



Annual Impact Report 2022



Mission and Impact

National Acoustic Laboratories' mission is to lead the world in hearing research and evidence-based innovation to improve hearing health and transform the lives of people with hearing difficulties.

As one of the longest established hearing research organisations in the world, NAL's work has delivered significant advancement in knowledge and practical tools for the hearing community since 1947.

Our team of world-class researchers and innovators focuses on projects that deliver impact and address unmet needs through truly translational research.

NAL's contemporary methodologies overcome traditional barriers to deliver research that benefits researchers, clinicians, industry experts, product developers and, most importantly, people with lived experience of hearing difficulties.

Life changing innovations developed by NAL include a counselling tool that is used by clinicians worldwide; the most commonly used hearing aids prescription around the world; and a validated questionnaire for the early identification of hearing loss in Aboriginal and Torres Strait Islander children.

Acknowledgement of Country

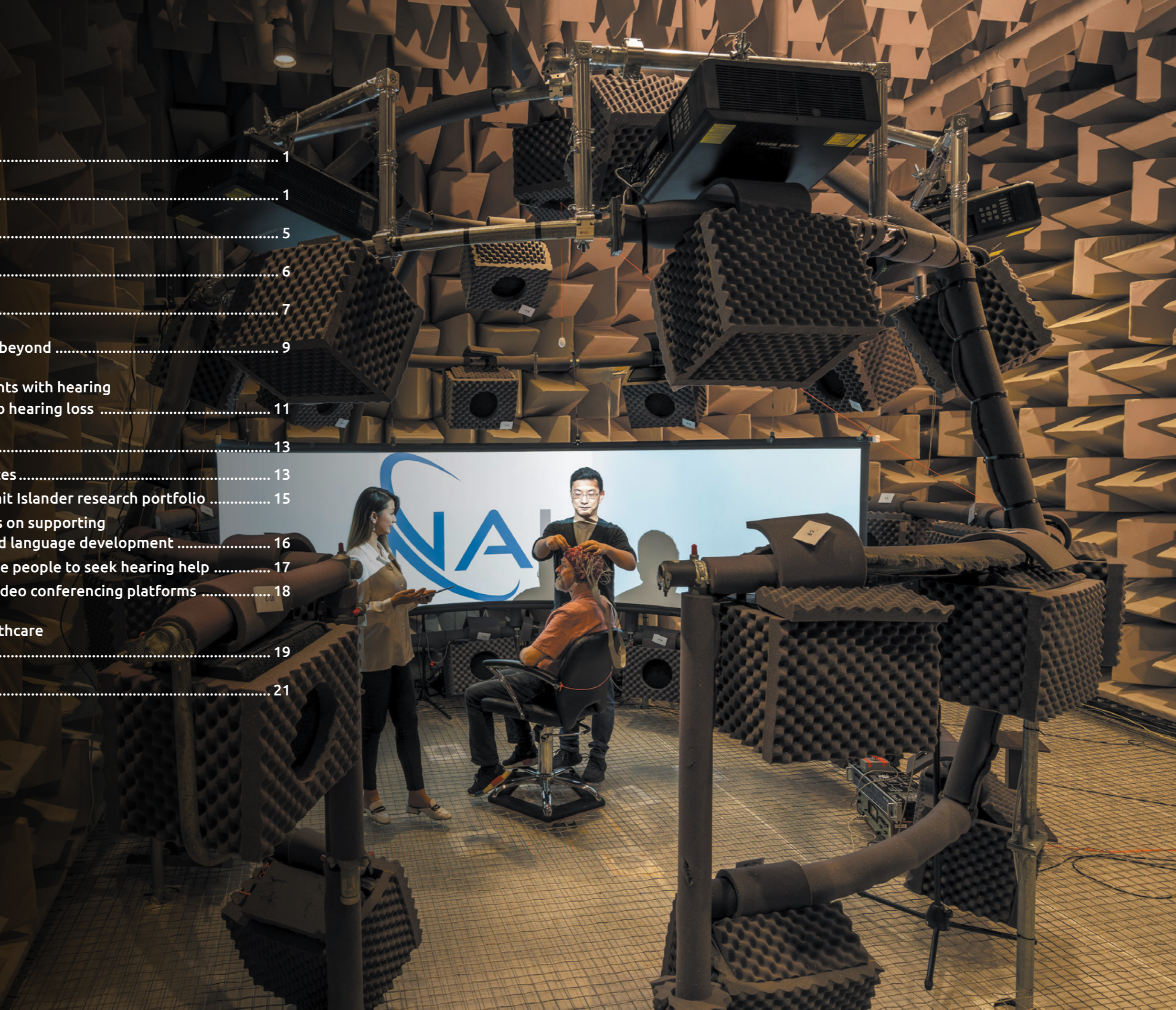
NAL would like to acknowledge and pay our respect to the Traditional Owners of the land on which we live and work.

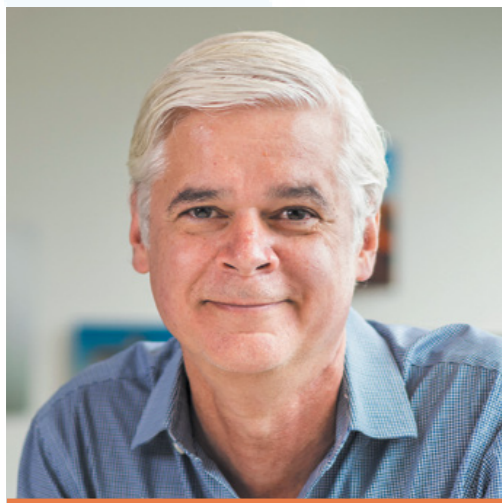
We pay our respect to Elders past, present and emerging and acknowledge the longest continuing culture on Earth.

We extend our acknowledgement and respect to all Aboriginal and Torres Strait Islander peoples we work with and serve, now and into the future.

Contents

Mission and Impact	1
Acknowledgement of Country	1
Message from Dr Brent Edwards	5
Message from Kim Terrell	6
2022: A year of global impact	7
75 years of research and innovation and beyond	9
Join the Conversation: Solutions for clients with hearing difficulties and normal audiogram and no hearing loss	11
Project Spotlight.....	13
Apple AirPods Pro as hearing devices	13
Feature: Aboriginal and Torres Strait Islander research portfolio	15
Aboriginal caregivers' perspectives on supporting young children's hearing health and language development	16
Better health messages to motivate people to seek hearing help	17
Difficulties in communication on video conferencing platforms	18
Outlook to future trends in hearing healthcare	
- Fireside chat with NAL Director	19
Thank you	21





Message from Dr Brent Edwards

NAL Director

As I look back on what we accomplished in 2022, I am amazed at the many and diverse ways in which NAL researchers have had an impact on hearing healthcare, particularly on the heels of recovering from the effects of COVID-19 on our ability to conduct research.

The NAL team has done exceptional work to help the Australian Government's Department of Health and Aged Care: conducting key research to assist with policy decisions, developing tools to help the general public on their hearing health journey, providing insights into and recommendations for the Government's Hearing Services Program that spends over half a billion dollars on hearing healthcare in Australia every year. There is likely no bigger impact that NAL can have than helping to improve a whole nation's hearing health, and I have no doubt that as the details of these research efforts are made public, their impact will grow to influence policymakers worldwide.

We have made inroads into advancing our research program into Aboriginal and Torres Strait Islander hearing healthcare. Our PLUM and HATS tools for identifying listening difficulty in young Aboriginal and Torres Strait Islander children continue to be taken up across Australia, our insights into the perspectives of parents and caregivers of this population has received significant notice within government and across key stakeholders, and we have formed an Aboriginal and Torres Strait Islander Research Leadership Group to strengthen cultural aspects of future research in this portfolio.

We have helped other organisations in their attempts to impact hearing healthcare, from assisting with clinical trials that led to FDA product clearance to advising organisations on how best to run clinical trials in the current regulatory environment. We have also developed our own methodology for measuring the impact of our research and are seeing interest from other organisations in leveraging this approach, along with interest in our user needs and design thinking training that is often required to ensure impact of delivery.

One of the biggest impacts that we have had over the past year is our research with people who have hearing difficulty but no measurable hearing loss. Hearing healthcare clinics around the world are presented with people asking for hearing help without a measurable hearing loss and most clinics have no method of validating their need or have any notion of what solutions might help this unique population. I've been able to talk about this issue to thousands of audiologists and hearing healthcare professionals around the world over the past year with overwhelmingly positive responses and the need for insight, advice and solutions for this issue is clear. The research that NAL has done to provide all of these for the hearing healthcare community is clearly having an impact on treatment approaches to this underserved population and we receive communications from clinics around the world about the success they've had in order to support this population based on our research.

Finally, our partnerships continue to grow, both within industry and academia. We are singularly focused on our mission to improve the lives of those with hearing difficulty and are privileged to be able to work with many organisations worldwide who have this same ambition, working together to change the world in ways that we couldn't on our own. We are truly grateful for these collaborations and look forward to continuing them in the next year and beyond.



Message from Kim Terrell

Hearing Australia Managing Director

For 75 years, NAL has been leading the world in hearing research and evidence-based innovation that has resulted in advancements in knowledge, clinical tools and technology that have had a significant impact on hearing healthcare in Australia and around the world. NAL continues to deliver a wide range of projects funded by the government, commercial partners and Hearing Australia to support ongoing policy reform and improvements to service delivery, clinical outcomes and the prevention of avoidable hearing loss.

In 2022, NAL made considerable progress towards its mission to improve hearing health, by collaborating with global leaders, to transform the lives of people with hearing difficulties. NAL is leading the investigation on the benefits of devices other than hearing aids, such as Apple AirPods Pro, for people with hearing difficulties but minimal diagnosed hearing loss. We also saw the commencement of a longitudinal study to support Aboriginal and Torres Strait Islander children with persistent otitis media. NAL's ongoing work continues to play a critical role in shaping the future of hearing healthcare.

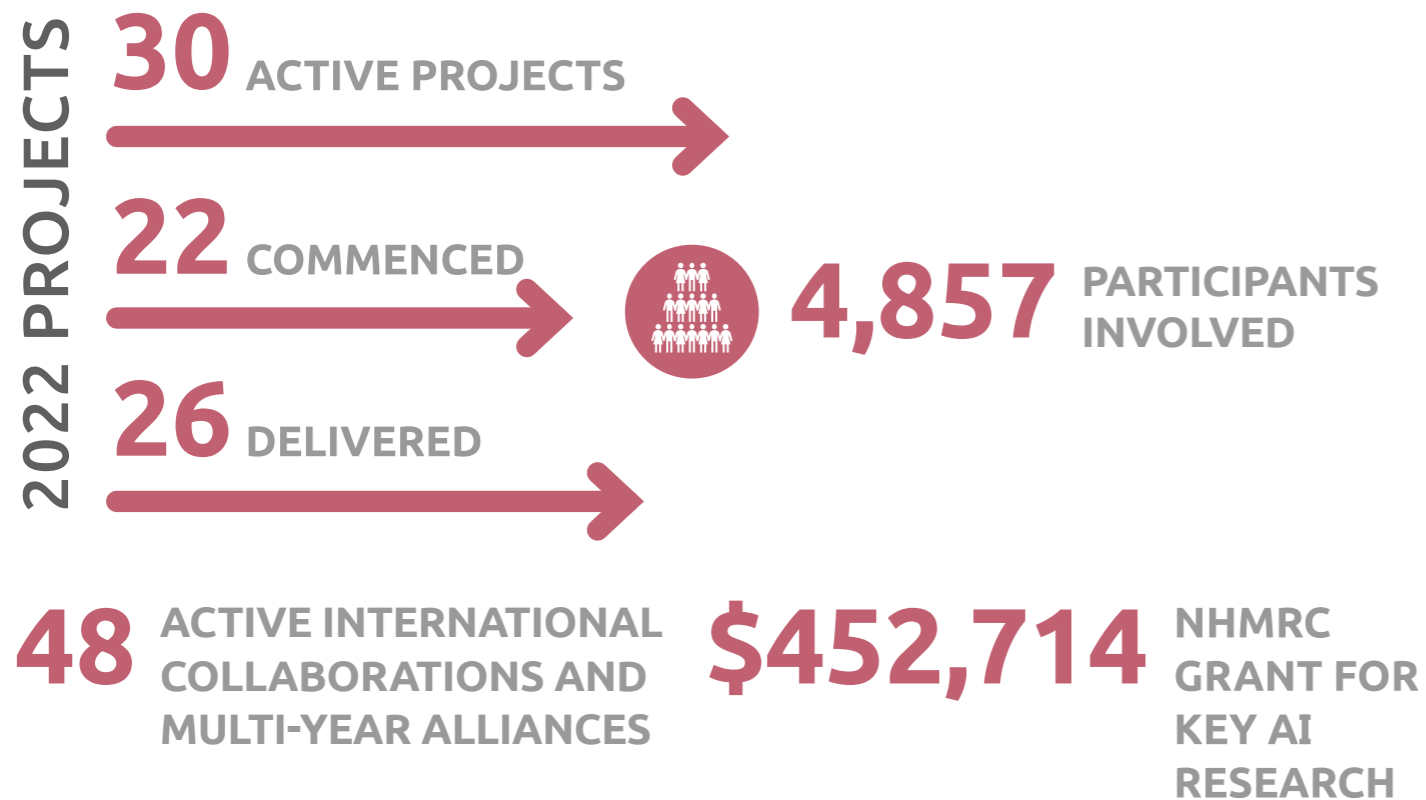
As Hearing Australia's research division, NAL is uniquely positioned to gain valuable insights into the urgent unmet needs of both hearing care professionals and those with lived experience of hearing difficulties. With support from clinics across Australia, we are able to design and deliver research outcomes and solutions that will benefit clients, clinicians and the broader industry.

As a demonstration of NAL's ongoing value and our continued collaboration with the Australian Government, we entered a new agreement with the Federal Department of Health and Aged Care to undertake hearing research valued at \$19.3m over the next four years.

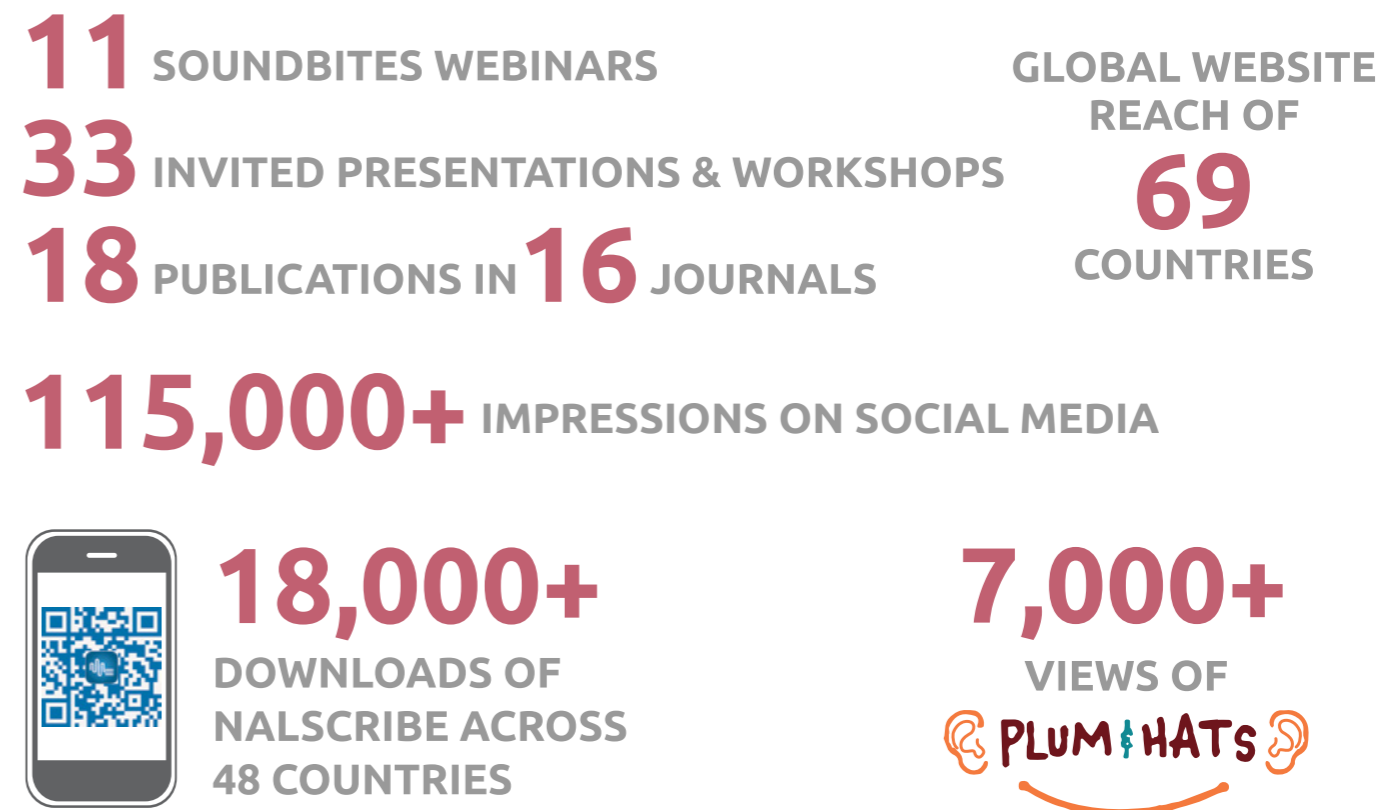
Our journey started in 1947 and since then, we have helped over one and a half million children and adults with hearing loss. Today, Hearing Australia continues to care for some 270,000 clients across the country including more than 30,000 children and young people. Through our dedicated First Nations Services Unit, we're helping more than 20,000 Aboriginal and Torres Strait Islander peoples with their hearing needs. NAL is focused on developing new solutions and improving the diagnosis and treatment of hearing loss and continues to play an important part in our work to improve the hearing health of all Australians.

2022: A year of global impact

TRANSLATIONAL RESEARCH



KNOWLEDGE DISSEMINATION



75 years of research and innovation and beyond

NAL celebrated 75 years of hearing research impact with leaders in hearing healthcare from around the world at the Hearing the Future conference in November 2022.



Dr Brent Edwards - Director of the National Acoustic Laboratories:

"We're so fortunate to work with many hearing care partners who share our vision and commitment to taking action and transforming the lives of people with hearing loss."

Our supporters and collaborators:



Professor Louise Hickson, AM - Associate Dean (External Engagement), Faculty of Health and Behavioural Science, University of Queensland:

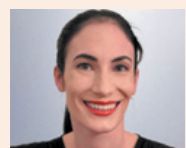
"Everywhere I go around the world, everyone knows and admires NAL's leadership in hearing healthcare over so many years and how that leadership has improved the lives of children and adults with hearing loss. Fundamentally, the work of the NAL team has driven evidence-based innovation. I feel very proud to have collaborated with colleagues at NAL throughout my career and was even lucky enough to have a previous Director, Dr Denis Byrne, supervise my PhD."



Dr Stefan Launer - Senior Vice President Audiology & Health Innovation:

"NAL builds a bridge between understanding the needs of people suffering from hearing loss, the challenges they are facing when using rehabilitation technologies and developing innovative solutions for hearing care practice. It is really impressive to see how this organisation managed to stick to its major mission and themes and to contribute ground-breaking work improving the lives of those suffering from hearing loss around the world over decades."

Featured researcher of the year

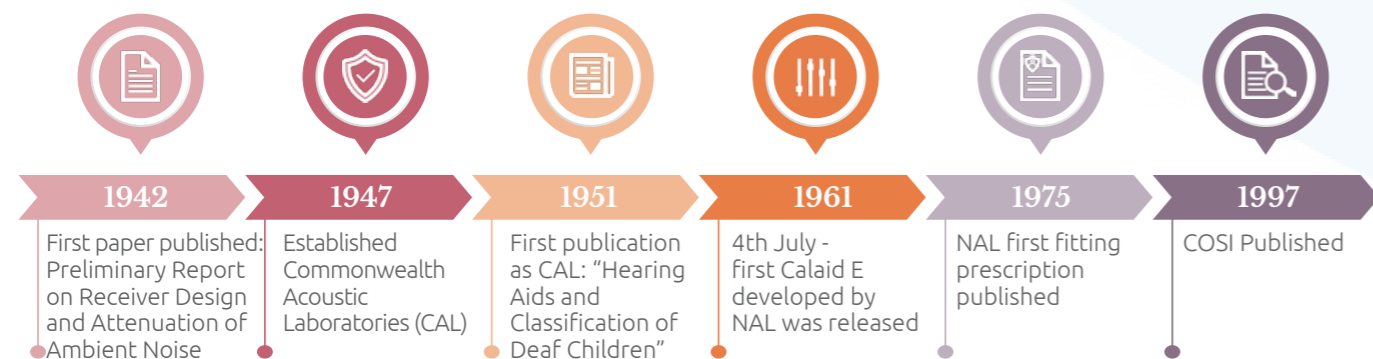


Dr Jessica Monaghan

Dr Monaghan has a background in Physics and Engineering, with expertise in human listening, machine learning, and hearing technology. Her current work focuses on how machine learning and technology can be used to tackle problems in hearing healthcare.

What do you see in the future in hearing healthcare and AI?

"AI has the potential to revolutionise hearing healthcare with faster, more accurate diagnoses of hearing problems, more personalised treatments, and enhanced communication for those with hearing loss."



What will we see from NAL in 2023?

NAL leadership team shares their future vision.



Dr Pdraig Kitterick - Head of Audiological Sciences, Adult hearing loss portfolio

A goal for our adult hearing loss portfolio is to develop innovative models of care that are both easy to access and highly effective at making sure hearing problems do not limit the lives of adults in Australia, and around the world. Our research in 2023 will be focused on ensuring hearing technologies and care are personalised to meet the needs of each individual.



Dr Viji Easwar - Head of Communication Sciences, Paediatric hearing loss portfolio

In 2023, we will focus on identifying determinants of intervention success in ongoing longitudinal studies in children with hearing loss, enabling better remote assessments, and revealing hearing loss characteristics in children based on large-scale clinical data. We will also establish new community partnerships to better understand the impact of otitis media related hearing loss in Aboriginal and Torres Strait Islander children and identify effective detection and intervention options.



Dr Jorge Mejia - Head of Signal Processing, Technology portfolio

Our team is focused on the research and development of more accessible, useful, and impactful technologies for people with hearing health conditions. We take a holistic approach to address unmet needs by providing real life assessments of hearing problems and hearing aid technologies. Working with our global partners, we look forward to using the state of art AI technologies and scientific discoveries to develop evidence-based innovations that are smart, robust and economical.



Catherine Morgan - Head of Clinical Trials

Clinical trials are critically important to translate scientific innovations into clinical practice. Our work focuses on offering sensitive trial designs incorporating our insights into new regulations in hearing healthcare, auditory physiology and audiological assessment for novel interventions. With our partners in 2023, we will deliver pertinently designed clinical trials applicable to international regulatory requirements, which are also relatable to the payers and consumers.



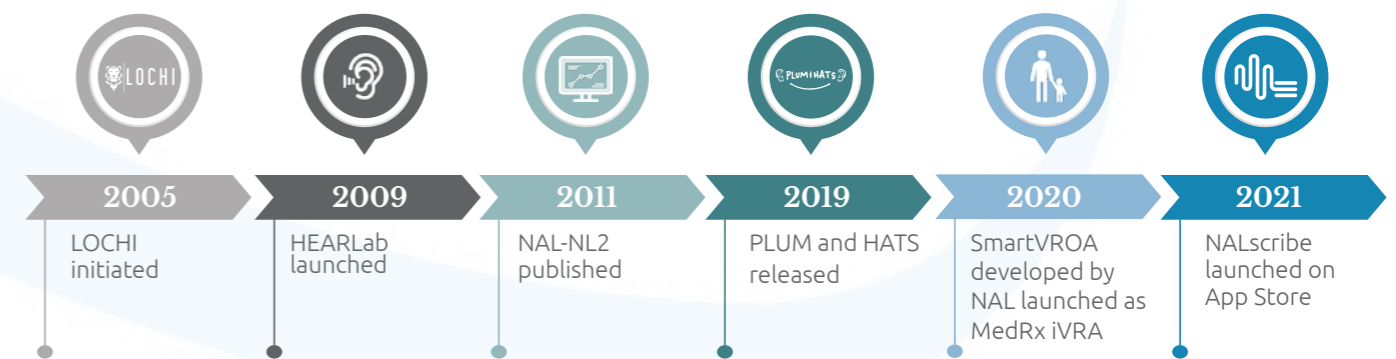
Phillip Nakad - Head of Operations

NAL's operations staff support our researchers and partners through our project and grant management offices. The operations team helps ensure our research is thoroughly planned and delivers the intended impact with our global partners. Our team will continue to innovate and build our facility and capability in the Australian Hearing Hub, and with its members.



Xiaoyin Shang - Head of Strategy and Innovation

The Strategy and Innovation department focuses on enabling translational research impact through growing external engagement, as well as managing the impact framework at NAL and its innovation agenda. In 2023, we will actively seek partnerships to assemble transdisciplinary teams in the hearing innovation ecosystem who will work with us to tackle complex challenges and develop valuable solutions that deliver positive impacts to end users. We are excited to support novel solutions and new entrants to the evolving ear and hearing healthcare market.



Join the Conversation: Solutions for clients with hearing difficulties and normal audiogram and no hearing loss

The Challenge

Many clients report hearing difficulty but present with normal audiograms in their appointments. At one large hearing healthcare provider in Australia, over 20% of people who book an appointment for hearing help have no measurable hearing loss. Hearing healthcare clinics around the world have similar experiences. Since there is no standard of care for this population, audiologists may provide counselling and suggest a follow up in a few years to monitor hearing status, but there is typically no consensus on the guidance to provide a solution. Current practice is that people with “normal” hearing (as indicated by the audiogram of PTA < 25 dB HL) are presumed not to have a need for hearing help and are unable to benefit from hearing aids or other hearing healthcare technologies. NAL challenged the status quo from multiple perspectives.

Why are people with “normal” audiograms going to hearing healthcare clinics?

A NAL exploratory study in 2022 examined 12 months of clinical records from 10,276 clients with normal hearing measures who contacted a hearing healthcare clinic to seek help. A high proportion of these people (67%) were younger than 65 years old.

The primary factor that influenced hearing help-seeking was the perceived limitations in daily life due to hearing difficulties. Over 46 percent of people surveyed said that their family and friends were influential in leading them to get their hearing assessed. Also, when asked to rate their perceived level of hearing difficulty, the majority thought that they had at least a moderate degree of hearing loss. The results suggest that the motivational factors for this group seeking hearing help at a clinic are similar to those for people with hearing loss.



How might we better support clients with hearing difficulties and no hearing loss?

Firstly, what do we know about why people may have hearing difficulties but no hearing loss? A recent magnetoencephalography (MEG) study explored neural tracking of speech and suggested a cortical origin of the hearing difficulty. NAL recently extended the evaluation of neural speech tracking further by examining cortical responses to concurrent, linguistic units embedded hierarchically in connected speech in background noise. Using electroencephalography (EEG), cortical tracking to different levels of linguistic structure (i.e., syllable, phrase and sentence) were shown to reduce systematically but differently to the increased level of a multi-talker background noise. This allowed us to better understand the patho-physiology behind the hearing difficulty and uncovered a potential bio-marker that could be developed into an objective clinical diagnostic test.



The results from NAL’s studies and those of others demonstrate that the large number of people who are seeking hearing help, yet being told they have normal hearing and turned away at hearing healthcare clinics, may actually benefit from hearing devices. NAL has undertaken extensive research into possible solutions for this population. These include evaluating the benefit of fitting low-gain hearing aids with directional microphone features, and testing consumer technology such as Apple AirPods Pro with ‘Headphone Accommodations’ feature as an alternative solution.



How do we identify those who need hearing solutions?

A recent NAL project found that people who reported hearing difficulties with normal or near-normal hearing were more likely to have a history of noise exposure and performed worse on a task measuring sustained auditory attention compared to people with no reported difficulties. However, the greatest differences between the two groups were seen in their responses to questionnaires about listening difficulties. Using machine learning, the NAL team identified a subset of five questions from the two questionnaires that could accurately identify individuals with difficulty hearing in noise with 95% accuracy. Responses were found to be associated with a number of other measures of auditory dysfunction tested in the study, suggesting that these questions are sensitive to types of hearing damage that may not be evident on an audiogram.



How can technology, such as hearing aids and other assistive devices, benefit people with hearing difficulties who have normal audiograms?

Devices to help people hear better is a growing, fast evolving industry. More recently, technology companies that are household names are investing in developing hearing devices i.e., over-the-counter hearing aids, but they have little to no experience navigating the labyrinthine world of FDA clinical regulations.

The evolution of the digital health ecosystem supports hearing devices to be made available to consumers online. For many people with hearing loss, the process of purchasing a hearing aid can be overwhelming and confusing. With so many different brands, models, and features to choose from, it can be difficult to know how to select devices best suited to their hearing needs—especially when purchasing online. NAL’s research aims to inform context-specific interventions, translating scientific discoveries into clinical practice by assessing the effectiveness of interventions in broader populations.



NAL studies demonstrated that the technologies below can improve speech understanding in noisy situations for this population. We have explored and validated all the options below and are actively seeking collaboration to advance innovation in this space.

- Fitting traditional hearing aids with low gain
- Direct to consumer hearing devices with self-fit capability, can be a cost effective option and effective for use in certain situations where communication is challenging
- If a client already owns an AirPods Pro, clinicians could provide guidance and support to set up the hearing features with the client’s audiogram, inform them about the directionality and noise reduction features, and in what situations to activate them
- Other assistive technology smartphone apps, such as NALscribe live captioning, or sound amplification apps are used as alternative ways to enhance communication in important conversations.



Take-home question: Have you considered offering these to your clients?
Read on for details on our work to explore Apple AirPods Pro as hearing devices.

Apple AirPods Pro as hearing devices

The Challenge

Many people who could benefit from hearing aids do not have them for a variety of reasons. To overcome the barriers of stigma, cost, and poor accessibility to hearing services, alternative hearing solutions are becoming available, such as the Apple AirPods Pro consumer earbuds. AirPods Pro offer hearing aid-like features, such as personalised amplification, directional microphones and smart audio processing, helping to enhance hearing and communication in noisy environments. This research aims to evaluate the effectiveness of AirPods Pro for people with hearing loss or difficulties and determine their potential as a cost-effective and accessible option for hearing assistance.

Our Approach

NAL conducted a comprehensive evaluation of the AirPods Pro's acoustic performance and benefit to people in noisy environments through a combination of objective, behavioural, and subjective methods, both in the laboratory and real-life environments.

1. Laboratory evaluation:

Objective measurements were carried out in an acoustic test room using 16 loudspeakers to simulate a realistic noisy environment. The customised amplification and compression provided by the AirPods Pro for a particular audiogram was measured and compared to the NAL-NL2 gain prescription commonly used in hearing-aids. In addition, the amount of signal-to-noise ratio advantage achieved using the directionality and noise reduction features was measured to estimate speech intelligibility benefit.

The acoustic measures showed that the gain provided by the AirPods Pro was similar to that prescribed by NAL-NL2 for normal speech levels, however, it generally over-amplified loud sounds and under-amplified soft sounds compared to NAL-NL2.

2. Participant evaluation:

A study was conducted with 17 adults (aged 21—59 years) who had normal audiometric thresholds but self-reported speech-in-noise hearing difficulties. Participants completed audiometric tests, standardised questionnaires, and speech-in-noise sentence testing with and without AirPods Pro.

The directionally feature provided a significant improvement in SNR by 5-7dB. In speech-in-noise tests, intelligibility increased from 54.6% to 66.4% on average when participants wore the earbuds, and they reported reduced listening effort and mental demand.



3. Evaluation in real-life environments:

To complement the laboratory measures, real-life listening experiences were captured using the smartphone-based NAL ecological momentary assessment (NEMA) app over a four-week period. Participants wore AirPods Pro in environments where they typically have difficulty hearing and recorded their experiences, including sound environment, social participation, device usability, hearing benefit, and satisfaction, as well as acoustic environment features.

Real-life measures using NEMA showed that participants found their overall hearing experience and speech understanding slightly better in their daily life, however, some also reported social barriers to use, such as AirPods Pro not being recognised as assistive listening devices.

NAL Ecological Momentary Assessment (NEMA) smartphone app

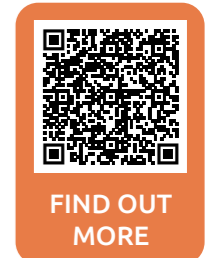
Motivated by issues with traditional self-report methods of data collection, the NEMA smartphone app was developed by NAL to repeatedly sample a person's preferences in their everyday life. NEMA is a valuable tool used in many of our research studies and clinical trials to complement traditional lab results. It provides real-world insights, and enables researchers to gain a more comprehensive understanding of a person's difficulties or experiences in their natural surroundings.



Outcomes and Impact

The study shows that the AirPods Pro are beneficial for those with hearing difficulties, with laboratory tests and real-world data demonstrating their ability to amplify soft sounds, improve speech understanding in noisy environments, and increase listening comfort. These findings can assist audiologists around the world in making evidence-based recommendations for individuals not going onto hearing aid fitting.

Consumer earbuds with hearing accessibility features, such as the AirPods Pro, offer an accessible and convenient entry point for individuals to address their hearing needs. By empowering individuals to take control of their hearing journey, these earbuds have the potential to significantly enhance hearing, communication, and overall quality of life for those with hearing difficulties. NAL's advancement on this topic can lead to better considerations for determining the suitability of alternative hearing solutions for individuals, and design better solutions to address the unmet need of this population.



Soundbites webinars



Using Apple AirPods Pro to improve communication in noisy venues



Exploring Apple AirPods Pro as hearing devices

Feature: Aboriginal and Torres Strait Islander research portfolio

Ear disease and associated hearing loss is more frequent and serious among Aboriginal and Torres Strait Islander children than among non-Indigenous children. Hearing loss during a child's early developmental years impacts their development of speech, communication, and language with lifelong consequences on their health, social and economic outcomes. In much of NAL's recent work, we have worked with Aboriginal and Torres Strait Islander community stakeholders towards earlier assessment of ear health and hearing status and earlier detection of delayed listening and communication skills, so that children may be treated and prioritised for specialist care earlier.

2019

Co-developed the PLUM and HATS parent/carer checklists with Aboriginal health and early childhood workers.
To further support earlier identification of listening and communication difficulty in young Aboriginal and Torres Strait Islander children, additional relevant materials were co-developed. These materials include: screening and score forms, illustrated versions of the checklists, user guides, 'Yarning at Home' booklet for families and a suite of training videos. All materials were made freely available on a new PLUM and HATS website.

2020

Produced an evidence-based recommendation for the optimal timeframe for hearing improvement for young Aboriginal and Torres Strait Islander children with persistent ear disease and measured how long it takes for Aboriginal children to reach ear surgery across Australia.
Improved the PLUM and HATS website, including a training module and online PLUM and HATS forms. Implemented a promotional campaign to increase awareness of the PLUM and HATS tools and resources.

2021

Co-developed the prototype of Early Childhood Observation Checklist (ECHO), together with early childhood educators, for identifying listening and communication difficulties in young Aboriginal and Torres Strait Islander children during day-care/preschool.
Found that urban parents, carers, and health practitioners agree on the need for clear hearing health promotion, that families often experience long wait times, and that primary health ear checks are rarely carried out routinely. Parents and caregivers of young Aboriginal children shared what makes services feel safe and welcoming.

2022

Established acceptability of the PLUM and HATS tools amongst service providers and caregivers; developed a PLUM and HATS e-learning module for the TAFE's EarTrain program; and co-developed recommendations for ear health and hearing checks for young Aboriginal and Torres Strait Islander children in primary healthcare settings.
Through interviews with Aboriginal caregivers in urban NSW and remote NT communities, identified ways in which they support their children's hearing health and language development and documented their suggestions to improve ear health and hearing support pathways.

NAL has a growing portfolio of research relating to supporting the hearing health of Aboriginal and Torres Strait Islander children, families, and communities. This work is now assisted by a recently established Aboriginal and Torres Strait Islander Research Leadership Group and is undertaken in partnership with communities and services, responding to shared priorities, including those identified in the Roadmap for Hearing Health.



FIND OUT MORE

Aboriginal caregivers' perspectives on supporting young children's hearing health and language development

The Challenge

Many Aboriginal and Torres Strait Islander children are affected by chronic middle ear infections (otitis media or 'OM') and associated hearing loss, which can have long-term negative impacts on them and their families. Caregivers play an essential role in the early detection of OM, seeking treatment and intervention, and in supporting their children, which are all key to minimising these negative impacts. Understanding caregivers' perspectives is needed to identify and address gaps in intervention and support services to ensure they meet the needs of children and their families.

Our Approach

With oversight from an Aboriginal Research Leadership Team, led by a Wiradjuri researcher Michelle Kennedy, our collaborative team aimed to explore the perspectives of Aboriginal caregivers of children with OM-related hearing problems on 1) how they support their children's hearing health and language development; 2) audiology and speech pathology services.

Using the Yarning method (semi-structured, conversational interviews that follow local cultural protocols), our study privileged the lived experience and expertise of 8 Aboriginal caregivers from urban NSW remote NT communities. The interviews were analysed to identify themes.

Outcomes and impact

The two main themes identified were: 1) Caregivers are—and have to be—proactive; and 2) Hearing health pathways are complex and difficult to access and navigate. These quotes exemplify both themes:

" I was thinking [...] 'I have to help my child to make them to become like good listener and good speaker in the future so I have to just do it just gotta keep pushing ENT doctors and hearing mobs [fly-in-fly-out hearing services] to like do something for their ears' [...] So probably [the ear and hearing pathway] took me like, couple of years now from [child 2 name] and then switched it to [child 3 name]." - (Participant 3, NT).

" He [my child] was very un verbal, so that's when I was like, 'alright, we need to act on this!' And then he had the hearing test, that showed fluid, went back to [Aboriginal Medical Service name], we started speech [pathology], that helped and then he's had another hearing test [...] and then he has another one next month. So this'll be the fourth or fifth [hearing assessment] [...] My point is, if he does need ENT surgery, I wanted it before he's at school, cos I don't want him struggling when he doesn't need to be." - (Participant 1, NSW)



Insights from the study, including caregivers' suggestions for improvements, can help services and health professionals reflect on how well they are meeting the needs of Aboriginal children and their families, and how they can empower and support caregivers. The findings can also inform policies and help improve hearing pathways to ensure family-centred, culturally responsive service provision and clinical care. The teams at NAL will continue to work with Aboriginal and Torres Strait Islander caregivers, communities, and stakeholders to co-develop solutions to prevent the long-term negative impacts of OM-related hearing loss.



FIND OUT MORE

Better health messages to motivate people to seek hearing help

The Challenge

Globally, millions of dollars are spent on advertising for hearing care clinics to encourage people to reach out for hearing help. Timely help-seeking has the potential to lead to better hearing and health outcomes. However, research has shown many barriers – a person with hearing loss can take over nine years to seek help after first noticing difficulties. There is a need to learn more about what messages are most effective for motivating individuals to seek help for their hearing.

Increasingly, government and private organisations are drawing on behavioural science principles to encourage desirable health behaviours. Research has shown the potential benefits of incorporating such principles when developing health messages.

The Process

A team operating under the Sonova-NAL-Macquarie Alliance has been working to better understand the behavioural influences on hearing help-seeking behaviour in relation to the important early step of booking a hearing appointment.

This work identifies behavioural principles contributing to reluctance to seek help, as well as developing and evaluating messages designed to address these barriers. Using tools available through the social media platform Facebook, the team has been able to move beyond the research environment to test the impact of these messages on appointment-booking behaviour in the real world.

Outcomes and impact

This theoretically driven study is providing an important evidence-base about how to more effectively encourage individuals with hearing difficulties to seek help. This work has potential implications not just for promoting earlier hearing help-seeking, but for learning more about how to engage people with their hearing health.

“ Too often behavioural research projects limit themselves to measuring changes in intentions or attitudes rather than action. While attitudes or intentions sometimes correlate highly with behaviour, this is often not the case with health-related behaviours (just consider many people’s New Year’s resolutions to engage in exercise!). This project is an exciting step forward in developing and evaluating messages in ‘real life’ ” - Dr Gurjit Singh, Sonova Senior Scientist



FIND OUT MORE



Difficulties in communication on video conferencing platforms

The Challenge

With the adoption of remote working likely to persist for the foreseeable future in many countries around the world, there is growing interest in developing and evaluating new technologies to assist people with hearing loss to communicate more effectively via video conferencing (VC) platforms. This study aimed to explore how video calls impact on the ability to understand speech and follow conversations for people with and without hearing loss, and whether hearing aids improve the experience for people with hearing loss when using VC platforms.

The Process

To understand how hearing loss affects communication experiences when using VC platforms in comparison to face-to-face interactions, we recruited two groups of participants: those with normal hearing and those who wear hearing aids. Experiences were also compared between aided and unaided conditions for hearing aid wearers. Additionally, the team compared audio processing across a range of commonly used VC platforms.

To evaluate the impact, we used a comprehensive range of hearing outcome measures, including speech perception, speech comprehension, self-report assessments on listening difficulty/effort, ease of communication, mental load, satisfaction of sound quality, and acceptability of VC administration. To effectively administer these tests, the team at NAL developed a unique assessment setup for VC platforms.

Outcomes and impact

The project provides direct evidence that while communicating via VC platforms is acceptable for people with hearing loss, **it imposes significant difficulties and requires additional effort compared to normal-hearing controls – significant difficulties still exist even when hearing aids are worn.**

This research has the potential to enhance awareness of the challenges faced by those with hearing loss. We are actively collaborating with organizations to develop and evaluate novel technologies to improve communication via VC platforms.

“ I strongly prefer meetings by video conference and if its level of expertise can be applied equally then I would choose that option.” - Project participant



FIND OUT MORE



Outlook to future trends in hearing healthcare - Fireside chat with NAL Director

1. What technological advances will change hearing healthcare in the future?

As we've seen with the explosion of interest in ChatGPT, artificial intelligence (AI) is going to transform every industry, including the field of hearing healthcare. How, exactly, remains for the innovators to figure out and will depend on what unmet needs AI can fill.

How is NAL advancing these upcoming changes?

We are looking at AI and machine learning in a number of ways, including its use in identifying that someone has hearing loss from their speech pattern and its use in identifying whether someone is at risk of progressive hearing loss.

2. What big changes are coming for hearing health service delivery?

The introduction of over-the-counter hearing aids in the US is forcing a conversation on the value of services delivered by traditional models. There is strong evidence, including data from NAL, that people are more successful with their hearing devices with successful assistance from a hearing care professional, but different people have different needs—needs for different technology solutions, services and delivery channels.

What will this change look like for Audiology?

The most important improvement to hearing healthcare in the next few years will be diversity in channels, services, and technology solutions available to people who need hearing help.

The traditional approach to hearing healthcare will continue to thrive, but Audiology will need to adapt to a more personalised approach to hearing service delivery rather than a one-type-fits-all approach that has been the norm in our field for decades.

What would be your recommendation to decision makers in preparation for these changes?

As new approaches develop to meet the unique needs of different populations, the number of people accessing hearing health help will also increase in the future. Decision makers will need to consider carefully when and how to transform their modes of engagement and service depending on the needs of their clients and the business. It is equally important to meet the needs of hearing healthcare professionals to be able to address different hearing challenges in more diverse ways.

3. What are the important priorities that NAL is focused on in the coming year?

NAL is focused on exploring the emerging approaches to hearing healthcare, including the upcoming changes mentioned in the previous questions. Our goal is to provide insights and develop solutions with and for hearing healthcare partners. We have a history of co-developing and validating innovative technology for partners, and we foresee an urgent need for this given the emerging novel approaches to hearing technology, hearing services that includes teleaudiology and self-treatment, and channels for hearing healthcare delivery. We are also focused on engaging with thought leaders on the ways that people are changing in their listening behaviour, such as whether hearing loss (and hearing technology) affects people's ability to communicate when videoconferencing on platforms such as Zoom.

4. If NAL had unlimited resources, what would it do first?

NAL would expand into an international virtual research conglomerate that allows the many amazing researchers from a variety of disciplines around the world to collaborate on the top research challenges facing hearing healthcare. We would also fund Grand Challenge competitions to get other researchers focused on the same hearing healthcare challenges that we are focused on at NAL. Combining NAL's team of hearing healthcare experts and its ability to direct research towards high-impact solutions with the deep research and innovation talent that exists around the world would be amazing.



Thank you

Our global connection of collaborators enables translational outcomes and allows us to pursue our mission of improving hearing health and transforming the lives of people with hearing difficulties.

Colleagues



Collaborators

Australasian Newborn Hearing Screening Committee	NextSense
Cochlear ANZ and global	Nuheara
Deafness Foundation	Phonak
GN Hearing	Sensorion
Google	Tharawal Community Controlled Health Service
Ida Institute	WS Audiology
Macquarie University	
MedRx	

Valued contributors to NAL research

4857 participants involved

Aboriginal Health Council of Western Australia
 Aboriginal Medical Services Alliance Awabakal
 Community Controlled Health Service
 Northern Territory
 Amplify Hearing and Diagnostics
 Australia Indigenous Doctors Association
 Clarity Hearing and Balance
 Cochlear Care Centre
 Deadly Ears
 Department of Health ACT, NSW, NT, WA, and SA
 Drumbeat-ai
 Ear Science Institute
 Fiona Stanley Hospital
 George Institute for Global Health
 Indigenous Allied Health Association
 Kimberley Aboriginal Medical Service
 Mater Health Services
 Murdoch Children's Research Institute
 National Aboriginal Community Controlled Health Organisation (NACCHO)

National Association of Aboriginal and Torres Strait Islander Health Workers and Practitioners
 Nganampa Health Council
 Oorunga Wandarrah MACS Centre
 Queensland Aboriginal and Islander Health Council
 Royal Australian College of General Practitioners
 Royal Brisbane and Women's Hospital
 Royal Flying Doctor Service
 Royal Hobart Hospital
 Royal Perth Hospital
 Royal Sir Charles Gairdner Hospital
 Royal Victorian Eye and Ear Hospital
 Rural Doctors Network
 South Australia Cochlear Implant Centre
 Sydney University Faculty of Medicine
 Telethon Kids Institute
 Townsville Hospital
 University of Newcastle
 UNSW Faculty Medicine & Health
 Victorian Aboriginal Health Service
 Waranwarin Early Learning Centre
 Western Sydney University

Our collaborators





National Acoustic Laboratories

Level 4, Australian Hearing Hub
16 University Avenue
Macquarie University NSW 2109 Australia
+61 2 9412 7026
nal.gov.au