 3 Frequency Average Hearing Loss (3FAHL) of ≥ 60 dB HL, or an aided phoneme score of ≤ 60%, you can feel confident in referring them for a cochlear implant assessment.

2 How much will a cochlear implant cost?

There is often a misconception regarding the cost of a cochlear implant. Fortunately, in Australia, **there is excellent public and private funding for cochlear implants.** Device and surgical costs may be covered by funding provided by the state government or Department of Veterans' Affairs (DVA), or through your client's private health insurance – should they have an appropriate level of cover.^

3 What if my client is too old for surgery?

Age alone is not a limiting factor when considering a cochlear implant.[5] The oldest cochlear implant recipient was 103 years old when they were implanted. There is published evidence showing improved speech discrimination outcomes and quality of life for older cochlear implant recipients.[5] You can be assured that the medical suitability of your client for surgery is assessed and confirmed by the surgeon.

So, why wait? Your referral could be life-changing.

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*This provides a recommendation only of when an adult may be referred for a cochlear implant evaluation but does not guarantee candidacy based on indications.
^ Cochlear takes care to ensure the accuracy, currency, authenticity and reliability of the information within this document. However, Cochlear accepts no responsibility for any errors or omissions, nor for any changes or amendments affecting the information which occur after the time of publication. Coverage of surgical and hospital costs will depend on the patient's insurance level. Contact the health insurance provider or the relevant government agency to determine eligibility and coverage.

1. Gaylor BA et al. Cochlear implantation in adults. JAMA Otolaryngol Head Neck Surg. 2013;139(3):265-72.
2. Sorkin, DL., Buchman, CA. Cochlear implant access in six developed countries. Otology and Neurotology. 2015:37;e161-e164
3. Zwolan TA, Schvartz-Leyzac KC, Pleasant T. Development of a 60/60 Guideline for Referring Adults for a Traditional Cochlear Implant Candidacy Evaluation. Otol Neurotol. 2020 Aug;41(7):895-900.
4. Leigh JR, Moran M, Hollow R, Dowell RC. Evidence-based criteria for recommending cochlear implants for postlingually deafened adults. Int J Audiol. 2016;55 Suppl 2:S3-8
5. Adult Hearing. Best practice clinical pathway for diagnosis [Internet]. [cited 21 July 2022]. Available from: https://adulthearing.com/diagnosis/

Teleaudiology Guidelines:

"so what?" and "how do I use them?"

By HHSA Teleaudiology working group

Funded by the Australian Department of Health, Audiology Australia has developed guidelines for hearing health care practitioners and hearing services providers to support the safe and effective delivery of hearing services through teleaudiology. The guidelines provide practice operations and clinical guidance on the use of teleaudiology practices. Accompanying the guidelines are a series of consumer resources (written and video) and a clinician resource listing organisations and websites to assist clinicians with skill development and implementation planning:

https://teleaudiologyguidelines.org.au/teleaudiology-guidelines/

Guidelines.

The process of developing these guidelines were a wonderful opportunity to reinvent professional practice guidelines to ensure that they were, in addition to being a theoretical resource and vision, a practical and useful tool. Our vision was to build an evolving and living document accessible to all professionals involved in the delivery of hearing health care and rehabilitation services, including business owners, service providers and referral partners. Our goal was to ensure that teleaudiology, as a service delivery model, maintained a focus on high quality clinical care and equitable service to patients and clients whilst also remaining practically and financially feasible.

The Guidelines, which consist of 28 pages are divided into 3 practical sections:

Section 1: General considerations. This section talks about guiding principles and the overarching considerations as well as implementation factors that are that are required to incorporate teleaudiology into a day to day part of patient and family centred audiological care.

Section 2: Practice operations guidance - his is the practice operations guidance which goes through the business and overarching practice management considerations when implementing this service delivery model into an audiological service. It also includes clear guiding principles that a practice or service should consider.

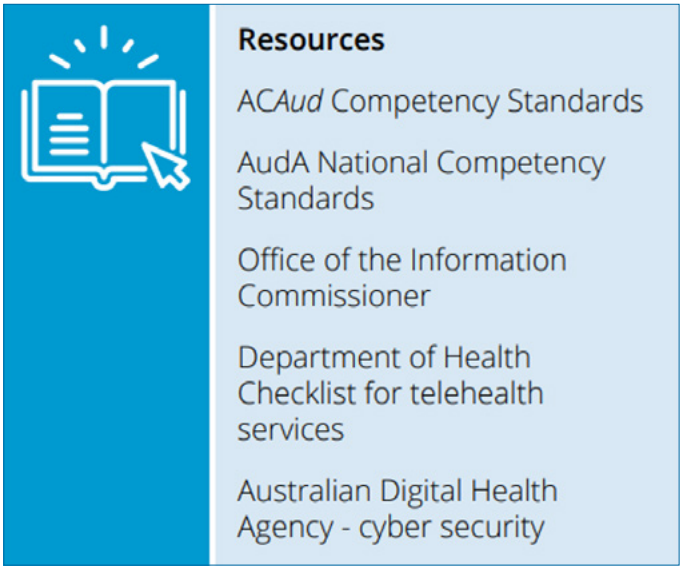
Section 3: Clinical Guidance - The part of the guidelines that will be of most interest to audiologist and audiometrists in practice however is Section 3.

This section assists hearing care professionals with ideas around "how" to provide teleaudiology services in a day to day clinical context, and with identifying what they need to know or investigate or learn or invest in to ensure they can provide a high-quality service to clients AND great outcomes. The 5 pages of this section break down the audiological journey into clinical activities such as hearing assessment, hearing aid fitting and adjustments, tinnitus, neonatal screening. Clicking on any of the headings in the index at the front of the guidelines takes you directly to the relevant section.

Additionally, clicking on any of the "Resources site names" (example below) which are located in the icons through the guidelines that have a picture of a book in a blue box, you will be taken directly to that website to investigate further.

This means that you can jump to those sections that are most relevant for you and your situation in your clinic. If you are not sure what any of the terms is referring to or are unsure about the terminology, there is also a glossary of terms at the end of the document.

These guidelines will be reviewed and updated regularly and feedback and improvements to these guidelines for future editions are always very much welcome. As you start your teleaudiology journey, we wish you all the best. Read on to discover what each of the resources sections entails.



Clinician resource.

This section includes a series of ideas for implementation based around aspects of audiological care, as well as links to further resources. It was decided after a great deal of audiology profession consultation to ensure the practical element was embedded within the guide along with an accompanying clinician resources guide that will be reviewed and updated regularly (AudA-Teleaudiology-Suggested-Resources-2022.pdf (teleaudiologyguidelines.org.au)). These include resources and links for support staff and consumers to demystify Telehealth and assist them in knowing what questions to ask and what to look out for in a service to be confident if this "new" way of working is for them. For those that are already on the teleaudiology journey. This resource will hopefully give ideas and resources for expanding and refining your service. We took this approach so that audiology professionals can design and build a teleaudiology program that suit their individual context, budget and clinical needs. This structure and resources ensured that it wouldn't balloon out to a very large library or a "how to" guide for only very specific scenarios. This also means that many of the more crucial resources in the final version are now embedded links and incorporate ideas and suggestions as to how you might utilise these. It was critical to the development of the guidelines that they be seen as an adjunct for the delivery of services by clinicians and not as a replacement of services by clinicians. The belief that the quality of service delivered by use of the guidelines would be as good as those delivered conventionally was tantamount to the development of the guidelines.

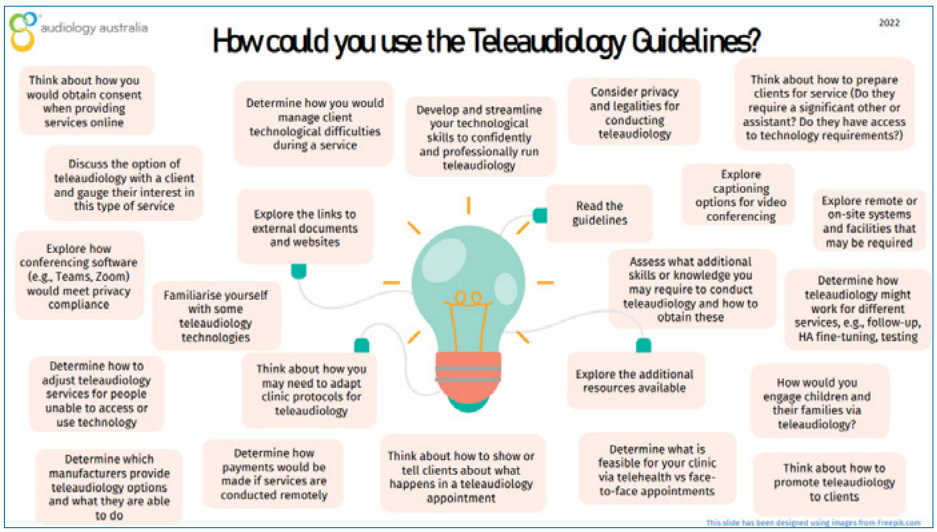
Client resources.

During stakeholder consultation it became apparent that audiology professionals required consumer resources to help them raise awareness about teleaudiology services, educate their clients on the basics of how teleaudiology works and how it can benefit them, and almost destigmatise or demystify the whole concept of teleaudiology. To achieve these goals, we developed a consumer resource document which is designed to be available and accessible to all levels of consumers and distributed by audiology professionals or hearing health care services.

We also developed a series of four educational animated videos depicting and describing how teleaudiology can occur, who might benefit from it and for which clinical needs. These videos were launched with the guidelines in mid-2022. Audiology Australia initially disseminated these videos through social and mainstream media channels, and sent the videos to all of their members so that clinics across Australia could use the videos to promote their own businesses and service options. For a copy of the videos please contact Audiology Australia.

How do I get started?

To incorporate Teleaudiology service delivery modes into an established clinical practice, some discovery and preparation is required. It is essential to investigate and plan for what your clients want and what you have to do to prepare in order to incorporate most elements of teleaudiology into your practice. We believe that it is critical to the success of the guidelines that they are shared with all people involved in the delivery of services, from the first person who makes contact with the client to the person who finally delivers the service, if all delivery stakeholders are aware of the resources then the highest quality of service can be assured. The teleaudiology guidelines provide a high-level vision as well as ideas and suggestions of things you can incorporate and even give you some inspiration to do this. Your investigation will almost certainly lead to further questions you have which can then direct you to the clinical resources in the guidelines. Examples of an investigation and questions to be asked could be encompassed as a start in image 1:



Once you have some of these ideas generated from the examples in the guidelines, some further resources and links can be found in the guidelines and clinical resource document to help you get started. Examples such as the Ida institute recipe for online success resources Recipe for online success (idainstitute.com) and the online assistance starter pack Online appointment_V3 (idainstitute.com)

Thanks again to the teleaudiology working group, Audiology Australia staff and you, our members, for all of the input and guidance as we crafted these guidelines and resources. We look forward to hearing your experiences when implementing these guidelines, both the wins and the challenges, so that we can continually improve on the documents and facilitate improved outcomes for people with ear and hearing disorders across the country.

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SONIC
Everyday Sounds Better

Streamed music for the hearing impaired - an exploration of the challenges

By Ian O'Brien PhD MAudSA(CCP),
Research Audiologist, Audeara
Principal Horn, Queensland Symphony Orchestra

Music and its place in life

Music is an important part of many people's lives, whether they are musically inclined or not. For some it is an expression of their identity, or part of their communication. For others it is a lifestyle enhancement, a way to connect to or remember loved ones, or it may simply be used as a mood booster or to reminisce. Music is also critical to positive ageing, especially regarding self-esteem and social connection[1].

The impact of hearing loss on music enjoyment is well-documented, with some studies finding that around half of those with hearing loss report effects on their enjoyment of music[2], and this becomes more of an issue as people age[3].

An important part of our role as hearing and communication specialists is to ensure our clients enjoy continued positive engagement with music. This article will look at current design challenges of reproducing *recorded* (not live) music and media on personal listening devices, approaches to the personalisation of these signals for the hearing impaired and will compare the performance of the three main device types.

Music 'quality'

There are many challenges associated with music reproduction generally. When it comes to our favourite music, we know what we like and tend to be fussy about what we hear. Our ears - impaired or not, trained or not - are well tuned to distortions or artefact in the signal, often described in terms of sound 'quality'. But what is meant by 'quality' in this context? Most of the published literature tends to focus on dynamic range and spectral balance.

Dynamic Range

Compared to live speech and music signals, recorded media typically has a smaller dynamic range, particularly with recent pop music releases. However, further reduction or alteration of this dynamic range is closely associated with a perceived loss in music quality by both trained and untrained listeners[4].

Spectral balance

There is much discussion regarding the 'ideal' spectral response in headphones and earphones. While clearly a highly subjective issue, research at Harman International has shown that age, gender and listening experience are all important factors, particularly in the bass and very high frequency areas. The Harman target response curves (based on mimicking loudspeaker response in a semi-diffusive room) are today an industry-wide starting point for many manufacturers of high-fidelity headphones and earbuds. Excessive deviation from these 'ideal curves' has been shown to negatively impact the perceived audio 'quality'[5].

Personalisation of music signals

Hearing impaired listeners share a similar intolerance to changes in dynamic range and the spectral balance of music signals to those with unimpaired ears. Applying speech-oriented algorithms with compressed or even semi-compressed dynamic range has been shown to impact the perception of music quality and is significantly less preferred to linear processing by hearing impaired listeners[5]. While non-linear processing is obviously a requirement for some hearing losses, careful application is necessary to avoid 'squashing' the music signal. In real terms this results in a loss of clarity and instrument balance, especially considering most of today's pop music dwells almost completely in the top 15-20 dB of the 'dBFS' ('full-scale') range.

Spectrally, due to the non-linear loudness growth of impaired ears, choices must be made about presumed listening levels and the weight of amplification at various parts of the spectrum. Further to this, a typical audiogram (250-8000 Hz) covers a five-octave range starting at a (slightly sharp) 'middle c' on the piano, leading to extrapolation over three octaves

of audible bass and the octave or so above 8 kHz associated with brilliance, clarity and 'air'[6]. Although it is true that there are some listeners who have little functional hearing in the very high frequencies, there are also many with hearing loss who benefit greatly from amplification above 8 kHz. Similarly, incorrect assumptions around low frequency hearing ability can result in over- or under-amplification in this region, resulting in either 'muddy' or 'thin' signals, respectively.

Hearing device choices

Common personal devices for recorded music and media are headphones, earbuds and - increasingly - hearing aids with streaming capabilities. The functional delineation between hearing aids and wireless earbuds has blurred, with each making strong incursions into the domain of the other, whether it be hearing speech in noisy situations, tinnitus management, music streaming or phone use. Headphones are also extending their capabilities, with the latest noise cancelling models featuring 'pass-through' as standard.

Earbuds

Today's earbuds can have excellent sound reproduction, noise cancellation, phone functionality and even 'personalised' pass-through similar to a hearing aid[7]. While convenient, perhaps their main drawback is comfort and form factor. The requirement for insertion and occlusion of the ear canal for effective bass response means that users with small or unusually shaped ear canals or who dislike something in their ear canal for long periods can struggle to find a usable solution.

Headphones

Many users prefer to have their audio delivered by over- or on-the-ear headphones, whether for convenience, comfort or both. A well-designed headphone sits comfortably on the ears with little clamping force, making them suitable for longer listening periods. Advances in active noise cancelling can provide high isolation with very little occlusion and the large 'dynamic' drivers in these devices ensures plenty of bass power and clarity, even in 'open-backed' models.

Hearing Aids

Most of today's hearing aid manufacturers offer devices with music and media streaming. While very convenient for those with hearing loss, constraints and limitations with the fundamental design of hearing aids can cause challenges when listening to these signals. This includes poor bass response with open-fit and vented devices and pronounced non-linear dynamic range processing. Additionally, the necessary focus of hearing aids on live speech signals can leave both the bass and very high frequency content neglected. While various manufacturers have sought to address these issues either through mechanical innovation[8] or through algorithm design[9], definitive solutions seem elusive to date.

Current hearing aids are also limited due to the single balanced armature driver used in most common receivers. Although capable of full spectral reproduction, single drivers can struggle to faithfully reproduce the full audible spectrum simultaneously. It is for this reason most in-ear monitor manufacturers use multiple drivers, often claiming that "unmuddied" bass and clear high frequency responses require dedicated drivers tuned to different parts of the spectrum[10].

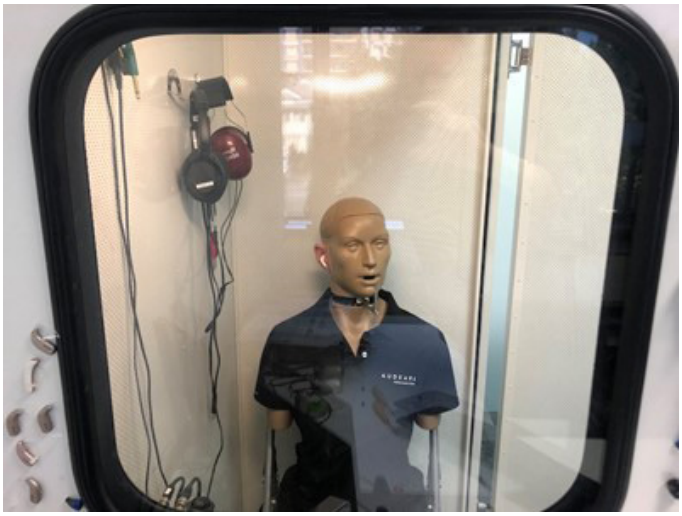

Figure 1. Audeara employee, 'Kevin'

Device comparison

By way of illustrating these points, Figures 2 and 3 compare the spectral and dynamic range responses to Bluetooth streamed test signals of a popular recent model headphone, earbud, and hearing aid from three high-profile brands. These tests were performed on a KEMAR head and torso simulator fitted with GRAS anthropomorphic pinnae, coupled to an Acoustic Precision acoustic analyser.

Figure 2 shows the spectral response of the three devices. The headphones adhered mostly to the Harman response curves below 6 kHz with pronounced sub-bass (under 60 Hz) but boosted very high frequencies closely followed a typical 'free-field'

response[13] resulting in a clear, spacious sound when compared to the other devices. The earbud showed a less pronounced bass and a sharp fall above 8 kHz, lacking power and fullness. The hearing aid fell steeply above 6 kHz, impacting clarity and brilliance, while a bias between 60-250 Hz combined with a dip between 500-1500 Hz imparted a muddiness and lack of presence.

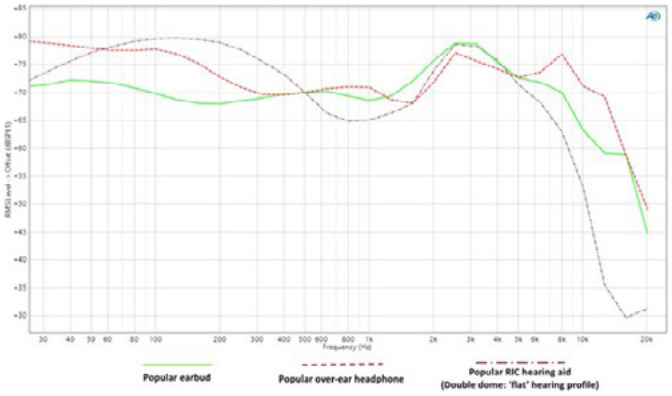

Figure 2. Spectral responses of various devices to swept sine test signal streamed through Bluetooth (normalised at 500 Hz)

From an input/output perspective (Figure 3), while the headphone and earbud were linear (input = output) the hearing aid applied heavy input compression at around -10 dBFS (regardless of user-selected listening level). This results in a loss of separation and balance between instruments in a very important part of the dynamic range for recorded music.

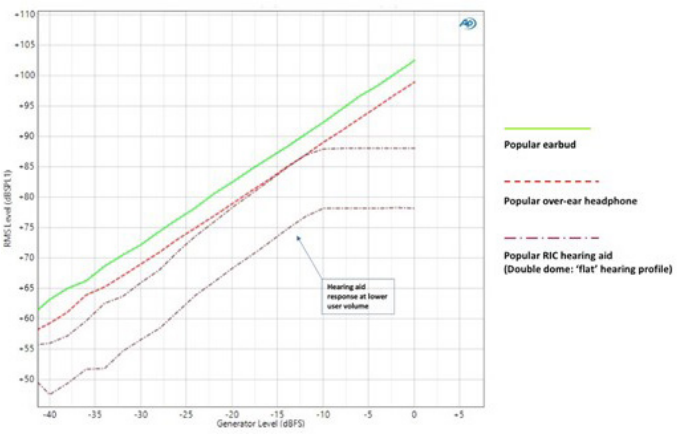

Figure 3. Input/output responses of various devices to stepped sine test signal streamed through Bluetooth

There are many hearing aids, earbuds and headphones on the market and wide range of approaches to spectral and dynamic range processing. The above results represent a very limited sample and are for illustrative purposes only.

Conclusion

While great advances have been made in delivering music and media through hearing aids, there are still challenges to be overcome in order to provide a true high-fidelity experience to all users. Earbuds are developing quickly but still face physical and mechanical design limitations. For now, headphones still consistently provide a high quality and comfortable personal listening experience. Hearing impaired listeners are benefitting greatly from a deeper understanding of algorithm design for music enhancement combined with new technology available to tailor headphones to hearing profiles.

At Audeara our Bluetooth headphones can be fitted to the user's audiometric profile through our AudAssist Desktop software (only available to clinicians) or through our consumer mobile app. We are continually undertaking R & D to improve our innovative personalisation algorithms and fitting parameters to ensure all listeners receive the highest quality sound for their streamed music and media, regardless of their hearing profile.

This is an increasingly competitive space - which is great news for the consumer - and clinicians should keep a keen eye on this fast-moving market on their client's behalf.

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Phonak Audéo Lumity introduces two new directional beamforming algorithms to deliver improved speech understanding and reduced listening effort in challenging communication situations.

By Shin-Shin Hobi

Shin-Shin has been working at Phonak HQ as an Senior Audiology Manager since 2006. In her current role she ensures end user and hearing care professional needs are taken in to account during product development. She has a keen interest in product training and tinnitus. Originally from Australia, Shin-Shin earned her Audiology qualifications from University of Melbourne. She gained wide clinical experience in private practice, in Perth, before making the move to Switzerland.

The latest product launch from Phonak, Audéo Lumity, brings the industry focus back to the core of audiology with two new directional beamforming algorithms: StereoZoom 2.0 and SpeechSensor. Technical measures and a clinical study show both improve the Signal-to-Noise ratio while resulting in improved speech understanding and reduced listening effort in noise.

Why is Phonak, a leader in hearing aid innovation, returning to a technology that has been around for decades?

Communication in noise is one of the most challenging listening situations for people with hearing loss and one of the most important factors for hearing aid satisfaction (Abrams & Kihm, 2015). Hearing aid wearers need a better signal-to-noise ratio (SNR) compared to their normal hearing peers for the same level of performance (Killion, 1997). Phonak has been delivering well-known beamforming technologies for many years and the benefit can be shown in several studies (for a full review of the evidence see Woodward, Kühnel & Latzel, 2022).

However, directionality has the potential to interfere with the users' ability to maintain awareness of their listening environment (Jespersen et al., 2021). Automatically steered by AutoSense OS 5.0, StereoZoom 2.0 and SpeechSensor, aim to resolve the outstanding challenges of (1) maintaining more spatial awareness or speech focus depending on the listening environment; (2) the ability to listen to speech coming from a direction other than the front.

StereoZoom 2.0, an improved algorithm from the original introduced in 2012, is a binaural beamformer with an adaptive null that utilizes the four microphone array of a binaural fitting to create a narrower beam compared to a monaural beamformer. In Lumity, with StereoZoom 2.0, we introduce a new algorithm that is smoother, smarter and stronger for better speech understanding when speech is from the front.

1. Smooth transition from our monaural beamformer UltraZoom, to maintain environmental awareness
2. Smarter activation of a new 7 point activation range, compared to the single setting in older technology, for optimum StereoZoom 2.0 strength according to the level of environmental noise
3. Stronger activation for an even narrower beam than before. This can be set either in Phonak Target fitting software or by the client via myPhonak app.

Walden et al. (2004) reported that, 80% of the time, signals came from the front, however in 20% of listening situations clients may not be looking directly at the speaker (Hayes, 2019).

The 2nd new feature in Lumity, SpeechSensor, automatically detects the location of the dominant speaker and transitions the directional microphone mode accordingly. If the speech comes from the side, a Fixed Directional beamformer is triggered, if the speech originates from behind Real Ear Sound (RES) is activated.

Using the Hagerman and Olofsson inversion technique, technical measurements with StereoZoom 2.0 show a 3.0 dB better SNR compared to RES when speech is from the front. Clients can activate an additional 2.5dB better SNR by adjusting the strength via the myPhonak app. When SpeechSensor detects that speech is from the side, there is a smooth transition from StereoZoom 2.0 to fixed directional, resulting in 3.4dB better SNR. While Real Ear Sound, compared to StereoZoom 2.0, with speech from behind delivers 2.5dB better SNR.

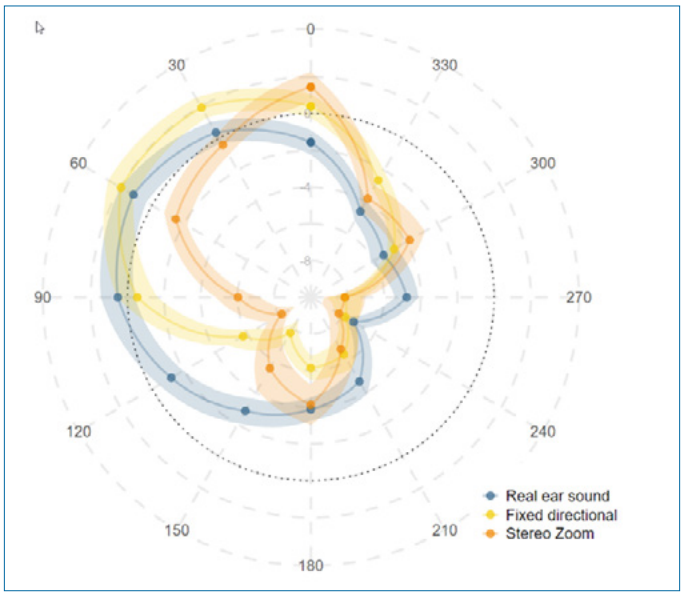

Fig. 1: Average differences between input SNR and hearing aid output SNR measured on the left ear with Real Ear Sound (blue), Fixed Directional (yellow) and StereoZoom (orange). The hearing aid is placed on a model head (KEMAR) and the talker moves around in 30° steps. Recordings are measured with input SNRs from -5 up to +10dB SNR and with 4 different background noises.

A clinical study conducted at Hörzentrum Oldenburg, Germany, investigated if the measured SNR benefits resulted in improved speech understanding and reduced listening effort for clients with mild-severe hearing loss. Study results showed a clinical benefit of 16% better speech understanding with StereoZoom (default strength), compared to a monaural beamformer (Fixed Directional), with speech in noise test when target speech was presented from the front (Fig 2).

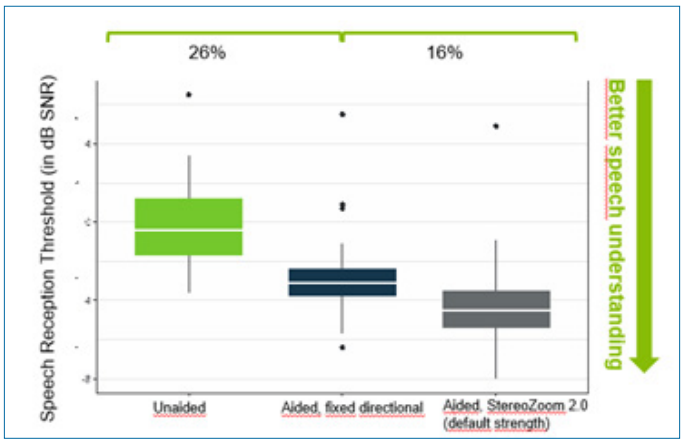

Fig. 2: Distribution of the SRTs measured in the fixed directional and StereoZoom conditions.

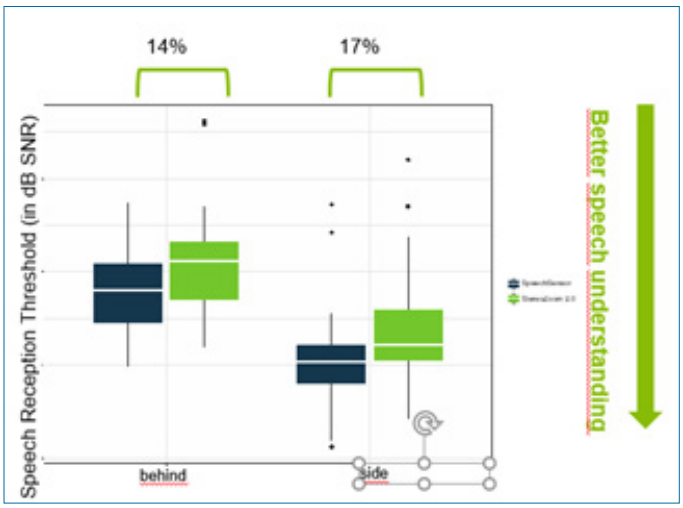

Fig 3. Speech reception thresholds distribution by talker location (x-axis) and tested beamformer.

Thanks to the detection of the direction of speech, SpeechSensor delivered improvements in both speech understanding and listening effort for clients. Compared to StereoZoom, the Fixed Directional setting showed 17% better speech understanding when speech came from the side and 14% when speech came from behind with RES. (Fig 3).

The Adaptive Categorical Listening Effort Scaling (ACALES) test showed an improvement of 11% in listening effort with SpeechSensor.

Market research has shown that speech understanding is one of the most important needs expressed by hearing aid users (Appleton 2022). Speech understanding and communication in a variety of listening environments are important for well-being, connection with loved ones and to fully engage with life. Phonak Audéo Lumity combines the new algorithms of StereoZoom 2.0 and SpeechSensor, orchestrated through AutoSense OS 5.0 for optimal speech understanding and reduced listening effort. In addition, clients can use the myPhonak app for personalized, real time adjustments to suit their unique listening needs.

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Introducing Phonak Lumity - Let conversations shine.

The new Phonak Lumity platform provides the sound quality you expect from an industry leader and focuses on illuminating speech understanding. Developed with SmartSpeech™ Technology, representing Phonak's dedication to designing features that improve speech understanding and reduce listening effort in various listening environments. Plus our heritage features including Speech Enhancer, Dynamic Noise Cancellation, Motion Sensor Hearing and the existing benefits of ActiveVent™ Receiver and RogerDirect™ Technology

Phonak Audéo™ L-R
Powered by the innovative technology of the Phonak Lumity platform, for mild to profound hearing losses and the ideal solution for clients that desire a discreet RIC housing.

Phonak Audéo™ L-RT
Packed with Lumity features and with a telecoil, for clients who want greater auditory access in public spaces equipped with loop systems.

Phonak Audéo Life™ Lumity
Our world's first waterproof[†] rechargeable hearing aid in its second generation. All Lumity features come packed in a waterproof and sweatproof housing!

Innovative speech understanding solutions: Lumity with Phonak SmartSpeech™ Technology

Phonak has developed innovative hearing solutions for over 75 years, supporting speech understanding in diverse listening environments, reduced listening effort, effective communication, and overall well-being.

Two new features continue this long tradition: StereoZoom 2.0 and SpeechSensor. These build on existing evidence-based features aiming to further improve speech understanding (Appleton, 2020; Thibodeau, 2020; Latzel, Mejia, Young & Hobi, 2022).

75 years of innovations

PHONAK life is on

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Phonak SmartSpeech™ Technology

SmartSpeech™ Technology is a collection of features, controlled by AutoSense OS 5.0. With Lumity two new features are added: StereoZoom 2.0 and SpeechSensor.

SmartSpeech™ Technology provides reduced listening effort thanks to features such as Speech enhancer and Dynamic Noise Cancellation[1], plus improved speech understanding in challenging environments thanks to StereoZoom 2.0 and SpeechSensor[2].

Key benefits

16% better speech understanding with StereoZoom 2.0*[2]

15% better speech understanding with SpeechSensor**[2]

Improved speech understanding by up to 10% with ActiveVent Receiver[3]

Exceptional speech understanding in group conversations and over a distance with Roger Technology[4]

StereoZoom 2.0: Smoother, Smarter, Stronger

StereoZoom 2.0 is a narrow binaural directional microphone mode, active in the Speech in Loud Noise program. With Lumity there is a gradual transition from Speech in Noise (UltraZoom) into Speech in Loud Noise (StereoZoom 2.0). The strength of StereoZoom 2.0 activates smoothly and smartly as the noise level increases and can now be personalised by the client via the myPhonak app.

As the level of noise surrounding the client increases, the microphone directionality gradually transitions from UltraZoom to StereoZoom 2.0. This provides a balance between providing more spatial awareness and speech focus to the front, depending on the listening environment.

Key benefits

- Seamless activation of StereoZoom 2.0 for 16% better speech understanding^[2]
- 3dB better Signal-to-Noise ratio^^
- Personalised, real-time adjustment with the myPhonak app

SpeechSensor: Accurate detection of the direction of speech

SpeechSensor is an automatic feature of Phonak SmartSpeech™ Technology, providing better access to speech from the side and rear in noisy environments. This results in an average of 15% better speech understanding when speech is from the side/behind.[2]

SpeechSensor automatically detects where the dominant speaker is located and sends this information to AutoSense OS 5.0 to adjust the directional microphone mode accordingly. If the speech is coming from the left/right it goes into fixed directional, if the speech is coming from behind it goes into Real Ear Sound.

Key benefits

- 17% better speech understanding when speech is from the side[2++]
- More access to sound not only provides clarity but reduces listening effort[5,6,7]
- 11% reduced listening effort[2]
- 14% better speech understanding when speech is from behind[2]

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†up to 50cm, *compared to fixed directional, **compared to StereoZoom 2.0 when speech is from side/behind, ++compared to StereoZoom 2.0 with power dome
^for speech from front compared to fixed directional, ^^based on technical measures for speech from front compared to Real Ear Sound

GN Hearing - Why clients should hear with their own ears

By Lisa McBride, Product & Audiology Manager ANZ SG MY, GN Hearing Pty Ltd

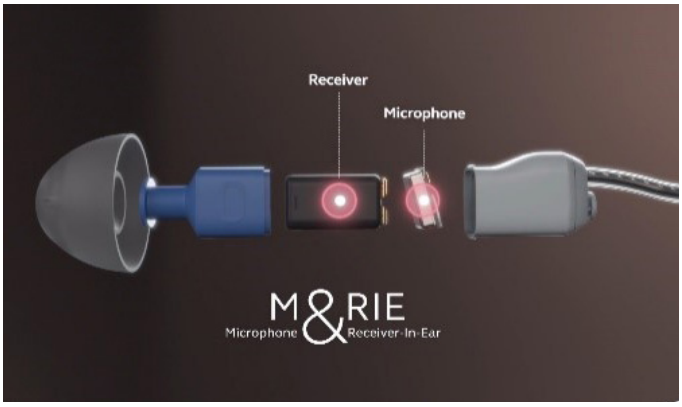
You may have read the title of this article and thought "obviously clients hear with their own ears". In reality, for the majority of hearing aid users, this isn't actually the case.

When we consider the natural auditory pathway, everything starts with the outer ear. This is where sound is collected, shaped, and personalised with our unique pinna characteristics. This provides us with individualised pinna cues for localisation and gives us the immersive experience we grow up listening to.

When we add a hearing aid to this process, this natural auditory pathway changes. Due to the popularity of Receiver in the Ear (RIE) and Behind the Ear (BTE) device models, suddenly the auditory journey now begins from the top of the ear where the microphones on the devices are positioned. This positioning results in a bypassing of most of the outer ear, sending sounds directly into the ear canal. Our brains expect to receive sound that has been shaped by our outer ear and it could be adding to the need for acclimatization to a new way of hearing the world with hearing aids. We want clients to be able to continue benefiting from RIE and BTE devices, at the same time allowing for a more tailored fitting approach utilising their own ear characteristics.

What if we could keep the RIE design but move where the sound is collected in a more natural position?

This was this vision and need that allowed the GN Hearing Research & Development team to create what we now call the M&RIE. This stands for Microphone and Receiver in the Ear. It involves adding a third microphone to the receiver itself allowing for our unique outer ear characteristics to do what they do best before the sound is collected.



Which lifestyle goals would the M&RIE meet for clients?

Since we launched the M&RIE technology we have gathered a lot of evidence supporting the benefits of this world first technology. In the below table you will find some common client needs that M&RIE can support with and how.

The M&RIE was introduced with the ReSound One and Beltone Imagine product families but is also now compatible with our most recent product introduction Beltone Achieve.

To fully understand the benefits of the M&RIE technology for yourself we recommend experiencing it with your own ears.

Contact one of our GN Hearing Product Specialists to book a demo and learn more about the M&RIE and other premium GN Hearing technologies that can make life sound better for your clients.

My client wants to experience a natural sound that's easy to adapt to	The M&RIE allows us to retain the natural use of the outer ear, shaping and directing the sound entering the device. Evidence shows that clients find the use of a M&RIE a preferred sound quality compared to a standard receiver fitting[1].
Some of my clients struggle to tell where sounds are coming from	With the M&RIE, unique spatial cues are naturally restored. This results in a reduction in errors made when localising sounds1 and improves further over time as the user acclimatises to the technology[2].
My client avoids group conversations because it is too much effort to hear.	For this client we need to provide an easier listening experience. In a study investigating the impact of different fitting styles on listening effort it was found that the M&RIE produced a reduction in effort compared to a standard fitting[3]. During speech in noise testing the researchers also found an improvement in speech intelligibility in background noise.
My client spends a lot of time outdoors.	The placement of the microphone on the M&RIE leads to a natural wind noise reduction, without the reliance of wind reduction algorithims. This fitting style can reduce the level of wind noise by approximatley 9dB[4]. Along with an improvement in comfort, an improvement in sound quality rating of approximately 33% was found when a M&RIE was added to the fitting[4].
Mishearing phone calls is impacting on my clients work	Phone calls can be a challenge for hearing aid users as they are required to learn a new method of holding the phone. The position of the M&RIE receiver allows the client to hold the phone exactly how they're used to. During testing 95% of participants could clearly hear a phone call with little-to-no effort when using the M&RIE and would recommend this solution to others[5].

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Unitron - Assessing the direction of speech

By Donald Hayes, Ph.D. Director of Clinical Research Unitron Hearing

As Director of Clinical Research, Dr. Donald Hayes is responsible for leading the company's audiology research efforts, as well as new product concept testing and validation.

Don joined Unitron Hearing in 2002 as Manager, Audiology Research. Prior to joining Unitron, Don held the positions of Assistant Professor at the University of Cincinnati and Lecturer in the Department of Speech Pathology at the University of Toronto. Don has also worked as an Audiologist Consultant for Sunnybrook Health Science Centre in Toronto and the Canadian Ministry of Health as part of the Sioux Lookout Project.

Don works with a network of audiology experts around the world to develop new hearing solutions that incorporate innovative technologies and improve the lives of people with hearing loss. Don holds a Ph.D. in Audiology from the University of Cincinnati and has published articles in several peer-reviewed and trade journals over the years.

Introduction

Directional hearing aid microphone designs historically presumed that speech was always from the front. However, it has been known for some time that this is not entirely correct (Walden et al., 2004). Their data showed that out of 1,586 reported observations 318 (20%) recorded speech as "not from front". Noise was present during 1,006 observations. For 239 (24%) of those, speech was "not from front". When speech is not from front as much as 20% - 24% of listening time, it represents a substantial amount of time where traditional front-facing microphones are not optimal - even somewhat problematic (Wu, 2014).

Method

Log It All data was anonymously obtained from 6998 fittings From December 1, 2021 – February 14, 2022 from 37 countries. It included information on the amount of time spent in each of seven different listening environments and the direction of speech in the three speech in noise environments. Additional details about the fittings can be found in, "Log It All and the direction of speech" (Hayes, 2022).

Results

Figure 1 shows that on average, hearing instrument wearers tend to spend the largest percentage of their time in either quiet listening situations or small group situations. Another common outcome in large group Log It All data sets is a wide range of individual variation. Average Log It All data for large groups of hearing aid wearers follows a consistent pattern, but there are always huge variations among individuals. This is why Log It All is so important. When we compare an individual fitting to the average, they can be quite different. Looking at individual data can lead to a better alignment of appropriate technology level with real world listening.

Figure 1

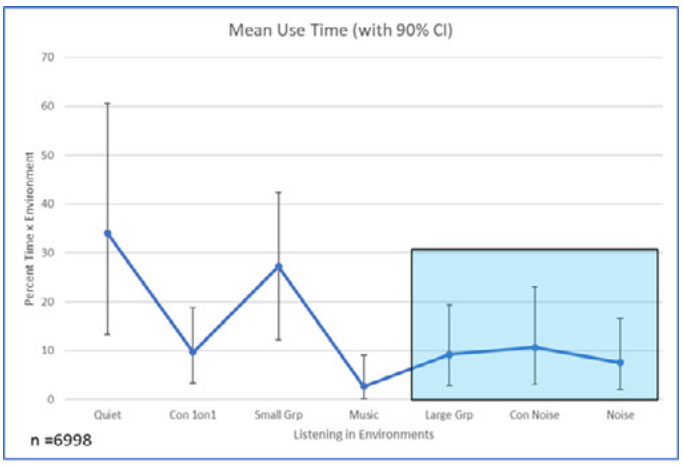

Figure 1. The thick blue line connects the values representing the average use time percentage in each of the seven Log It All listening environments. These include, from left to right, *quiet listening, 1 on 1 conversation, conversation in small groups, music, conversation in large groups, conversation in noise and noise only.* The error bars for each listening environment show the range from the lowest fifth percentile of fittings to the highest 95th percentile. The blue shaded area indicates the three listening environments where Log It All records the direction of speech.

The most complex listening environments are in the blue shaded area of Figure 1. The average time spent in either speech in a large group or speech in noise is roughly 10% each. Noise only is slightly lower, at around 6%. But the bottom end of the error bars can be as low as 3% or 4% each, and the higher end as much as 19% to 23% each. In the most difficult situations, speech in noise and speech in a large group, we get a combined possible range from 7% of the time to 42% of the time.

Continued - Assessing the direction of speech

In Figure 2, we are most interested in the median percentage of time where speech is from each of the recorded directions. The median for speech from the front is 30% of the time. The combined medians for speech from the left and right is 21% of the time. Speech is from the back 4% of the time. The median recorded for no target was 33% of the time. The "No Target" condition is highly correlated with time spent in the Noise Only listening environment (Person's correlation coefficient, r = 0.676). In other words, the median time for speech recorded from the front is 30% whereas speech is from the sides or back is 25% of the time.

Figure 2

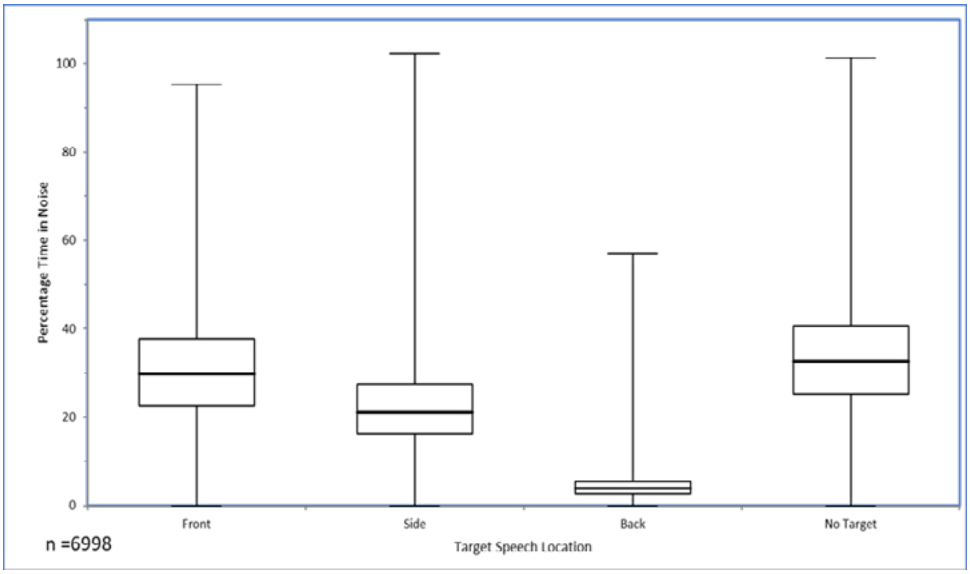

Figure 2. Shows the median and interquartile ranges for speech from the front, the sides or the back in percentage of time. Also shown are the interquartile ranges from the percentage of time where no target was observed by Log It All across the sample. The top of each error bar is the 99th percentile of time, the top of each box the 75th percentile, the line in the middle of each box is the median or 50th percentile of time, the bottom of the box the 25th percentile and the bottom error bar the 1st percentile.

Summary

Do people always look in the direction of speech? No they do not. Listeners are not facing the direction of speech almost as often (25% of the time) as they are, (30% of the time). Consequently, it makes sense to offer those people hearing instruments which accommodate their non-frontal listening behavior.

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Competition – CEP Magazine Quiz

Below are 10 quiz questions to answer. Each ACCORD edition you can enter this competition to not only get the chance to win a prize, but also gain you CEP points. Correctly answering all 10 questions puts you in the draw for this Edition's Prize. All entries with at least 75% of questions answered correctly will gain 1 CEP to go toward the mandatory CEP cycle.

October ACCORD CEP Magazine Quiz prize:

Set of AUDEARA headphones.

Email your entry, with 'Oct 22 CEP Quiz Questions' in the subject line, with the following details to: editoraccord@acaud.org by Monday 28 November 2022

Name:

Email:

Phone:

State:

The winner will be notified by Monday 5 December 2022 and announced in the December 2022 issue of ACCORD.

October 2022 CEP Quiz Questions

1. What are the 4 constituencies of the Hearing Health Sector Alliance (HHSA)?
2. What client/consumer resources were developed to raise awareness of Teleaudiology services?
3. _____ gyrus, is found on the upper surface of the temporal lobe that contains the primary auditory cortex.
4. When will the SAT be released and how long do providers have to complete the online questionnaire?
5. Why does the Signia Assistant utilise Artificial Intelligence (AI) technology?
6. What are the Harman target response curves based on?
7. Do people always look in the direction of speech?
8. 11% improvement in listening effort with SpeechSensor was detected with which test?
9. The M&RIE naturally restores unique spatial cues. How does this help with localisation for the client?
10. Which hearing aid has a new 2-Way Audio feature?

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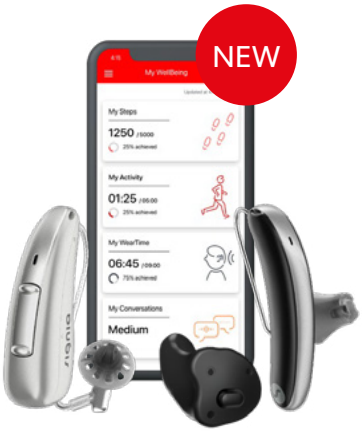


The latest Signia firmware upgrade unlocks new convenience and health features. Enabled via Connexx, Tap Control allows Handsfree calls to be answered with just a touch or press of a button for added convenience. Additionally, the My WellBeing feature provides a new way for patients to track their physical and hearing activity – helping them get the most out of their devices, and themselves.

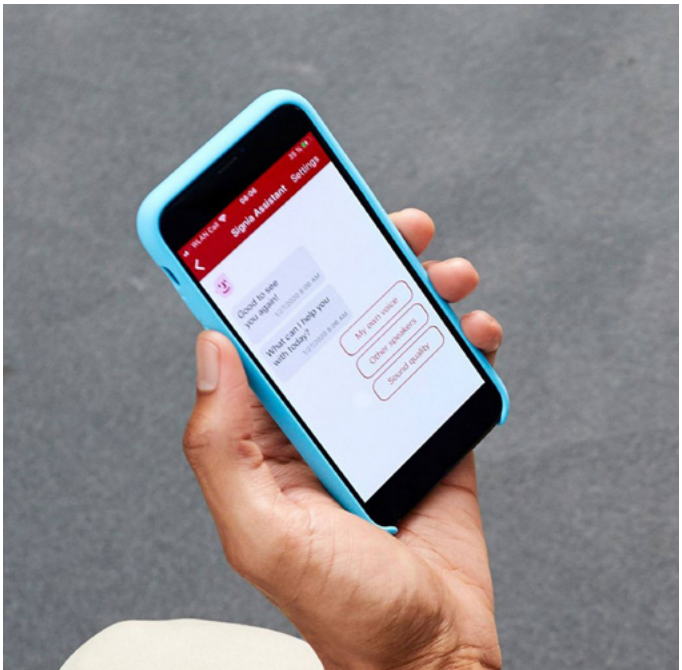
Upgrade your patients today

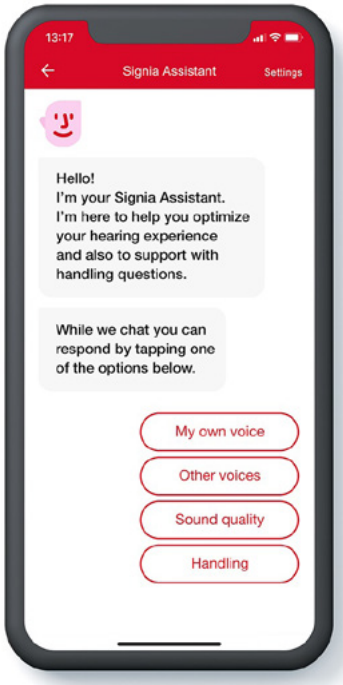
The new way: Ensuring consistent support and individualised care through the Signia Assistant

Hearing aids have gone through tremendous development in the last 20 years. With more and more precise speech enhancement and advanced sound processing, they are now able to provide speech understanding and excellent sound quality in almost every situation.

During this time, hearing aids have advanced from the use of a screwdriver to make one or two basic adjustments to having countless fine-tuning options available in computer-driven fitting software.

Despite the advancements in how hearing aids are adjusted, methods used to fit hearing aids have not changed. For example, we continue to rely on wearer feedback, which is highly variable and subjective, as a basis for nearly all fine-tuning decisions. While good provider-wearer dialogue is always crucial, we often ignore the fact that many wearers cannot always find the language to describe sound or accurately recall situations where they had problems hearing. During follow-up appointments this means the hearing care professional (HCP) must make educated guesses about what might fix the problem - in the perfectly quiet clinic - before sending the wearer home for another trial round in real-world listening situations. In some cases, the result may be a long trial-and-error process in which the wearer needs to go back to the clinic multiple times before an acceptable adjustment to the hearing aids is found - and sometimes an acceptable adjustment may never be found.





While these shortcomings are well-known, until recently, there have been few alternatives. Fortunately, new technologies bring new possibilities that remove much of the uncertainty related to hearing aid fine-tuning and adjustments. The Signia Assistant utilises new Artificial Intelligence (AI) technology to improve the outcome of individual hearing aid fittings.

Signia Assistant is both the tool for the modern audiologist, and the tool for the modern wearer.

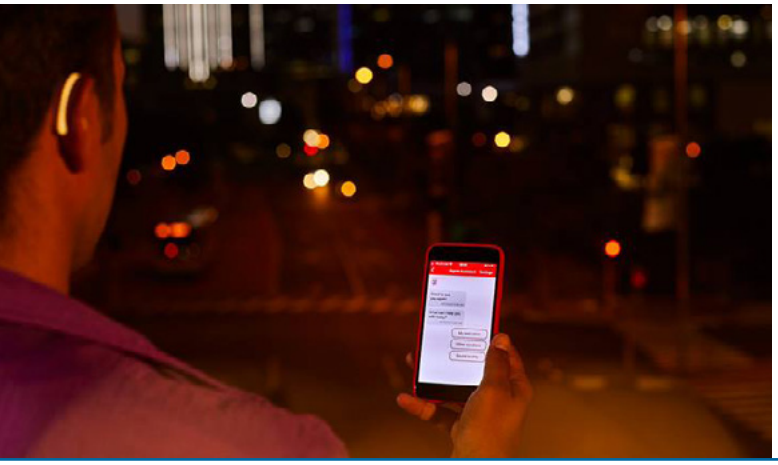
If a wearer is in a situation where they can't hear their conversation partner, a restaurant for example, they can simply click on the Signia Assistant in the Signia app. The Assistant will then analyse the environment they're in, and suggest a new setting, made to improve that specific situation.

With the Assistant, the wearer can instantly participate in the conversation again, there, and then, not two weeks later at the follow-up appointment.

As the wearer agrees to keep the new setting the Assistant will remember that individual's preference, always optimising the settings to perfectly tailor the sound to that unique wearer.

Continued - The new way: Ensuring consistent support and individualised care through the Signia Assistant

When the wearer does return however, the HCP will see an overview of all the changes done by the Assistant; with this whole new level of insight, the HCP can achieve more precise fittings than ever before. It supports both the wearer and the HCP in finding that perfect sweet spot for every individual person.



While focusing on keeping the usability as easy as possible, so that anyone can use it, the magic truly happens in the background.

When the Signia Assistant is activated for support by a wearer, the analysis of that given environment is compared to thousands of similar events globally and based on highly advanced machine learning algorithms, the solution with the highest success rate for that situation is suggested to the wearer.

This means that every time the Signia Assistant is being used, it gains more knowledge and improves the support for people in similar situations all over the world. In parallel, it learns the preferences of every unique wearer, to create the optimal tailored solution for each and every one.

It's fair to say that the Signia Assistant is the next level in modern optimised care.

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Does your client experience any of the following with hearing aids?

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- Having difficulty understanding unfamiliar speakers
- Withdrawing from social events
- Often needing others to repeat themselves

Is your client's audibility

≥ 60 dB[1] Pure Tone Average (0.5, 1, 2 kHz)

Is your client's speech understanding

≤ 60%[2] Aided Phoneme Score (conversation levels)

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*Provides a recommendation only of when an adult may be referred for a cochlear implant evaluation, but does not guarantee candidacy based on indications.

References: **1.** Zwolan TA et al. Otol Neurotol 2020 Aug;41(7):895-900. **2.** Leigh JR et al. Int J Audiol 2016;55 Suppl 2:S3-8.

This material is intended for health professionals. If you are a consumer, please seek advice from your health professional about treatments for hearing loss. Views expressed are those of the individual.

From hearing aids to implant to hearing aids – how device decisions changed

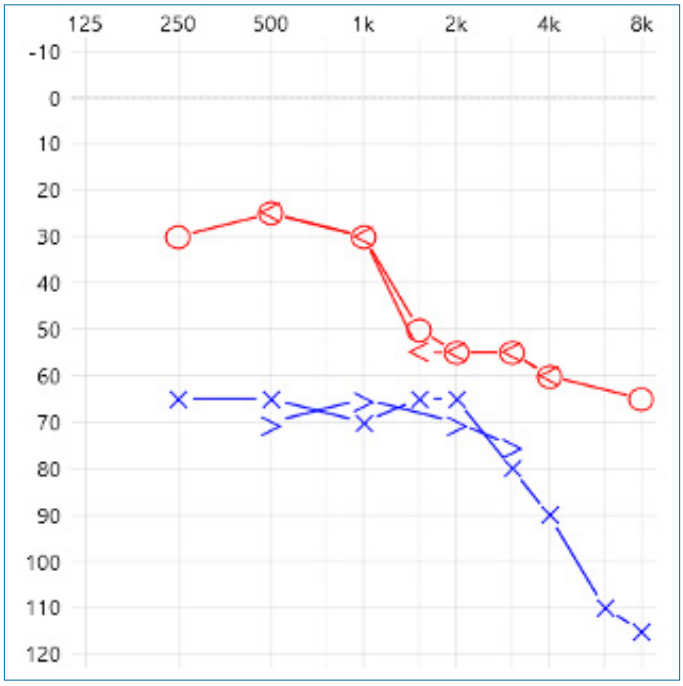
By Alexandra Summers, Associate member AC*Aud*

This client was an interesting case of changing device recommendations with changes in hearing levels.

Background:

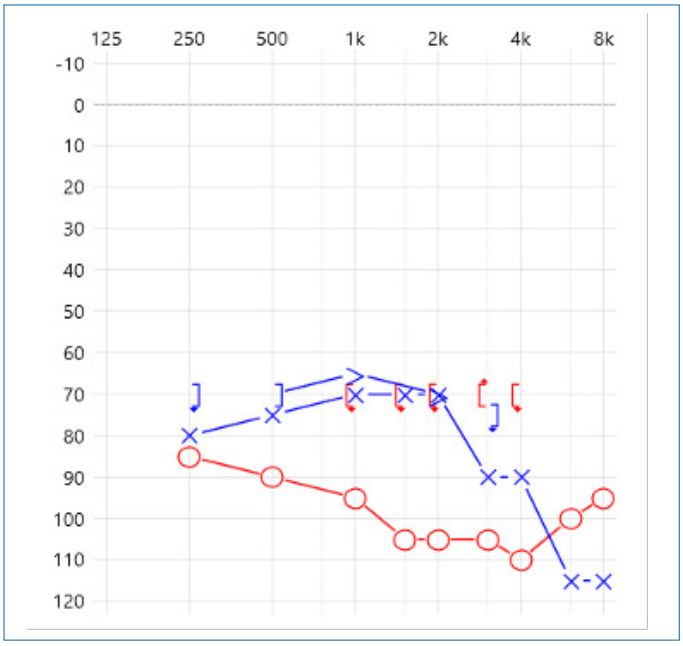
Mr H.D is a Cantonese speaker with little English. He is aged 87 years, lives with his wife (attended appointments with his son as interpreter) and presented to the ENT clinic on the 5th April 2022 following a sudden change in his hearing for the right ear. He had a history of hypertension and diabetes and had been a heavy smoker in the past. Given his lack of English and reliance on phone communication with his family, the deterioration in his hearing was distressing. An audiogram obtained from his previous provider from 2015 revealed a mild to moderate sensorineural loss in the right ear, and a moderate to profound sensorineural loss left ear. He had been fitted with binaural BTEs with thin tubes with skeleton moulds, but noted he always relied on the right ear to hear – he received little benefit from the left ear. Tympanometry was within normal limits bilaterally.

Test from 2015



On Saturday, 2nd April, at 'precisely' 8pm, Mr H.D suddenly lost the hearing in his right ear. He noted the right ear felt 'blocked'. There was no associated vertigo, and he denied any tinnitus. On examination by the ENT on the 5th April, the eardrums were normal and pneumatic otoscopy suggested normal middle ear compliance bilaterally. Pure tone assessment showed a moderately severe sensorineural loss left and a severe/profound loss for the right ear. He was distressed at the change in hearing, particularly as he could no longer communicate with his family in Sydney, or with his daughter who lived in Hong Kong and to whom he spoke daily via phone or Facetime.

Test from 5th April 2022



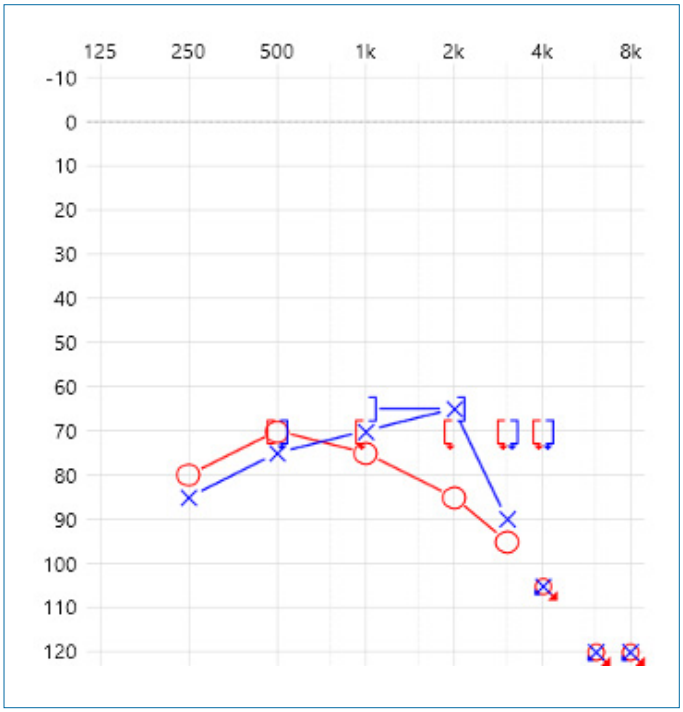
Mr H.D was prescribed prednisolone but stopped after one day as it caused a mild headache. Headache is a potential side effect of this medication, however, as steroids are the only medication likely to rescue his hearing, the ENT increased the dose and explained the potential side effects – insomnia, headache, and gastric upset - with Mr H.D and his son. He then continued the medication, however, five days of oral prednisone resulted in no improvement in hearing. This was followed by two trans tympanic steroid injections, which relieved the blocked sensation but made no noticeable difference for Mr H.D in hearing – in fact, audiometry showed a deterioration in right thresholds.

Test from 20th April 2022

An MRI was organised to investigate the asymmetry. There was no evidence of an acoustic neuroma or superior semicircular dehiscence, however, the MRI showed a number of old microbleeds, likely caused by his history of smoking, uncontrolled hypertension, and diabetes.

Subsequent to this test, and in view of the client's distress at not being able to communicate with his family living overseas, the possibility of cochlear implantation for the right ear was discussed, and he was referred to an ENT specialising in cochlear implantation. Mr H.D was very much opposed to the idea of implantation; ultimately, he did not attend the appointment with the implant ENT. On the 27th May, Mr H.D returned to the clinic, reporting a delayed improvement in hearing thresholds for the right ear. He felt he could now hear his family and follow conversations if they raised their voices, but still found it impossible to hear his daughter over the phone or Facetime. His ENT subsequently recommended a review of his hearing aid fitting.

Test from 27th May 2022



Rehabilitation program

Mr H.D had three goals that were a priority:

1. To be able to participate in 1 on 1 conversations with his wife without her having to raise her voice and with minimal repeats
2. To be able to converse with small family group in quiet most of the time (up to 70% of the time)
3. To be able to participate in Facetime calls with daughter with minimal repeats

He was eligible for service through the HSP program and opted to transfer to our clinic as this was convenient to his home and in the same rooms as his ENT. His current HSP aids were only two years old, so approval was requested to refit him with aids more appropriate for his current loss. Thin tubes were no longer appropriate, and impressions were therefore taken for carved shell earmoulds with standard tubing. Other considerations – Mr H.D used an android phone and he wanted to take advantage of streaming directly to this phone. He also had limited means and could not afford top-up devices. In discussion with Mr H.D and his son, he was prescribed Unitron Stride Blu Ultra Power BTEs.

Continued - From hearing aids to implant to hearing aids – how device decisions changed

Fitting

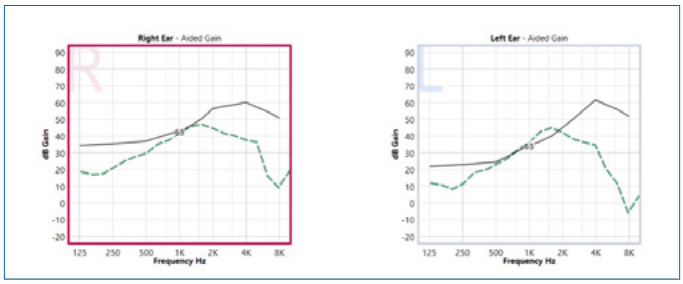
Mr H.D attended the fitting with his son. His initial response to the aids was very positive – he was surprised that he could hear from both ears after a period of not hearing much sound from the right. The sound on the right ear appeared clearer than on the left side, however, this has always been the case, so he was not surprised.

- Prescription: NAL NL2 for tonal languages
- Experienced user
- Liked look and fit
- Moulds comfortable

Programs: Universal program; speech in noise; comfort in noise. No issues with management, or insertion of the moulds/aids. Preferred thin tubes on previous aids; the benefit of thicker tubing discussed.

Verification

Results of speech mapping was reduced in the higher frequencies, however, given degree of high frequency loss (and possible dead cochlear zones) the gain could not be matched to the prescription formula in the higher frequencies. Adjustments via the Unitron software did not help with target match in higher frequencies - other mould options to be considered to increase the high frequency gain (trial a Libby horn?)



Validation

Given he had little English, the Ling 7 sound test was performed to determine whether he heard sounds covering all the speech frequencies.

The Ling 7 sounds are:

'ar' – as in car – low and mid frequency

'ee' – as in bee – low and high frequency information

'oo' – as in shoe- low and mid frequency

'or' – as in 'roar' -

'm' – as in yummmm – low frequency to mid frequency

'sh' – as in wish – mid frequency

's' – as in bus – high frequency

Of these sounds, /s/ was not detected, and /sh/ was detected but not discriminated correctly.

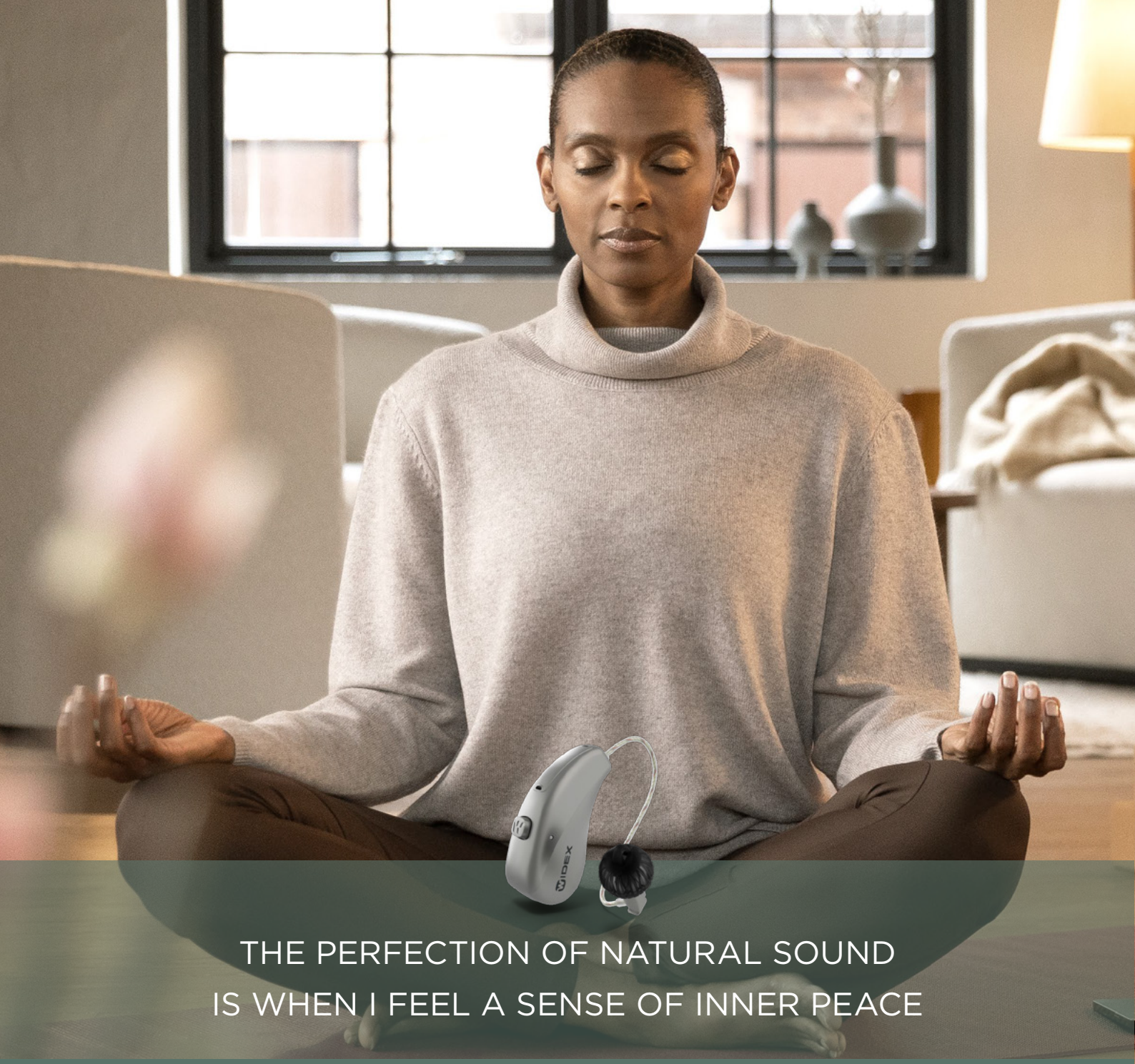
Follow up appointments

Mr H.D had difficulty managing the app on his phone as he was not technically savvy, so a remote control was ordered, which he found easier to manage. COSI goals reviewed and to date, Mr H.D has been very positive.

1. He was able to participate more effectively in 1 on 1 conversations with his wife without her having to raise her voice, at least in quiet
2. He felt he was managing conversation with his family more easily, once again in quieter situations and on the phone, and this was corroborated by his son
3. He was able to speak with his daughter in Hong Kong using Facetime, and streaming through the phone

Going forward

Mr H.D was an interesting case, where the change in his hearing levels moved focus from hearing aids to cochlear implant and then back to hearing aids. He has enjoyed the benefit provided by direct streaming technology for maintaining contact with his family in Sydney and Hong Kong, noting that without this, he is very isolated. He is managing better in small family groups in minimal noise, and is also using his speech in noise program in those noisier situations that he occasionally finds himself in. He is due to return for a further ENT and hearing aid review in coming weeks, but at this stage, appears to be achieving his COSI goals through the fitting of new hearing aids.



THE PERFECTION OF NATURAL SOUND IS WHEN I FEEL A SENSE OF INNER PEACE

WIDEX **MOMENT SHEER**™

Natural sound is as much about reconnecting with yourself as it is about reconnecting with the world around you. That's why we've introduced a great new palette of fractal sounds in Widex SoundRelax™, each designed to increase focus and relax the mind. And because SoundRelax works with PureSound™, you get the best sound quality whatever your hearing loss.

LEARN MORE

WIDEX

SOUND LIKE NO OTHER

Widex Whitepaper:

Connecting Hearing Aid Wearers To Life With The Natural Spatial Perception Of Widex Puresound™

For people with hearing loss, the first experience of a hearing aid is vital in setting the direction of their journey to better hearing. If that experience is not right, they often wonder if they should have tried wearing hearing aids at all. That is why at Widex we have developed hearing aid technology so natural it can make them feel more connected to their life than they have felt for years.

This advanced hearing aid technology is called ZeroDelay technology, found in Widex PureSound™. Widex PureSound™ eliminates the delay-based distortion that characterises the sound of other digital hearing aids so wearers can hear more naturally. Widex PureSound™ remains unique in the hearing aid industry, with the lowest delay in any digital hearing aid, as illustrated in Figure 1, which shows measurements against the most recent competitor platforms **(Balling and Helmink, 2021)**.

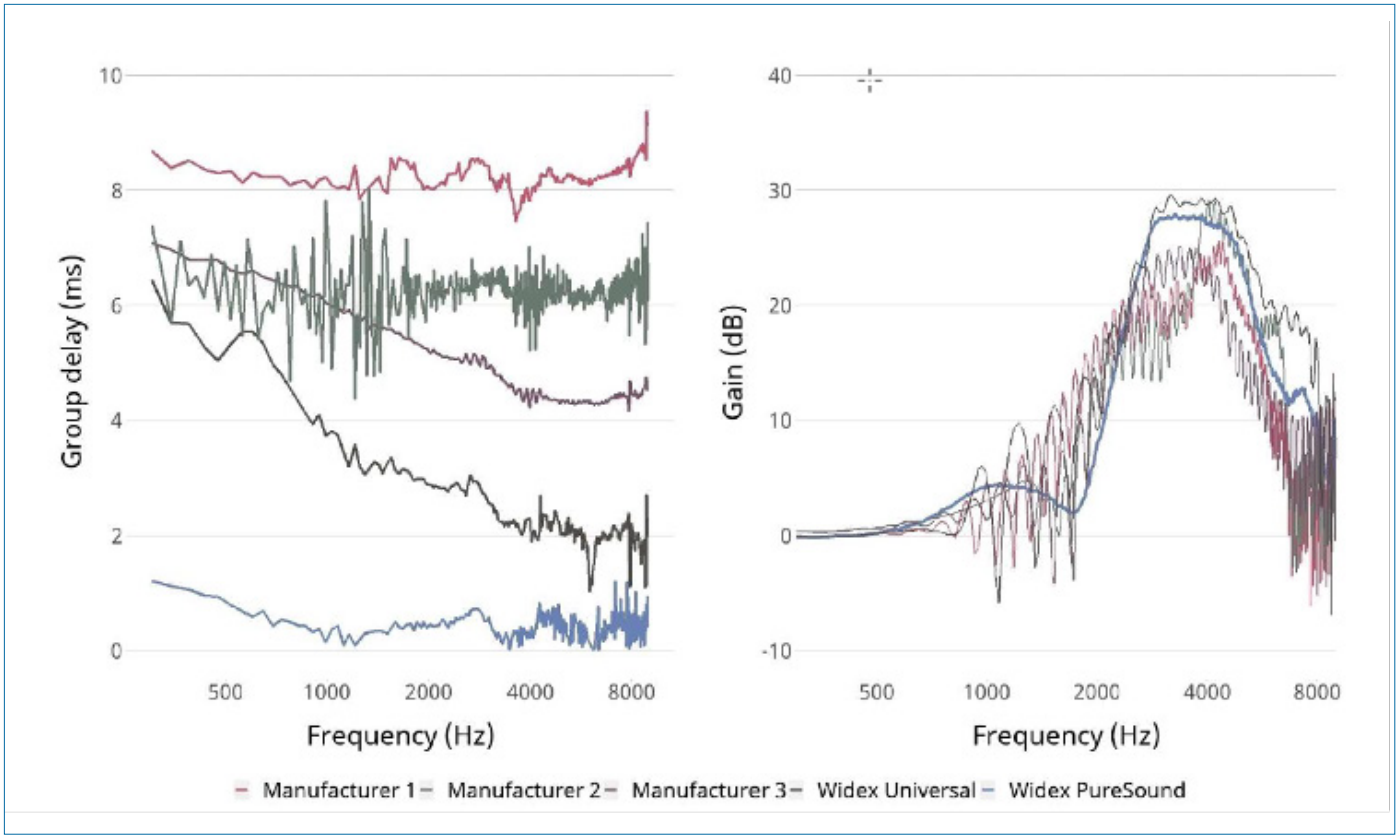


Figure 1. The left panel shows processing delay for Widex hearing aids and three other major manufacturers with Widex PureSound illustrated in blue and the Universal program in dark grey; the right panel shows the comb-filtering that arises as a consequence of delay in the competitor hearing aids, but is absent for PureSound (smooth blue curve). Figure originally published in Balling and Helmink (2021).

Widex PureSound™ - Improved Spatial Perception

There is anecdotal evidence supporting that the ultralow delay of Widex PureSound™ may preserve the timing of room reflections for a more natural sound. Survey data showed that 95% of users found that, with Widex PureSound™, they had the impression of sounds coming exactly from where they would expect them to **(Balling et al., 2021)**.

Natural sounds contain cues that inform us about our environment: our location in a room, our position relative to the speaker, the room's acoustic properties, and much more. Compare, for instance, a hotel's lobby with its bar – the lobby's echo and grandeur feels inspiring and welcoming, while the more intimate bar with its dampened sound is designed for private conversations.

Much of this difference is driven by room reflections, meaning how the sound is reflected from the surfaces in the room, and how fast those reflections return to the listener. Because hearing aid processing delay affects the time course of the reflection patterns, it is reasonable to expect that shortening the processing delay could preserve the natural cues and improve this spatial perception. Alternatively, the delay of standard hearing aids may interfere with the timing of these reflections for the wearer, resulting in an unnatural sound that does not match the room.

A new study investigated this. **Korhonen et al. (2022)** asked listeners to discriminate between sounds heard from different listening positions in a room. The sounds were recordings made on KEMAR (the manikin for hearing aid testing) with Widex PureSound™ and premium hearing aids from two other leading manufacturers, with average delays of 8 ms and 6 ms respectively.

The results showed that listeners were better able to discriminate between different listening positions within a reverberant room, when listening through the Widex hearing aids with Widex PureSound™ technology, compared to other premium hearing aids with longer processing delays, as illustrated in Figure 2.

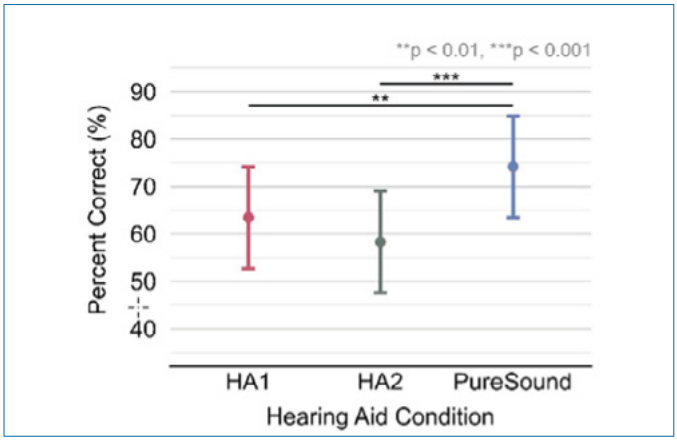


Figure 2. Listeners' abilities to discriminate the location in which KEMAR recordings were made within a reverberant classroom with three different hearing aids. Horizontal bars denote significance.

This suggests that this technology preserves the natural cues that listeners use for spatial perception better than hearing aids with longer processing delays. The longer processing delays likely smeared the initial and early reflections, making it more difficult for the listeners to discriminate. The ultra-low delay of Widex PureSound™ preserves the natural reflection of the room, resulting in a more natural, spacious, layered, or three-dimensional feeling.

Spatial perception is one of the areas where Widex PureSound™ makes a real difference, with a more natural sound that sounds three-dimensional and feels right. Widex PureSound™ preserves the natural cues for the listeners, whereby competitor hearing aid processing with longer delays likely smear the initial and early reflections, making it more difficult for listeners to discriminate.

To read the full results of this latest study in The Hearing Review, https://hearingreview.com/hearing-products/hearing-aids/psap/low-processing-delay-preserves-natural-cues-and-improves-spatial-perception-in-hearing-aids.

References

Balling, L. W., & Helmink, D. (2021). Optimizing Sound in Signal Processing and Hearing Aid Fitting. Audiology Practices, 13(4), 12–17.

Balling, L. W., Townend, O., & Helmink, D. (2021). Sound quality for all: The benefits of ultra-fast signal processing in hearing aids. Hearing Review, 28(9), 32–35.

Korhonen, P., Kuk, F., Slugocki, C., & Ellis, G. (2022). Low processing delay preserves natural cues and improves spatial perception. Hearing Review, 29(6).

Research and Reviews

Research links

Below are links to some of the most recent research on pathologies and hearing device considerations. If you would like to see research articles on a particular topic, please let us know at: editoraccord@acaud.org

Pathologies

- Automatic Prediction of Conductive Hearing Loss Using Video: Ear and Hearing (lww.com) by Byun., et al. Ear and Hearing: 43 (5),1563-1573
- Hearing Loss and Cognitive Function: Baseline Findings From the Brazilian Longitudinal Study of Adult Health: ELSA-Brasil by Samelli, A. , et. al., (2022). Ear and Hearing, 43 (5), 1416-1425.

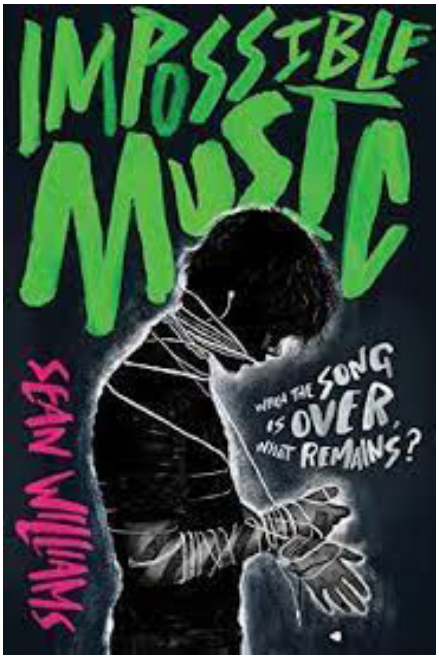
Hearing device evaluation

- Both-Ear Method for the Analysis of Audiometric Data by Chen, C., et. al., Ear and Hearing, 43 (5), 1447-1455.
- Is Having Hearing Loss Fundamentally Different? Multigroup Structural Equation Modeling of the Effect of Cognitive Functioning on Speech Identification by Marsja, E., et. al., 2022 Ear & Hearing, 43(5), 1437-1446.
- Ecological Validity, External Validity, and Mundane Realism in Hearing Science by Beechey, T. (2022). Ear and Hearing, 43 (5), 1395-1401.

Teleaudiology

- Barriers and facilitators to tele-audiology service delivery in Australia during the COVID-19 pandemic: perspectives of hearing healthcare clinicians by Bennett, R.J., Kelsall-Foreman, I., Barr, C., Campbell, E., Coles, T., Paton, M. & Vitkovic, J. (2022). International Journal of Audiology, Online.

Book Review – Impossible Music by Sean Williams



I loved this book for a number of reasons – good writing, great characters, excellent story, and lots of interesting audiological terms. Sean Williams writes a compelling tale of young rock god (so described) Simon Rain, who loses his hearing overnight. While his auditory systems remains completely intact, he suffers from a bilateral embolic stroke to his Heschl's gyrus while sleeping. This leaves him with no sound or, as our hero describes his condition, "Ears work fine, but my brain is as deaf as a post." I hadn't heard of this condition before – a cortical deafness, rather than an auditory one, and it is extremely rare (as the author notes). Simon is in his last year of school, hoping to gain entry to a composition writing degree at the local university. Losing his hearing has a huge impact on his ambition and gets him thinking about what music really is and how it can be enjoyed differently, by everyone. Simon initially rejects the Deaf world he now inhabits – cutting out of AUSLAN classes, refusing to sign at home - even though his family is learning the language with him. His identity has changed overnight, and he is not yet willing to embrace Deafhood. In amongst this battle he meets G (George-who-likes-coffee, sign name). G is also newly deafened through severe debilitating tinnitus that makes hearing anything other than the cacophony in her head impossible. The author's description of G's severe tinnitus is well-written, examining the suicide factor that can accompany this debilitating noise. Simon and G's relationship develops as their individual battles with the silence and noises in their heads unravel their lives as they knew them. Simon's search for a music he can embrace, and G's yearning for a small amount of peace take them to places unchartered for them both. A journey all readers will enjoy.

Cognitive Power

Hearing Technology Find-a-Word

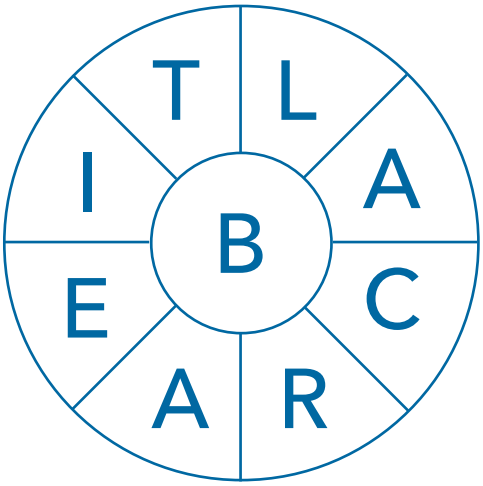
P	H	O	N	A	K	B	N	E	H	U	E	D	X	L
E	R	O	M	V	C	E	O	V	Q	S	M	E	A	N
Y	Y	O	Z	J	A	R	R	O	O	L	M	T	A	O
S	T	D	P	E	U	N	T	L	I	R	I	N	K	C
E	R	I	T	M	P	A	I	V	I	G	S	E	N	I
O	R	I	V	K	P	F	N	E	I	T	A	M	N	T
S	E	E	C	I	A	O	U	D	A	U	K	G	I	O
I	T	N	S	H	T	N	A	R	A	E	D	U	A	F
G	J	R	P	O	V	C	K	X	U	J	D	A	G	I
N	S	L	I	Y	U	E	E	T	E	X	J	R	K	W
I	A	J	M	D	Y	N	Q	N	E	X	B	L	I	R
A	U	D	E	O	E	C	D	W	N	D	T	D	M	J
H	A	N	D	S	F	R	E	E	Z	O	E	W	Z	Q
T	N	I	O	P	E	E	N	K	T	X	C	I	C	D
H	T	O	O	T	E	U	L	B	V	T	T	B	B	I

ALPHA
AUDEARA
AUDEO
AUGMENTED
BERNAFON
BLUETOOTH
BTE
CIC
CONNECTIVITY
DIGITAL
EVOLV
GAIN HANDSFREE
ITE
KNEEPOINT
MORE
MPO
MRIE
OTICON
PHONAK
RESOUND
RIC
SIGNIA
STARKEY
STRIDE
UNITRON
WIDEX

9 Letter Word Wheel

Find as many 4-letter words or using the letters below. Each word must contain the central letter. No plurals ending in 's', ore proper words. Each letter can only be used once. There is at least one 9-letter word to be found.

Target: 25 words GOOD, 35 words VERY GOOD, 50 + words EXCELLENT



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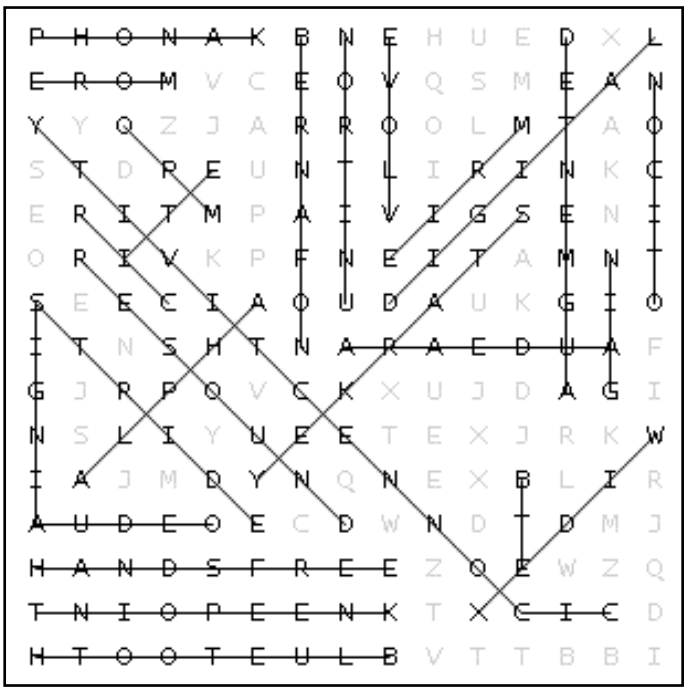
How to update my details for the Member Directory

https://www.acaud.com.au/member-directory/

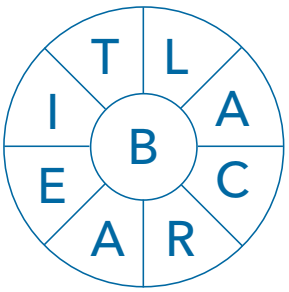
- Log in to the Member Centre
- Click on My Account
- Ensure your Profile Details are correct and save, indicating if you would like them displayed in the Member Directory
- Locate the Member Directory on the Homepage search for your name and verify your details are correct.

Cognitive Power - Answers

Hearing Technology Find-a-Word



9 Letter Word Wheel



Answers:

Bacterial, calibrate, bacteria, cabaret, actable, calibre, citable, triable, ablate, albeit, albite, arable, bailer, baiter, barite, cablet, labret, terbia, tribal, abaci, abate, abler, acerb, baler, baric, biter, blare, blear, bleat, brace, bract, brail, cabal, caber, cable, ceiba, labia, liber, libra, table, tribe, abet, able, abri, alba, bail, bait, bale, bare, bate, bear, beat, belt, beta, bice, bier, bile, bite, brae, brat, brei, brie, brit, crab, crib

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