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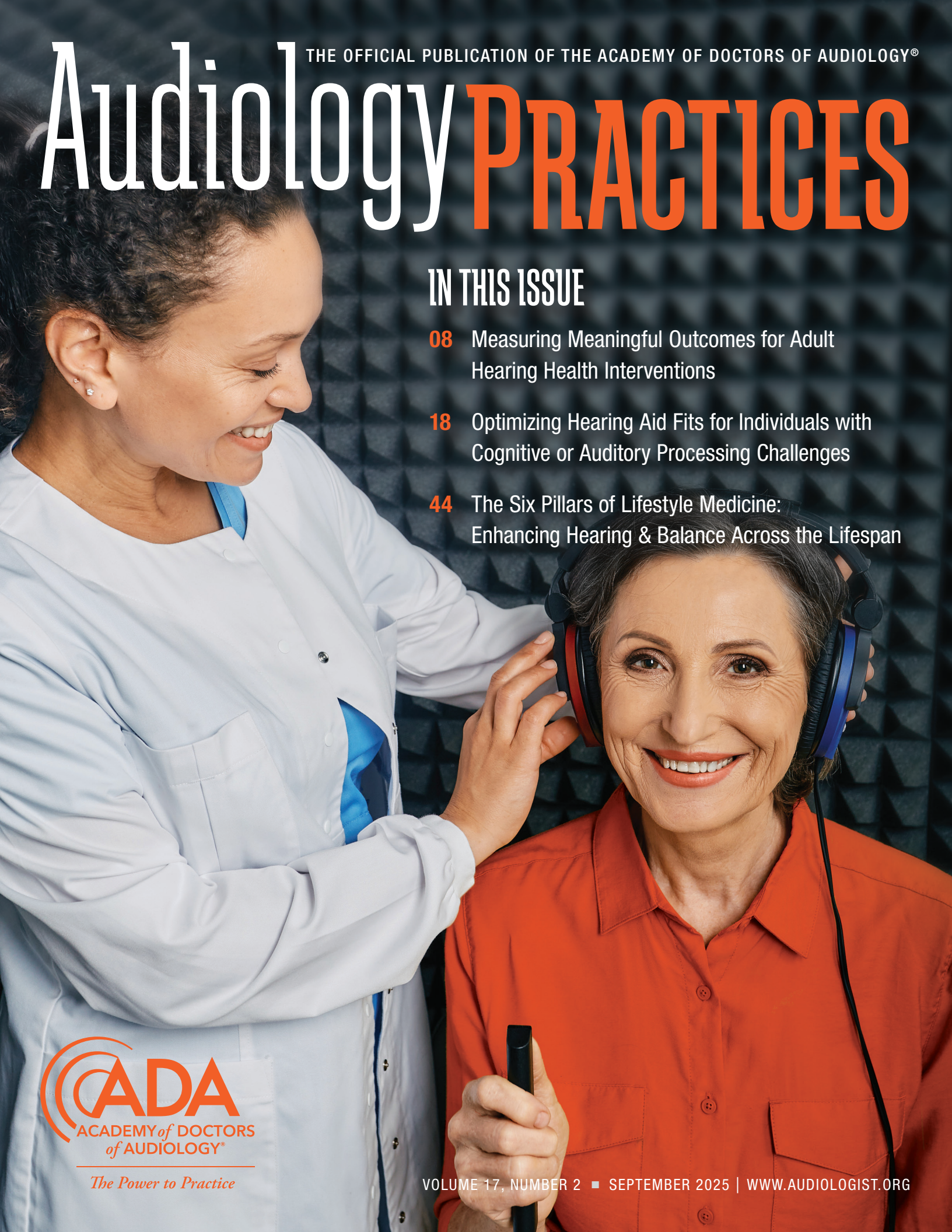
Audiology PRACTICES

IN THIS ISSUE



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VOLUME 17, NUMBER 2 ■ SEPTEMBER 2025 | WWW.AUDIOLOGIST.ORG

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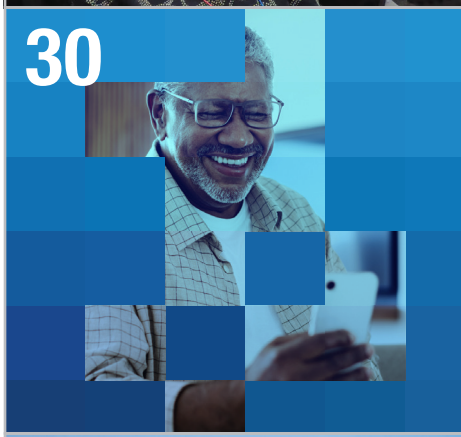

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The Academy of Doctors of Audiology is dedicated to leadership in advancing practitioner excellence, high ethical standards, professional autonomy, and sound business practices in the provision of quality audiological care.

Audiology Practices (USPS 025-476) ISSN (21645248) is published quarterly by the Academy of Doctors of Audiology, 1024 Capital Center Drive, Suite 205, Frankfort, KY 40601. Periodicals Postage Paid at Lexington KY and at additional mailing offices. Subscriptions are $25 as part of membership dues. POSTMASTER: Send address changes to *Audiology Practices*, 1024 Capital Center Drive, Suite 205, Frankfort, KY 40601.

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Amyn Amlani, Ph.D.

Practice Standards, Implementation Science, and the Policy Path to Autonomy in Audiology

Audiology is approaching a defining moment. In the decades since transitioning to the doctoral degree, the profession has demonstrated the expertise to manage complex hearing and balance disorders across the lifespan. Yet our influence in the healthcare system—and our ability to practice to the full extent of our training—remains constrained. We face a choice: define our role through coordinated professional action or allow others to define it for us.

That choice rests on three interconnected pillars: practice standards, implementation science, and professional autonomy. While each is essential, they only achieve their full impact when deliberately aligned. The future of audiology depends on bringing them together into a unified strategy, backed by policy advocacy.

Practice standards are the backbone of professional credibility. They establish what constitutes safe, effective, and ethical care, setting a baseline for quality and patient protection. In audiology, these standards encompass diagnostic procedures, amplification fitting protocols, verification and validation measures, vestibular assessment and rehabilitation, tinnitus management, and pediatric hearing care. They are shaped by professional associations, licensing boards, and federal agencies, and they evolve in response to emerging evidence and technology.

But a standard on paper is different from a standard in practice. In the profession, adherence is inconsistent. Some clinics embed advanced diagnostics, structured counseling, and outcome measurement into every patient encounter. Others operate at the minimum, often due to reimbursement limitations, time pressures, or institutional culture. This variability not only affects patient outcomes but undermines public trust and weakens the profession's collective identity.

Compounding the challenge is the pace of change in hearing healthcare. Over-the-counter devices, artificial intelligence, and shifting payment models are reshaping the healthcare landscape. Standards must adapt, but adaptation alone is not enough. They must also be adopted. This is where implementation science becomes indispensable.

Implementation science examines how evidence-based practices move from research to routine care. It identifies the barriers—whether logistical, cultural, financial, or policy-driven—that keep proven interventions from being widely used. Audiology offers no shortage of examples. Real-ear verification for hearing aids, comprehensive vestibular workups, and structured tinnitus interventions are all backed by compelling evidence, yet they are not universally applied.

Continued on page 62

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Welcome to the Academy of Doctors of Audiology (ADA), the only national membership association focused on ownership of the audiology profession through autonomous practice and practitioner excellence as its primary purposes. ADA is the premier network and resource for audiologists interested in private practice.

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- You want to help advance advocacy efforts that will ensure patient access to audiologic healthcare and professional parity for audiologists with other doctoring professionals.

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Brian Taylor, Au.D.

Unexplained Hearing Concerns & Normal Audiograms: Avoiding Ineffective Narratives

The numbers don't lie. Around one in ten adults in the U.S. have self-reported hearing loss combined with a normal audiogram. A pretty big number for a condition that doesn't have a clear name and lacks a consensus on how to identify and treat it. In addition to being quite prevalent, there is controversy surrounding the labeling of this condition. Until about 25 years ago, individuals presenting to the clinic with self-reported hearing concerns and a normal audiogram were sometimes diagnosed with King-Kopetzky Syndrome—a condition associated with psychosocial factors, such as anxiety and a feeling that the condition is "all in your head." Other terms associated with this condition are hidden hearing loss, obscure auditory dysfunction and many more. All inaccurate or misleading in some way.

Compounding the problem, audiologists put too much stock in the pure tone audiogram. The traditional pure tone audiogram, with testing out to 8000 Hz, provides no actionable information that contributes to a clear diagnosis. Consequently, individuals with this condition are often miffed, disappointed and upset when the audiologist with some glee proclaims their hearing to be normal and offers no additional guidance or explanation, besides "come back in a year."

A ray of hope for those tormented or annoyed by this condition. According to a recent report from Aryn Kamerer and Britton Barker, two researchers at Utah State University, who conducted semi-structured interviews with 15 individuals with self-reported hearing concerns and normal audiograms, there are three themes that explain the behavior and mindset of these patients.

1. **Hearing care providers are dismissive of their problem and disregard their concerns.** That is, the audiologist tends to downplay the patient's self-reported challenges and typically says, "Oh well, your test is normal, that's good news."
2. **Misaligned assessment protocols and patient concerns.** That is, a patient describes problems related to understanding speech in noisy places, but the only test they received was a pure tone audiogram. The patient is leaves saying, "Why didn't you assess the problem I told you about?"
3. **Doctor shopping.** Patients are so anxious or distressed in the lack of a diagnosis, explanation or management strategy that they embark on an endless quest in search of other professionals who might offer an alternative solution. Those that doctor-shop can become susceptible to quack science.

Fortunately, there are a few things audiologists can do to prevent these three themes from emerging in their own clinic.

Continued on page 63

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Audiology Empowered

Empowered is the theme of ADA's 2025 AuDacity Conference, and it is also an essential ingredient for the recipe to advance audiology! Audiology 2050, the roadmap to audiology's future, can only be achieved if audiologists are empowered to ask, empowered to act, and empowered to aim.

Audiology 2050 envisions a future…

- Where audiology's scope of practice is consistent with that of other clinical doctoring professionals;
- Where standardized, evidence-based clinical practices are adopted;
- Where innovative, interdisciplinary staffing and service delivery models are incorporated;
- Where audiologists are activists and advocates for the profession;
- Where audiology is recognized as the primary care entry point for hearing and balance conditions; and
- Where audiologists are recognized as limited license practitioners in the Medicare system.

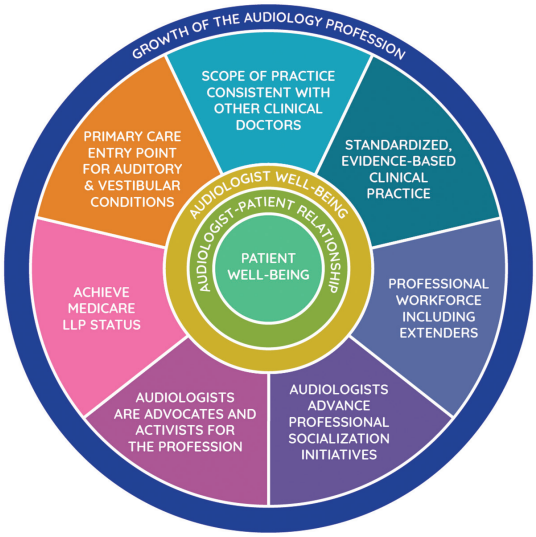
Empowered to Ask. Empowered to Act. Empowered to Aim.

Empowered to Ask reflects a commitment to curiosity, scientific inquiry, and advocacy—a willingness to understand diverse perspectives and adopt new ideas, to raise critical questions and to challenge outdated norms and barriers that limit patient access to audiology services.

Empowered to Act underscores audiologists' resolve to practice autonomously, and to translate knowledge into meaningful action in the clinic, in their communities, and in the media and public policy arenas.

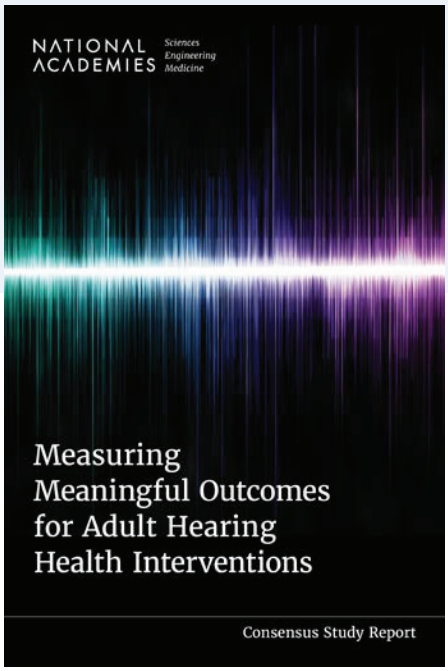
Empowered to Aim speaks to the pursuit of exceptional and evidence-based business and clinical practices, embracing proven standards of care and lifelong learning that propels audiology toward its full potential.

Audiology 2050 is a vision of audiology that is bold, purposeful, and forward-looking. And, it will be achieved by audiologists who are equally bold, purposeful, and forward-looking. ■



Audiology 2050 Roadmap

Measuring Meaningful Outcomes for Adult Hearing Health Interventions



As people get older, they become more likely to have difficulties with hearing in certain situations to the point that it can disrupt their lives in important ways. They may have trouble enjoying music or movies or understanding conversations in noisy environments. These hearing difficulties can sometimes lead to isolation, depression, or even fatigue from the effort needed to communicate with others. Ideally, once clinicians intervene with hearing aids or other approaches, they would be able to evaluate how well the treatment has worked to help these real-life situations. Unfortunately, while there are many ways to assess the outcomes of hearing health interventions, there is no standard approach to allow for the comparison of information across time, settings, and intervention types. Furthermore, current evaluations do not always capture the perspective of the adult with hearing difficulties or consider the issues that matter most to that person. The use of standard outcomes and measures can support clinical decision making, improve research, and emphasize the outcomes with the most meaningful impact.

To address this issue, a coalition of sponsors including the Centers for Disease Control and Prevention, the Defense Health Agency, the Department of Veterans Affairs, and the National Institutes of Health (including the National Institute on Aging and National Institute on Deafness and Other Communication Disorders) asked the National Academies of Sciences, Engineering, and Medicine to convene a consensus committee to identify a core set of outcomes and corresponding measures that researchers and clinicians should use each time they assess how effective hearing aids and other treatments are in addressing hearing difficulties among adults. The committee comprised 13 members with a broad range of expertise, including hearing health care, etiology of and interventions for hearing loss (and hearing difficulties), outcome measurement, primary care,

disability and rehabilitation, quality of life, health disparities, public health, and epidemiology.

The report *Measuring Meaningful Outcomes for Adult Hearing Health Interventions* offers conclusions about the current methods used to assess the effectiveness of hearing treatments in adults and recommendations on how to improve those assessments. In particular, the report identifies specific outcomes that clinicians and researchers should measure whenever they assess the results of hearing interventions in adults. The report details the specific measures that should be used for each outcome and offers recommendations for further research and refining of the core hearing outcomes and measures. In addition, the report provides strategies for promoting the use of these outcomes and corresponding measures in the hearing health community.

THE CORE OUTCOME SET FOR HEARING HEALTH INTERVENTIONS

When assessing the effects of an intervention, researchers and clinicians can measure a multitude of outcomes. For example, outcomes related to hearing and communication include understanding speech in a quiet environment, understanding speech in complex listening situations (such as in a noisy environment), perceiving music and other non-speech sounds, localizing sounds, and expending effort to understand speech or properly perceive other sounds. Other outcomes that may be considered relate to ways in which an individual might be affected by hearing difficulties beyond hearing and communication, including listening fatigue, social connection, hearing-related psychosocial health, socioeconomic effects, participation restrictions, cognition, physical health, and overall quality of life.

The committee considered several criteria to identify the specific outcomes to be included in a core outcome set, including that the outcome is (1) known to be associated with hearing difficulties, (2) meaningful to adults with hearing difficulties and to clinicians, and (3) directly affected by a hearing intervention. The outcome also needed to be well defined and able to be reliably assessed by at least one existing measure.

Audibility is the ability to detect sound across a broad frequency range and across a range of input levels. Improvement in audibility, an initial outcome of intervention, is a necessary first step to attaining successful outcomes, but improved audibility alone does not guarantee improvement in other meaningful outcomes that should be assessed.

Ultimately, two outcomes were identified for inclusion in the core outcome set: understanding speech in complex listening situations (such as an understanding of what a person is saying in a noisy restaurant) and hearing-related psychosocial health (such as the frustration some people can feel when they are not able to communicate easily with others) (see **Recommendation 5-1** in the report). This core set serves as a foundation for outcome assessment of hearing health interventions. Clinicians and researchers working with adults with hearing difficulties may need to examine additional outcomes that they find useful or meaningful for a particular person, setting, purpose, or population.

STANDARDIZED OUTCOME MEASURES FOR HEARING HEALTH INTERVENTIONS

The report also addresses which measures should serve as the standard ways to measure these core outcomes. The committee judged each of the candidate measures according to a variety of criteria including reliability, validity, and feasibility. Ultimately, for measuring an individual's understanding of speech in complex listening situations, the committee recommends the Abbreviated Profile of Hearing Aid Benefit (APHAB) global score, and the Words in Noise (WIN) test. To measure hearing-related psychosocial health, the committee recommends the Revised Hearing Handicap Inventory (RHHI) (see **Recommendation 6-1** in the report).

Two measures are recommended for assessing understanding of speech in complex listening situations because evidence shows the importance of having both a subjective report directly from the individual about how much a treatment has helped (the APHAB-global) and an objective measure taken by a clinician or researcher (the WIN test). Depending on context, other measures also

may be needed for examining additional outcomes or for providing additional details on one of the core outcomes.

FUTURE RESEARCH ON OUTCOMES OF HEARING HEALTH INTERVENTIONS

In examining what is known about the outcomes that are most meaningful to adults with hearing difficulties, the committee identified a number of areas where further research would be particularly valuable. For instance, there has been relatively little research that asks adults directly about which outcomes they find most meaningful. Instead, the evidence in this area has been mostly indirect, inferred from surveys asking patients about their satisfaction with interventions aimed at improving their hearing or from studies of how common or severe hearing difficulties are among adults. The report calls for sponsors of hearing health research to fund additional research to engage adults with hearing difficulties, their communication partners, and clinicians to determine the most meaningful outcomes based on direct evidence from adults with hearing difficulties (see **Recommendation 4-1** in the report).

Sponsors of hearing health research should fund research to build the evidence base on the clinical effect of hearing health interventions on key outcomes that are meaningful to adults with hearing difficulties and clinicians (see **Recommendation 5-2** in the report).

DEVELOPMENT AND REFINEMENT OF MEASURES FOR HEARING HEALTH INTERVENTIONS

Improving hearing health for older adults will also require further development and refinement of the measures used to assess hearing outcomes, including the measures that the committee recommended for use with the core outcome set.

The report offers specific recommendations on how to further develop and refine measures used to assess outcomes of hearing treatment. For the three measures recommended for use with the core outcome set, sponsors of hearing health research should support studies aimed at (a) developing links among the various measures, such as among different variations of the Hearing Handicap Inventory (HHI); (b) establishing the sensitivity to change (relative to intervention) of the three recommended measures; (c) developing a WIN equivalent in other languages; (d) assessing associations among the set of core outcomes to further establish the independence and uniqueness of each measure; and (e) using item response theory to further refine the three recommended outcome measures (see **Recommendation 6-2** in the report).

In addition, research on other outcome measures is needed (see **Recommendation 6-3** in the report). Particularly, research is needed for broader psychometric development of the Quick Speech-in-Noise Test, exploring the use of the Digit-in-Noise test as an outcome measure, and investigating the use of high-quality, language-agnostic tests to assess sound processing in complex listening situations.

UPTAKE OF THE CORE OUTCOME SET AND MEASURES FOR HEARING HEALTH INTERVENTIONS

The report concludes with five recommendations to encourage uptake of the core outcome set and measures. Awareness and understanding of the core outcome set and the corresponding measures is an essential first step. Information about the set and the measures should be shared with clinicians of first contact, hearing health clinicians, and adults with hearing difficulties (see **Recommendation 7-1** in the report).

The report also recommends strategies for creating incentives to use the core outcome set as well as strategies for alleviating burdens to its use. Sponsors of research on hearing health interventions should require the use of the core outcome set and corresponding measures (at a minimum) unless scientifically justified for exclusion, electronic health record (EHR) vendors should incorporate the APHAB and RHHI into EHRs, and insurers who require outcome measures should require the use of the recommended measures (see **Recommendation 7-2** in the report).

To facilitate big data meta-analyses, the report calls for the National Institutes of Health to develop a national database to allow clinicians and researchers to benchmark the use of the core outcome set and

corresponding measures as well as their results (see **Recommendation 7-3** in the report). The report also recommends revisiting the core outcome set in the future after an adequate level of new research has been gathered (see **Recommendation 7-4** in the report), and funding research on comprehensive implementation science approaches to identify additional key facilitators for and barriers to the update and use of the core outcome set and corresponding measures (see **Recommendation 7-5** in the report).

COMMITTEE ON MEANINGFUL OUTCOME MEASURES IN ADULT HEARING HEALTH CARE **Theodore G. Ganiats** (*Chair*), University of California, San Diego; **Kendall M. Campbell,** University of Texas Medical Branch; **Tamala David,** State University of New York at Brockport; **Larry E. Humes,** Indiana University Bloomington; **Alan M. Jette,** Boston University; **Colleen G. Le Prell,** University of Texas at Dallas; **Uchechukwu Megwalu,** Stanford University; **Catherine Palmer,** University of Pittsburgh and University of Pittsburgh Medical Center; **Carla Perissinotto,** University of California, San Francisco; **Thomas A. Powers,** Powers Consulting, LLC; **Nicholas Reed,** NYU Grossman School of Medicine; **Sherri Smith,** Duke University School of Medicine; **Fan-Gang Zeng,** University of California, Irvine.

STUDY STAFF **Tracy Lustig,** Study Director and Senior Program Officer; **Ella Morse,** Research Associate; **Abian Hailu,** Senior Program Assistant; **Taylor King,** Associate Program Officer (*from November 2024*); **Crystal J. Bell,** Program Officer (*from July 2024 to December 2024*); **Julie Wiltshire,** Senior Finance Business Partner; **Sharyl J. Nass,** Senior Board Director, Board on Health Care Services

NATIONAL ACADEMY OF MEDICINE (NAM) FELLOWS **Cameron Gettel,** Yale School of Medicine; **Paule Joseph,** National Institutes of Health

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FOR MORE INFORMATION

This Consensus Study Report Highlights was prepared by National Academies staff based on the Consensus Study Report *Measuring Meaningful Outcomes for Adult Hearing Health Interventions* (2025).

The study was sponsored by the Centers for Disease Control and Prevention, the Defense Health Agency (contract no. HT942524P0098), the Department of Veterans Affairs, and the National Institute on Aging and the National Institute on Deafness and Other Communication Disorders under a contract with the National Institutes of Health (contract no. HHSN263201800029I and task order no. 75N98023F00011). Any opinions, findings, conclusions, or recommendations expressed in this publication do not necessarily reflect the views of any organization or agency that provided support for the project. Copies of the Consensus Study Report are available from the National Academies Press, (800) 624-6242 or https://www.nap.edu/catalog/29104.

Health and Medicine Division

NATIONAL ACADEMIES *Sciences Engineering Medicine*

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Recommendation 5-1: Individuals and organizations engaged in hearing health interventions should adopt the following outcomes as a core outcome set in both research and clinical settings:

- Understanding speech in complex listening situations
- Hearing-related psychosocial health

Recommendation 6-1: When assessing outcomes in hearing health, clinicians, researchers, and individuals should use the following outcome measures for each of the outcomes in the core outcome set:

a. Understanding speech in complex listening situations
    i. Abbreviated Profile of Hearing Aid Benefit test (global score)
    ii. Words in Noise test
b. Hearing-related psychosocial health
    i. Revised Hearing Handicap Inventory

Recommendation 4-1: Sponsors of hearing health research should fund additional research to engage adults with hearing difficulties, their communication partners, and clinicians to determine the most meaningful outcomes based on direct evidence from adults with hearing difficulties**.**

Recommendation 5-2: Sponsors of hearing health research should fund research to build the evidence base on the clinical effect of hearing health interventions on key outcomes that are meaningful to adults with hearing difficulties and clinicians.

Recommendation 6-2: Sponsors of hearing health research should fund further psychometric evaluation of the measures recommended for the core outcome set. Specific areas of research include the following:

a. Development of links and crosswalks
    i. Words in Noise (WIN) test versus Quick Speech in Noise (Quick-SIN) test
    ii. Among different variations of the Hearing Handicap Inventory (HHI)
b. Establishment of the sensitivity to change relative to intervention (including minimal detectable change and minimal clinically important difference) for the WIN, the global score from the Abbreviated Profile of Hearing Aid Benefit (APHAB-global), the Revised HHI (RHHI), and the screening (RHHI-S)
c. Development of WIN (and QuickSIN) in other languages
d. Assessment of associations among the set of core outcomes to further establish the independence and uniqueness of each measure
e. Application of item response theory to further develop and refine the recommended outcome measures.

Recommendation 6-3: Sponsors of hearing health research should fund research to develop and refine hearing health outcome measures beyond the currently recommended measures, including:

a. Broader psychometric development of the Quick Speech in Noise (QuickSIN) test;
b. Exploration of the use of the digits-in-noise test as an outcome measure; and
c. Exploration of the usefulness of high-quality language agnostic tests for sound processing in complex listening situations.

Recommendation 7-1: Health academic organizations and programs, professional organizations, researchers, and consumer groups should disseminate information about the importance of the core outcome set to clinicians of first contact (e.g., primary care clinicians), hearing health clinicians (e.g., students, audiologists, otolaryngologists), and adults with hearing difficulties.

Recommendation 7-2: To create incentives for the use of the core outcome set and corresponding measures the following should occur:

a. Sponsors of research on hearing health interventions should require the use of the core outcome set and corresponding measures (at a minimum), unless scientifically justified for exclusion.

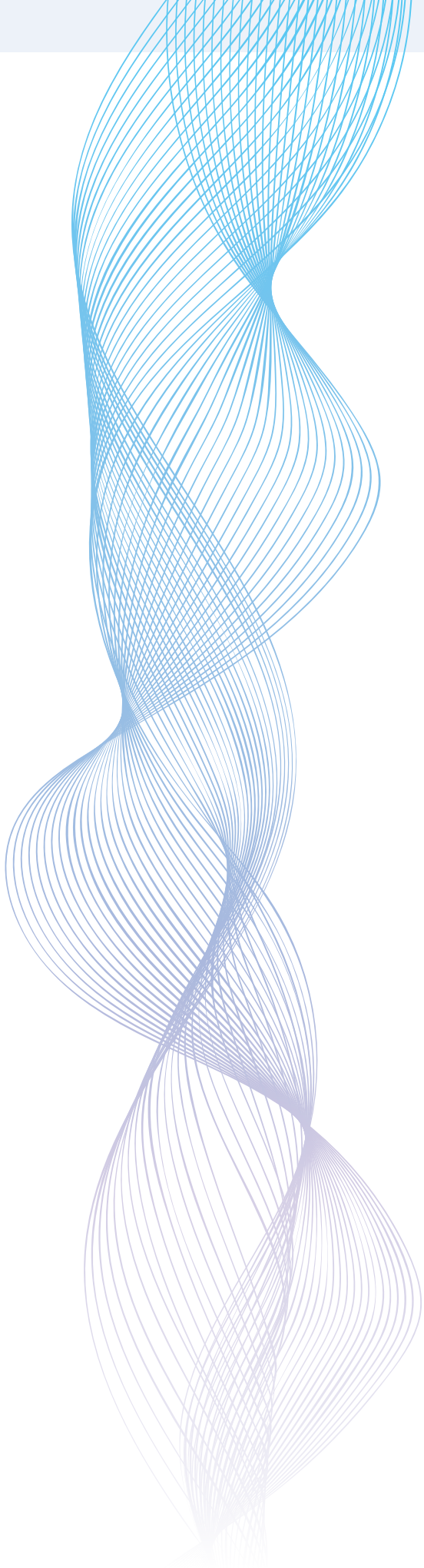
b. Electronic health record (EHR) vendors should incorporate the Abbreviated Profile of Hearing Aid Benefit and Revised Hearing Handicap Inventory into EHRs.

c. Insurers who require outcome measures should require the use of the recommended measures.

Recommendation 7-4: After an adequate level of new research has been gathered, the National Institutes of Health, the Department of Defense, and the Veterans Administration should collaborate to revisit the core outcome set.

Recommendation 7-3: To facilitate big data meta-analyses, the National Institutes of Health should develop a national database to allow clinicians and researchers to benchmark the use of the core outcome set and corresponding measures as well as their results.

Recommendation 7-5: Sponsors of hearing health research should fund research on comprehensive implementation science approaches to identify additional key facilitators for and barriers to the uptake and use of the core outcome set and corresponding measures.



Q&A

What Does NASEM's Measuring Meaningful Outcomes Mean to Clinicians and Business Owners?

Nicholas Reed, Au.D., Ph.D., shares some thoughts

To learn more about the NASEM's recent report, *Measuring Meaningful Outcomes for Adult Hearing Health Interventions,* Brian Taylor, the editor of *Audiology Practices,* reached out to Nick Reed, one of the committee members who created the consensus report.

BT: Many of our readers are familiar with your affiliation with New York University. Please tell us about your background and role there.

NR: After just over 10 years at Johns Hopkins University, I joined the faculty at the New York University Grossman School of Medicine as an Associate Professor in the Departments of Otolaryngology-Head and Neck Surgery and Population Health. I spend most of my time at NYU in my role as core faculty at the Optimal Aging Institute, a multidisciplinary institute dedicated to studying factors associated with and intervention targets for optimal aging. At the institute, I work on the ACHIEVE clinical trial (randomized control trial of best practice hearing care) follow up studies to understand the long-term impacts of hearing care and I run a dedicated audiology core that supports integration of hearing measures in epidemiologic studies across the globe.

BT: Please highlight some of your most recent research and how it applies to clinical practice.

NR: One of my most recent papers was a secondary analysis of the ACHIEVE randomized control trial where we examined social isolation and loneliness outcomes over 3-years among older adults with hearing loss who received best-practice hearing intervention compared to those in an achieve healthy education control group. We found that older adults who received hearing care retained one additional person in their social network relative to the health education control group over 3 years. Moreover, adults in the hearing intervention group had more diverse social networks and reported lower levels of loneliness over the 3-year period. While statistically significant, it is unknown whether observed changes in social network are clinically meaningful as there are no reported clinical cutoffs, and loneliness measure changes do not represent clinically meaningful changes. However, no participants were clinically lonely at baseline as that was not the target population for the trial. These results were robust across participants and suggest hearing intervention is a low-risk strategy that may help promote social connection among older adults. When having conversations on the benefits of hearing care among potential customers, these results offer a relatively straight forward story on the broader health benefits of hearing care compared to some of the more complicated areas such as cognitive decline.

Reed, N. S., Chen, J., Huang, A. R., Pike, J. R., Arnold, M., Burgard, S., ... & ACHIEVE Collaborative Research Group. (2025). Hearing intervention, social isolation, and loneliness: a secondary analysis of the ACHIEVE randomized clinical trial. *JAMA internal medicine*.

BT: I understand that you were on the NASEM committee that created the Measuring Meaningful Outcomes report. Tell us why this committee was convened and about the process the committee used to create their recommendations.

NR: That's correct, I was one of the 13 committee members. The National Academies of Sciences, Engineering, and Medicine (NASEM) has long played an important role in the United States as a convener of scientists to perform independent, professional studies or reports when asked. In this case, the National Institute on Aging, the National Institute on Deafness and Other Communication Disorders, Centers for Disease Control and Prevention, the Defense Health Agency, and the Department of Veterans Affairs requested a NASEM committee to review the state of science on hearing care outcomes (excluding surgically implanted devices) that are meaningful to individuals and clinicians and recommend a core outcome set for use in clinical and research settings. When used ubiquitously, core outcome sets are powerful tools that facilitate evaluation and comparisons of research and clinical care decision by standardizing at least some of the outcomes – it's always important to note that core outcome sets don't limit outcomes to the set, just recommend their inclusion in all relevant settings in addition to other outcomes of interest.

To accomplish our task, the committee reviewed the broad literature, held several public sessions to gain insights from key stakeholders, and developed basic guidelines to evaluate the inclusion of different outcome areas as well as evaluate the scientific acceptability (validity, reliability, sensitivity to change) of different instruments. We split into subgroups that reviewed the literature for targeting outcome measures from communication (i.e., understanding speech in complex situations, hearing-related psychosocial health) and non-communication (i.e., social isolation and cognition) domains. After we settled on domains of interest, we reviewed the literature to suggest recommended instruments for the core outcome set. At each step of the way we required consensus votes to move forward. It's a long process but the result is a strong, agreed upon set of recommendations.

The final report can be found online for free at https://nap.nationalacademies.org/29104

BT: I'd like to focus on the committee's recommendations that are most pertinent to work in the clinic. One of the core outcomes established by the committee is "understanding speech in complex listening situations." For this outcome the committee recommended use of the Abbreviated Profile of Hearing Aid Benefit (APHAB) self-report and the Words in Noise (WIN) test.

NR: That's right. These were among the dozens of instruments we reviewed during the process.

BT: Could you give us some details on why the committee settled on these two measures?

NR: The committee review process involved pulling studies using the various proposed instruments assessing their psychometric properties. We looked at validity (e.g., is the instrument measuring what it says it intends to measure), reliability (e.g., is the instrument consistent when measured under the same conditions), and sensitivity to change (e.g., will the measure change with appropriate hearing care). The report details that we had to make a lot of tough decisions as a committee as we often found there to be more research needed.

Nicholas Reed, Au.D., Ph.D.

BT: Many clinicians use the Quick SIN. Why did you choose the WIN over the Quick SIN?

NR: This was a hot debate for the committee and it's important to note that we required unanimous agreement before moving forward. The report includes a full side by side comparison of the QuickSIN and WIN psychometric properties (Appendix D). Both instruments had pros and cons and the report acknowledged that the QuickSIN is more widely used and faster. However, the WIN was ultimately recommended due to more rigorous psychometric assessments in the published literature. Specifically, there was stronger test-retest reliability evidence. The committee also noted that the WIN is currently part of the National Institutes of Health (NIH) toolbox and has been translated to Spanish. Two factors that could help propel its use in research and clinic.

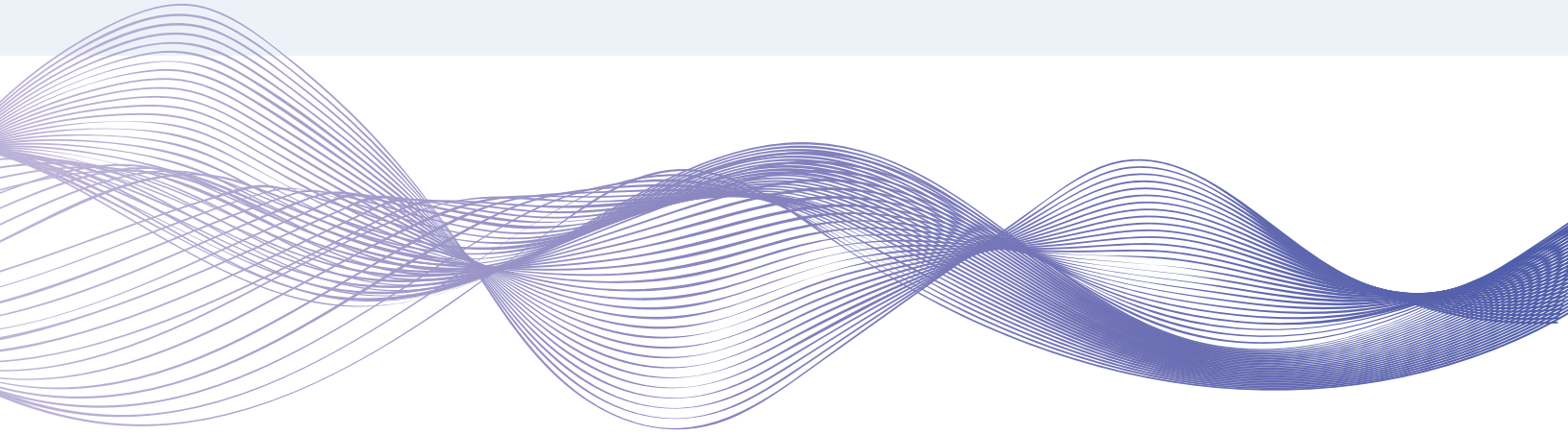
BT: The same holds true for the Client-oriented Scale of Improvement (COSI) self-report; it is quite popular in the clinic. Why did you choose the APHAB, which is used extensively in research but seldom used by clinicians. Why was the APHAB chosen over other shorter self-reports?

NR: This is near and dear to my heart as the COSI has long been one of my favorite instruments in guiding and assessing clinical care. The decision to recommend the APHAB is not at all a knock against the COSI as each has strengths and weaknesses. The committee found that the APHAB was well researched and psychometrically sound. Also key to the recommendation is that the APHAB fits within the domain of understanding speech in complex listening situations while many of the other candidate instruments (e.g., COSI, SSQ) go beyond this broader domain. Again, the APHAB doesn't have to replace anything but can be used alongside other instruments.

BT: In my experience, few clinics in the US use either of these measures. Do you think clinicians who routinely rely on COSI, and Quick SIN should continue to use them? How can we encourage more clinicians to use the WIN and APHAB?

NR: It's a great point, I am not sure on the exact percentage of clinics using these measures, but in a field where less than half of clinicians use real-ear measures and a field with dozens and dozens of outcome instruments, I do expect a lot of heterogeneity, and I think it'll take time to get everyone on the same page. It's always important for me to point out that these measures don't have to replace other measures and instruments and could be part of a broader outcome battery. Though, I know it's also unrealistic for clinics to have too many outcome measures.

It's no small task for audiology and the broader hearing care community to adopt a core set of outcome measures. My hope is that this report's rigor will help convince some. However, educational outreach and calling for alignment will only go so far – no matter how strong the science is backing a core outcome set. My personal belief is that audiology leaders from industry, clinical care, research, and policy will need to show the field the power of a core outcome set by producing studies comparing outcomes. Once we can show people that aligning on a core outcome set allows for readily comparisons between interventions then I believe adoption can really take off. We're keeping our field in the slow lane with so little overlap between the outcome measures currently in use.



BT: The committee also established another core outcome to be "hearing-related psychosocial health." Please shed some light on what that term encompasses.

NR: Broadly, psychosocial health refers to mental, psychological, emotional, and social wellbeing. Even within these areas are more specific outcomes such as embarrassment, irritability, frustration, nervousness, anxiety, loneliness, and depression. These are each important domains on their own that are separate from hearing. However, during the committee reviews, it was noted that several instruments focused on these areas when they were tied to hearing. Specifically, the Hearing Handicap Inventory has historically shown sensitivity to change and includes several items on how hearing specifically impacts these outcomes (e.g., embarrassment, irritability, nervousness, etc.). After some discussion, the committee referred to the combination of psychological and social challenges experienced by those with hearing difficulties collectively as hearing-related psychosocial health. So, while the term sounds kind of new, it's something we've had for a very long time.

BT: The committee's recommendation for measuring this outcome is the Revised Hearing Handicap Inventory (RHHI). How is the revised HHI different than the HHIE/A, which many clinicians have been using for several years?

NR: The Revised Hearing Handicap Inventory (RHHI) is a relatively recent instrument. It is based in the same set of questions using in the HHIE/A. Using a large community-based sample, researchers recommended a reduction of the number of questions in the HHIE to 18 and recommended a 10-item screener (RHHI-S) using a special type of analysis that can refine questionnaire items to represent a single construct or domain. The committee felt that this was a psychometrically sound evolution of the HHIE such that it improved the validity of the instrument. It doesn't hurt that it reduced the time needed to administer the instrument by reducing the number of questions.

The article is noted below, for those interested.

BT: What can ADA members do to encourage greater uptake of the core outcome set and their recommended measures for hearing care intervention?

NR: The ADA has been such a valued collaborator during the NASEM Committee's efforts and process. I think what is key now is that we get the word out about the recommended core outcome set and rationale behind it. The ADA can also help in guiding clinicians in where to find the measures and how to obtain them for integration into the clinic. Importantly, I think the next step is for the ADA and other professional bodies to begin to brainstorm how we can demonstrate the importance of adopting core outcome sets backed by rigorous scientific processes. ■

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Q&A

OPTIMIZING HEARING AID FITS

FOR INDIVIDUALS WITH COGNITIVE OR AUDITORY PROCESSING CHALLENGES

Interview with Dr. Heidi Hill,

OWNER OF HEARING HEALTH CLINIC, OSSEO, MN

One of the joys (and challenges) of private practice is deciding how you want to spend your time with patients. Dr. Heidi Hill, a leader in providing comprehensive "ear-brain" hearing care to her community, is a prime example. In her practice, located about 10 miles northwest of Minneapolis, in Osseo, Minnesota, Dr. Hill thoughtfully integrates the latest auditory and cognitive research into personalized hearing care. In this interview, she goes into painstaking detail on her approach to assessing, counseling and fitting older adults who are at-risk for cognitive and auditory processing challenges.

If you are lucky, you might even get to see her in-person at the upcoming ADA meeting at 10 am, on Saturday, September 27, where she lectures on these topics.

AP: Before we dive into our topic, please tell us about your practice. (Where is it? How long has it been in business? What did you do before opening your practice)

HH: Before I opened my practice, I worked in a private clinic in Tampa, Florida, and spent several years as a government representative for hearing aid manufacturers. I realized I missed working with patients, so I took a job with an ENT group for 10 months before I admitted that was not the kind of clinical work that I wanted to provide. I found myself back in a private practice, which I loved until the owner sold it to a buying group, and I found myself out of a job. That's when I had the genius decision to buy my practice.

In 2007, at the start of a recession and with a toddler and a 3-month-old at home, I purchased my clinic. That baby is headed to college next week, so while it was challenging, it was the right decision and has fashioned me into the audiologist that I am today. That and the disparity between what we know from research in audiology to what we are doing in the clinic. I never understood why we weren't doing all the things that research shows we should be doing. I was waiting for someone in the field to show us how to practice evidence-based, comprehensive audiology while still running a sustainable business. But one day I realized: my patients couldn't wait. So, I stopped waiting and started doing.

I didn't have all the answers. I had insecurities, like most clinicians do. But I began integrating the science myself; testing, learning, adapting. I stepped outside the box. Today, my work is grounded in research and functional, patient-centered care. I practice neuroaudiology; not just hearing care, but brain-based audiology that considers the entire auditory system from ear to brain.

AP: What differentiates your practice from others in the area?

HH: Our approach extends far beyond the cochlea. I've long been driven by the idea that the audiogram doesn't tell the full story. We must assess and treat both the peripheral and central auditory systems. While some clinicians wait for a "gold standard" before adopting new approaches, I've learned, especially as the parent of a child with a chronic mental illness, that we can't always wait for perfect solutions. Patients and their families need help now.

That philosophy drives me to integrate the best available research into practice, even when the protocols aren't perfect. I follow Arthur Ashe's advice: *"Start where you are. Use what you have. Do what you can."* I remain endlessly curious, determined, and tenacious in helping patients achieve optimal outcomes.

As such we don't compromise on our commitment to practicing ear-to-brain, evidence-based, functional audiology. We offer functional hearing evaluations, a 2-hour evaluation that includes questionnaires, information about cognitive processing, listening effort, and suprathreshold performance in addition to traditional audiologic assessments. We also believe that experiential learning is important for our patients, so during this appointment patients are fit optimally with hearing aids (probe microphone measurements and temporary custom fit earmolds made in the clinic if needed) followed by outcome measures.

We also complete auditory processing evaluations, including speech evoked potentials or Frequency Following Response (FFR), an objective measure of auditory processing. Recently, we have started providing auditory training as well.

While some clinicians wait for a "gold standard" before adopting new approaches, I've learned that we can't always wait for perfect solutions. Patients and their families need help now.

AP: Let's start with cognition, auditory processing, hearing loss and aging. How do you counsel your patients about these issues when they arrive for an appointment?

HH: We explain to patients right away that the "beep-beep" test only tells us if your brain detects sounds, but it doesn't tell us if your brain is getting enough information to understand the speech, especially in noise. I think that most hearing healthcare professionals are good about telling patients that we don't hear with our ears, but rather with our brains. However, that's a challenging concept to truly grasp, especially when we don't examine the entire system; we only test the ears.

My counseling involves other testing that I complete, from the questionnaires to suprathrehold testing. When I talk about hearing it's from the brain's perspective. What kind of information is the brain getting about sound from the ears and/or the auditory nervous system? That's when I talk about the audiogram to show them what the brain is not getting. I counsel about the Ease of Language Understanding model

from cognitive hearing science. I may talk about maladaptive cortical reorganization. I always talk about listening effort, since functionally, that is the cognitive processing piece. We can support the brain by improving the signal—and yes, we can help.

I may discuss how our auditory nervous system is responsible for separating and identifying sounds, amplifying essential sounds and attenuating or inhibiting non-essential ones. Our auditory nervous system essentially processes the data, and it must do so incredibly quickly.

I'll explain how aging impacts every aspect of hearing, from the ears to the brain. We know that auditory processing changes with age; temporal and binaural processing decline with age. Those are difficult concepts for patients to understand, so I don't really try to explain them, but those changes do impact how I program their hearing aids. With the patient, I'll talk more about cognitive processing changes they may be experiencing. For example, regarding how our processing speed slows down, we may feel like people are talking too fast. I explain working memory; its role in hearing and how it declines with age. I point out how that may impact long-term memory and why the patient may feel like they can't keep up with the conversation or may miss the end of sentences.

AP: What makes these patients more complex to work with?

HH: We know that changes in both auditory and cognitive processing as a result of aging make listening more difficult, especially in complex listening situations. These patients often present with subtle or overlapping challenges: hearing loss, processing difficulties, possibly cognitive decline, or all the above. Hearing aids do not directly enhance central processes and may, in fact, introduce distortion to sound, which can make listening more effortful.

As audiologists we need to use our expertise in acoustics and psychoacoustic to make sure that we are fitting patients optimally. We need to complete suprathreshold testing so we are more informed about our patients' abilities. We can't just focus on audibility (hopefully with verification of gain targets) and what hearing aid manufacturers teach us about fitting their products.

AP: In your experience, is there a certain chronological age that corresponds with declines in hearing and cognition?

HH: There's no magic number. But in general, extended high-frequency hearing begins to decline in our 30s, which affects spatial hearing and speech-in-noise understanding. I believe age-related hearing loss is due to acoustic overexposure, which increases as we age.

Cognitive processing changes typically begin in the 40s and 50s. That said, lifestyle, education, neurological health, and even music training can all impact this trajectory.

AP: Walk us through a typical assessment with a patient who might be at-risk for cognitive issues.

HH: We begin with patient-centered intake using questionnaires such as the SSQ-12, HHQ, Vanderbilt Listening Fatigue Scale, and the Communication Confidence Profile. These tools help us understand functional hearing and set collaborative goals with the patient and family.

I often include a cognitive screener, which is currently Cognivue, not to diagnose cognitive impairment, but to assess domains important to hearing: memory, executive function, and processing speed. I never talk about "dementia", instead, I frame results in terms of how the brain handles auditory information.

Suprathreshold testing is essential.

- Acceptable Noise Level testing (to determine tolerance to noise)
- Probe mic measures, with temporary earmolds if needed
- AZBio speech-in-noise in the soundfield (unaided and aided, similar to cochlear implant (CI) candidacy)
    - » Followed by subjective measures (adapted from NASA TLX) to assess listening effort, confidence, frustration, and motivation to engage/participate

AP: When and how do you assess for auditory processing disorder (APD)?

HH: If peripheral hearing is normal and symptoms suggest APD, I perform a full assessment battery, including:

- Temporal processing
- Dichotic listening
- Monaural low redundancy
- Masking level difference
- Frequency Following Response (FFR)

FFR has been invaluable in revealing subcortical timing deficits and is a great addition to confirming behavioral measures and showing patients objectively why they are having difficulty hearing.

AP: How do you screen for cognitive decline in your clinic?

HH: I'm currently using Cognivue, because it does not require a lot of my time and provides information about memory, executive function and processing speed. It's not perfect, but there is no gold standard for cognitive screening, and it informs me in combination with the rest of the functional needs assessment.

AP: During your assessment, what types of auditory processing tests do you conduct, if any?

HH: It depends. If there is peripheral hearing loss I will sometimes do a dichotic measurement, which is not sensitive to hearing loss and tells me about binaural integration abilities. If there is a "weak" ear for processing, as is often seen with aging, I have started recommending Dichotic Interaural Intensity Difference (DIID) as part of treatment and doing it with them at their hearing aid follow-up. DIID auditory training is a method used to improve listening skills, particularly for individuals with dichotic listening deficits, which are common in CAPD. It works by manipulating the intensity of sounds presented to each ear, often making one ear quieter to help the brain better process information from both ears. This training aims to improve both binaural integration (processing information from both ears simultaneously) and binaural separation (focusing on one ear while ignoring the other).

If self-reported hearing handicap scores and patient testimonials don't line up with the degree of hearing loss, and there is no cognitive decline, I will throw in some auditory processing measures.

If peripheral hearing is normal, I will do a full auditory processing evaluation that assesses temporal processing, dichotic assessments, MLD, monaural redundancy testing. I am lucky enough to have the ability to run Frequency Following Response (FFR) measures, which paired with behavioral testing provide really great information about auditory processing that traditional testing completely misses. The specifics of which, will guide treatment recommendations.

Of course, I'm always conducting speech-in-noise testing using Az Bio, and I may augment it with the QuickSIN and the LiSN-S.

AP: Tell us about the research or clinical evidence that supports your assessment protocol?

HH: LOL, I'll attach some of the references for you! (These are posted at the end of the interview).

AP: What is the difference between auditory processing and cognitive processing problems?

HH: I think of auditory processing as more of the bottom-up (afferent) processing and cognitive processing as the top-down (efferent) processing. One is not completely separate from the other as the afferent and efferent systems work together for understanding.

Decline in the bottom-up signal (hearing loss and auditory processing – temporal and/or binaural processing) will impact how much the brain has to compensate. Cognitive processing problems will impact if the patient is able to compensate for a poor bottom up signal.

AP: How do you handle failures on a cognitive screening?

HH: I counsel the patient/family about how cognitive processing is needed to compensate for the poor bottom-up signal, whether it's from the complexity of the environment or hearing loss/poor auditory processing. I often counsel patients in the following way: "You just completed a screening that assesses some cognitive processes, it indicates that you may have some weaknesses in these areas. That may contribute to the challenges that you are having with hearing in noisy places. I will make considerations for fitting your hearing aids the best way possible, but hearing aids will not change how you process so you may need more support than the hearing aids (remote mics, clear speech, visual cues, environmental modifications etc.)." In addition, I will let the patient know that they need to follow up with their physician since this is a cognitive screener. "It's important that you follow up with your physician since we want to ensure there is nothing medically going on that is impacting your cognitive processing (e.g., sleep apnea, vitamin deficiency, UTI, and yes, dementia, but I don't really go there)."

Sometimes I will refer the family directly to neurology if it is apparent by their report, the patient's behavior and the cognitive screener that a neurological evaluation is in order.

I will also let the patient know that their scores may not have been great because they were nervous or stressed and really don't mean anything at all.

AP: Describe your clinical approach to fitting hearing aids on individuals who might have auditory or cognitive processing problems?

HH: Ah, this is what my talk at ADA is about! I hope to see you in Washington DC in late September.

Here are some thoughts supported by the research (see my references):

Number one is preserving the speech envelope. We can inadvertently increase our patients' listening effort by distorting the signal that their brain is relying on, which is the speech envelope.

Number two is to improve the signal-to-noise ratio as much as possible, ensuring that excessive noise reduction does not compromise the speech envelope. Remote microphones for use with family members is great, but it is not realistic to expect your patient who has cognitive decline to be able to handle lots of technology.

Number three is to validate your fitting. We can't just rely on verification. Audibility is important, but we can inadvertently be distorting the speech envelope.

Validate your fitting. We can't just rely on verification. Audibility is important, but we can inadvertently be distorting the speech envelope.

AP: What research or clinical evidence supports your approach?

HH: Here are a few recent publications that I have integrated into my clinical approach:

- Alexander JM. Hearing Aid Technology to Improve Speech Intelligibility in Noise. Semin Hear. 2021 Aug;42(3):175-185. doi: 10.1055/s-0041-1735174. Epub 2021 Sep 24. PMID: 34594083; PMCID: PMC8463122
- Alexander, Joshua. Hearing Smarter: How AI is Transforming Hearing Aids. Audiology Online Course. 2024 https://www.audiologyonline.com/audiology-ceus/course/hearing-smarter-ai-transforming-aids-39924

- Balling LW, Jensen NS, Caporali S, Cubick J, Switalski W. Challenges of instant-fit ear tips: What happens at the eardrum? Hearing Review. 2019;26(12)[Dec]:12-15.
- Branda E, Wurzbacher T. Motion Sensors in Automatic Steering of Hearing Aids. Semin Hear. 2021 Aug;42(3):237-247. doi: 10.1055/s-0041-1735132. Epub 2021 Sep 24. PMID: 34594087; PMCID: PMC8463121.
- Derleth P, Georganti E, Latzel M, Courtois G, Hofbauer M, Raether J, Kuehnel V. Binaural Signal Processing in Hearing Aids. Semin Hear. 2021 Aug;42(3):206-223. doi: 10.1055/s-0041-1735176. Epub 2021 Sep 24. PMID: 34594085; PMCID: PMC8463127
- Hayes D. Environmental Classification in Hearing Aids. Semin Hear. 2021 Aug;42(3):186-205. doi: 10.1055/s-0041-1735175. Epub 2021 Sep 24. PMID: 34594084; PMCID: PMC8463125
- Kuk, F. (2016, September). Selecting the right compression. AudiologyOnline, Article 18120. Retrieved from www.audiologyonline.com
- Munro, K. Integrating cochlear dead region diagnosis into the hearing instrument fitting process.
- Mueller G, Stangl E, Wu Y-H. Comparing MPOs from six different hearing aid manufacturers: Headroom considerations. Hearing Review. 2021;28(4):10-16
- Taylor B, Teter D. Earmolds: Practical considerations to improve performance in hearing aids. Hearing Review. 2009;16(10):10-14
- Windle R, Dillon H, Heinrich A. A review of auditory processing and cognitive change during normal ageing, and the implications for setting hearing aids for older adults. Front Neurol. 2023 Jun 20;14:1122420. doi: 10.3389/fneur.2023.1122420. Erratum in: Front Neurol. 2023 Jul 18;14:1254802. doi: 10.3389/fneur.2023.1254802. PMID: 37409017; PMCID: PMC10318159
- Windle, R. (2024).20Q: Changes to auditory processing and cognition during normal aging – should it affect hearing aid programming? part 1 – changes associated with normal aging. *AudiologyOnline,* Article 28791. Available at www.audiologyonline.com
- Windle, R. (2024).20Q: Changes to auditory processing and cognition during normal aging – should it affect hearing aid programming? part 2 – programming hearing aids for older adults. AudiologyOnline, Article 28792. Available at www.audiologyonline.com
- Winn, Matt Speech Acoustics videos 2-5. https://www.youtube.com/@listenlab_umn

AP: When it comes to selecting and fine-tuning hearing aids on this population (older adults) what general rules might apply to how you set acoustic parameters like compression? (What might you do differently with this population as it pertains to selecting and fitting hearing aids?)

HH: Without getting into the details, here is a list of considerations:

- Slower compression speeds
- Low compression ratios (≤ 2.1)
- Avoid frequency lowering (to preserve spectral detail)
- Minimize excessive noise reduction (don't distort the envelope)
- Improve signal-to-noise ratio as much as possible but with "cautious" beamforming (protect spatial cues)
- Use earmolds when appropriate, don't over amplify low to mid frequencies to compensate for leakage with domes
- Prioritize comfort, but always measure MPO to ensure they are not set too high, or more probable too low (which will distort the speech envelope)
- Real-ear measures always but also validate with the patient (outcome measures, subjective feedback)
- Consideration of remote microphones

AP: That's quite an extensive list. Any words of advice for clinicians who might need to get up to speed on the recent research recommendations for fitting older adults?

HH: Yes, carefully read the two 20Q articles from Richard Windle that are listed above. His articles go into the science behind these recommendations. They also provide some additional details on compression speeds and use of bilateral beamforming.

AP: How do you counsel first time hearing aid wearers who might have auditory or cognitive processing challenges?

HH: Explaining why they have difficulty hearing in noise that goes beyond the ears in a way that makes sense highlights that hearing aids will not fix the problem 100%. Counseling regarding listening effort, cross-modal neural reorganization, and the importance of feeding your brain the sensory information is critical for preserving cognitive reserves so you can think better and reduce fatigue. I talk about the importance of social engagement and participation, which is typically one of our goals to improve. Family involvement is critical, from educating about the need for visual cues, clear speech, to using remote microphone technology. I have started working with my patients on installing closed captions on their phones (I like Innocaptions) and showing them how it works. I installed NALscribe captioning and

Consistency and simplicity are essential. I see these patients regularly—often more frequently than standard protocols—and always aim to include family or caregivers.

use it with them in the office if needed. I'm a big believer in auditory training, but compliance can be an issue. Most people want the easy button.

AP: Besides fitting hearing aids and providing detailed counseling, etc., are there any other technologies or services you recommend for these patients? Please elaborate.

HH: Ah, well that last one lead right into this one. I have started to try and implement more "experiential" instruction. Instead of "you can try this or do that" I will do it with them. It's amazing how it improves compliance and initiates more questions and conversations.

AP: What AI-driven hearing aid features have you found to be beneficial with this group of patients? Why do you find them beneficial?

HH: Some of my older patients, especially if there is cognitive decline, are not in noise often. If hearing in noise is not a goal then more basic technology is best. Easy and simple are always goals.

If listening in noise is important to the patient, I have found new technology that implements deep neural networks (DNNs), sensors, and good remote microphones to be beneficial. Providing as much extrinsic support as possible is essential when there is a lack of intrinsic ability.

AP: Take us through your follow-up cadence with this group of patients. How often do you typically see them back for follow-up care?

HH: Consistency and simplicity are essential. I see these patients regularly—often more frequently than standard protocols—and always aim to include family or caregivers.

That said, I also set clear boundaries. If they struggle with inserting devices, charging, or using phones, I gently explain that they'll need a support person. I recently had this conversation with my own mother-in-law—it wasn't easy, but it was necessary.

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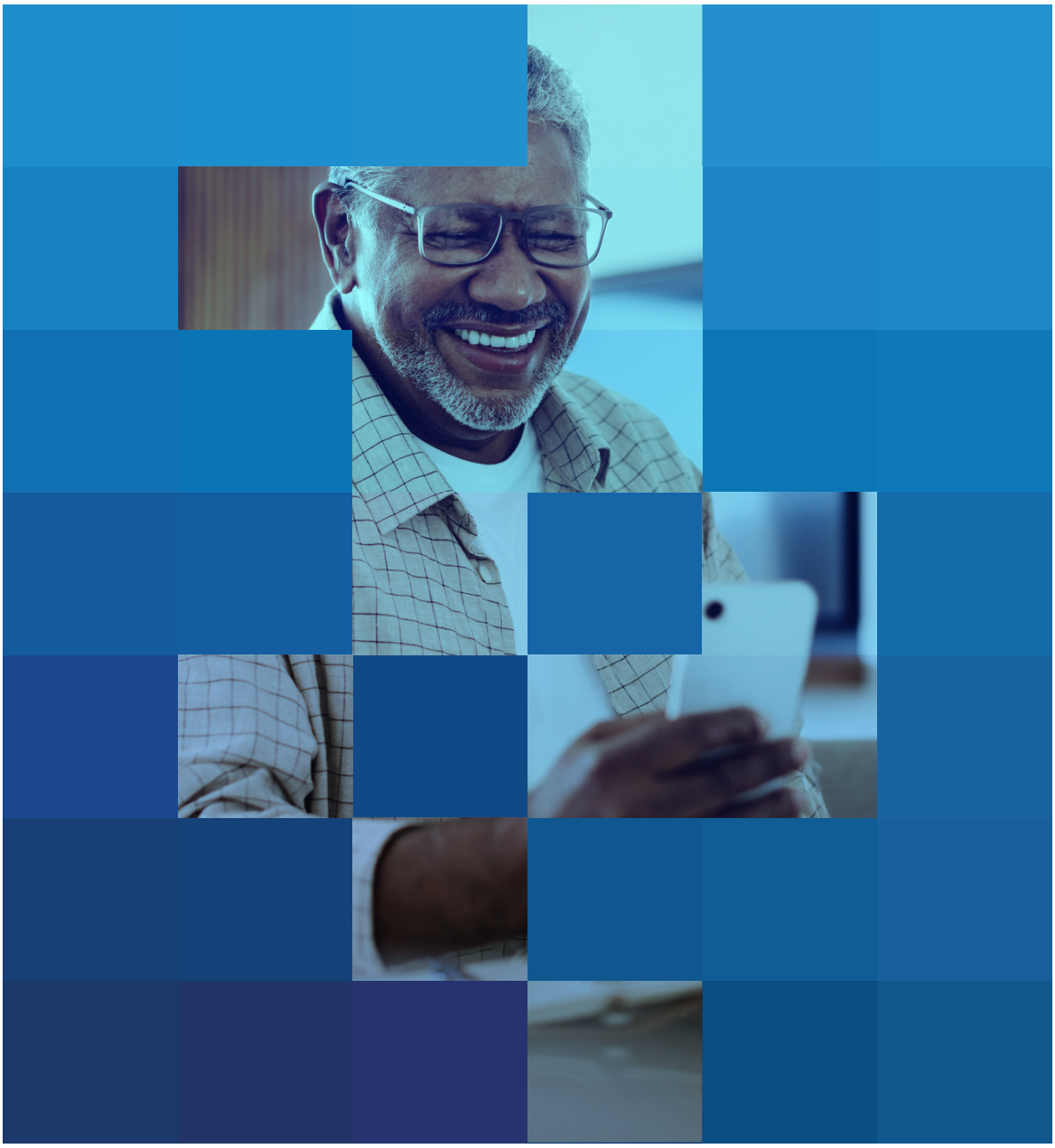


Optimizing OTC Hearing Enhancement:

CHOOSING FROM 100 PRESETS IN 2 MINUTES

Alexander Goldin, Ph.D.; David Nativ; Suhail Habib Allah

The Over-the-Counter (OTC) hearing aid device category offers accessible, affordable, and effective solutions for individuals with mild to moderate hearing loss, available in diverse form factors. An effective solution must precisely match the user's hearing loss and personal preferences. The FDA recognizes two OTC hearing aid categories: preset-based and self-fitting. Preset-based devices prioritize simplicity with limited pre-programmed settings. While simplifying FDA approval by minimizing overamplification, this design challenges users whose hearing loss doesn't align with presets. Conversely, self-fitting devices personalize amplification via a self-conducted hearing test. Though potentially more precise, they demand rigorous regulatory oversight and may not detect underlying "hidden" hearing loss. Table 1 illustrates some of the limitations associated with traditional preset and self-fitting OTC compared to our proposed hybrid approach.

We introduce a novel streamlined hybrid approach, combining the simplicity of preset-based devices with accurate personalization. Our method enables a quick an intuitive choice from large number optimized presets, effectively addressing a broad spectrum of hearing losses. This approach, implemented in Alango's hearing aid software, paves the way for a more accessible yet precise hearing enhancement solution.

Proposed Innovation

We propose a hybrid solution featuring up to 100 optimized preset-based profiles, enabling selection in under two minutes via an intuitive user interface. See Figure 1. Our innovation prioritizes balancing personalization with simplicity and safety.

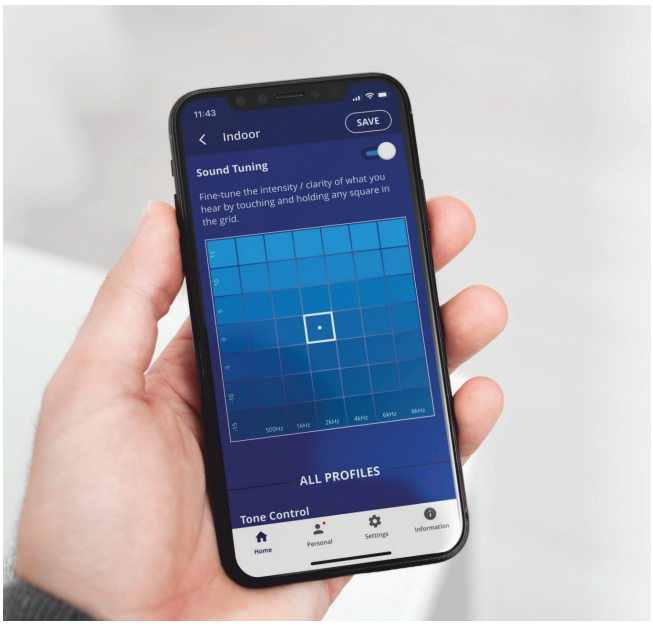
Users benefit from:

- A broad, optimized bank of presets addressing diverse hearing loss configurations.
- A fast, engaging interface designed for:
  - » Rapid A/B comparisons.
  - » Real-time audio preview. Preference-based adjustments.

Table 1. Key features of two OTC categories compared to Alango's proposed hybrid.

FEATURE	Traditional Preset	Self-Fitting	Proposed Hybrid
Easy to Use	✓	✗	✓
Personalized Fit	✗	✓	✓
Fast Setup	✓	✗	✓
Regulatory Simplicity	✓	✗	✓
Hidden Hearing Loss	✗	✓	✓

Figure 1. The Alango smartphone-based, pre-set interface.



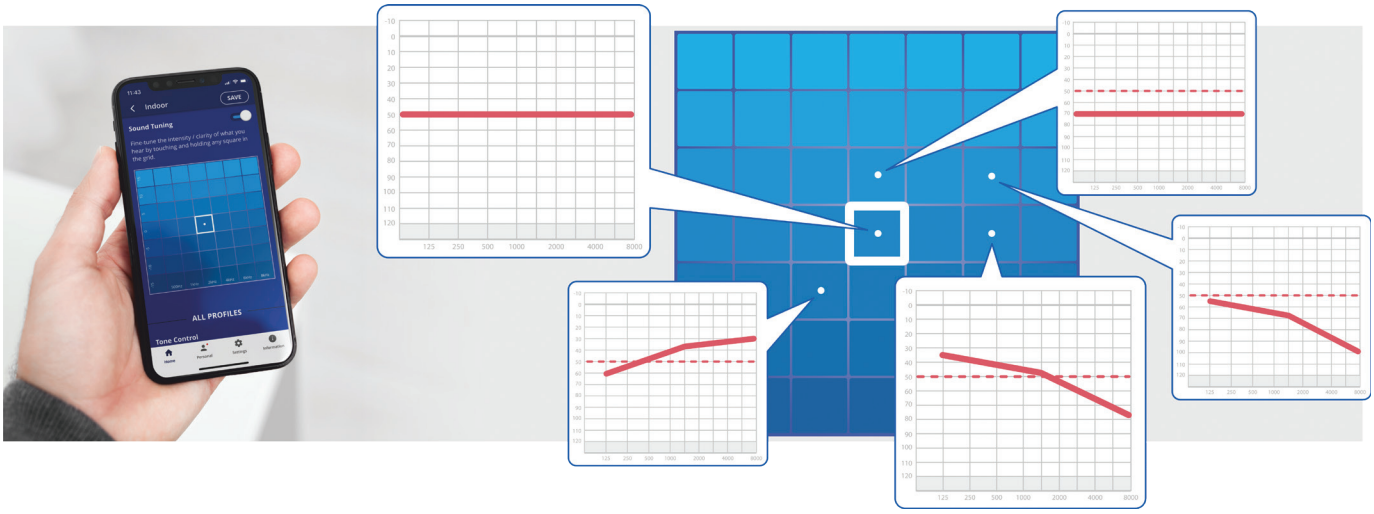
Grid-Based Preset Selection

Users personalize their hearing through an intuitive, **customizable grid interface (up to 10x10).** Each grid square corresponds to a unique preset:

- **Y-axis:** Average hearing loss level (e.g., mild to moderate)
- **X-axis:** Frequency tilt (e.g., more gain in highs or lows)

Users tap a square for real-time listening and comparison. An optional A/B comparison feature allows direct comparisons between grid points for precise fine-tuning, as shown in Figure 2.

Figure 2. The grid squares on the Alango interface that wearers tap during the A/B comparison self-fitting.



Conclusions

The hybrid fitting model integrates the simplicity of preset OTC hearing aids with the precision of self-fitting. By enabling rapid, intuitive selection of an optimized profile from a large variety of hearing loss profiles, this system promises personalized, accessible, and FDA-friendly hearing enhancement without audiometric testing.

This approach also helps address hidden hearing loss – individuals with normal pure tone audiograms through 8000 Hz with self-reported hearing difficulties. Future validation will confirm its potential to redefine OTC hearing aid personalization.

Future Research Directions

- Audiometric Optimization: Map 100 presets to ensure comprehensive coverage of mild-to-moderate hearing profiles.
- Comparative Benchmarking: Compare user satisfaction and fitting accuracy against:
  - » Standard 3-4 preset devices.
  - » Self-fitting OTC devices.
- Real-World Validation: Conduct clinical and usability studies to confirm effectiveness, satisfaction, and accessibility, especially for older adults.
- HCI Evaluation: Assess user navigation and responses during preset selection to refine interface intuitiveness.

Disclosure: The authors are employed by Alango Technologies LTD, Haifa, Israel.

More information can be found at www.alango.com or info@alango.com

Q&A

Alexander Goldin, Ph.D.

Interview with the author

Brian Taylor, Au.D. speaks with Alexander Goldin, Ph.D., Founder and CEO of Alango Technologies, Haifa, Israel

BT: I first met you at an American Academy of Audiology meeting about ten years ago, and you served on a panel with me long before OTC became an official FDA-codified category of hearing aids. At that time (2016-2017) I thought you were far ahead of other engineers and audiologists on how you thought about the hearing enhancement device market. What's changed over the past decade that tells you we might be on the brink of real change related to greater uptake of hearing aids?

AG: I remember this event very well. At the time, I was overly optimistic about the potential of affordable consumer electronic hearing enhancement devices to reduce the problem of untreated hearing loss worldwide. I expected this to be the case in 3-4 years. That was not the case, but now I am optimistic and again think we will see this in the next 3-4 years. What is happening at the moment that leads me to believe this? There are several developments underway.

The most important development is the application of Deep Learning Neural Network (DNN) approaches to noise reduction. The ability to improve speech intelligibility in noise is the most important function of hearing enhancement devices. The classical DSP noise reduction and wide dynamic range compression are very inefficient in this regard, especially for transient noises such as a babble of voices or sharp transient noises such as clattering dishes, slamming doors or closing drawers. In fact, they worsen intelligibility. With DNN-based noise reduction, the situation gets much better. DNN-based noise reduction can even improve speech intelligibility and listening comfort for people with normal hearing. This is a revolution, not an evolution. Hearing enhancement could become a wanted feature in ear-worn devices, making them hearing aids for people with normal hearing. This could have a huge impact on resource allocation in the consumer electronics industry, helping to perfect the solution, further reduce costs and spread it globally.

The second point is the development of intuitive, user-friendly strategies for self-fitting devices, as we presented at the Israeli Auditory Research Conference. It is not easy to explain how to perform a traditional, pure-tone hearing test. Moreover, hearing thresholds do not fully reflect the difficulty of understanding speech in noise. Alango's approach offers an alternative strategy where the user can find the best processing parameters based on pre-recorded, typical use case signals or even in real time in a specific situation. What we presented at the conference can be further refined to create more flexibility for advanced users. In fact, listening tests can still be used with the following "prescription formula", where our approach can be used to refine the automatic settings.

Third, it's about developing new devices with from factors beyond the AirPods Pro stick, which is not comfortable to use all day and every day. Personally, I love open, true wireless stereo ear clip type devices. I believe that with minimal modifications to reduce acoustic feedback, they provide a perfect platform for integrating hearing enhancement features that look cool, work well, and are comfortable to wear all day.

Another reason for the impending revolution is the significant advances in acoustic components such as MEMS microphones and micro speakers, as well as semiconductor technology that can rival dedicated ASICs (Application Specific Integrated Circuits) in terms of power consumption, size and wireless connectivity. Finally, people are also becoming more familiar with smartphones, so controlling or adjusting a hearing device via an app is less scary.

The stars are aligned and ready. We just need to make them work.

BT: I know you've been saying for many years that traditional hearing aids have several limitations. What are those limitations and what solutions are available today?

AG: The stigma of wearing a device that makes you look old and disabled, the price in some regions of the world, such as the US where it is not covered by insurance, the performance in noise, the time required to visit a hearing care professional to fit hearing aids, the availability of fitting services in remote and rural areas, the difficulty of self-fitting for over-the-counter devices, the inadequate performance in audio reproduction and telephone conversations due to the limited frequency response of balanced armature receivers. All these limitations mean that no one wants to buy or even use a hearing aid unless he or she is forced to do so.

Today, there are no solutions that address all of the above problems, but they will soon appear when self-customizing hearing enhancement becomes an integrated part of consumer electronics devices. It may not be called hearing enhancement, but something like "personalized ambient awareness" or "personalized amplified transparency".

BT: In your article, you propose a new, intuitive self-fitting interface. Tell us how you came up with this approach?

AG: We refer to this approach of intuitive self-fitting as "Best Sound Point" or BSP. The user simply selects the best point in a rectangular grid where he or she hears best. Each point corresponds to a preset with fixed parameters, but the number of presets can be up to 100, allowing a fairly precise fitting according to individual preferences, regardless of whether the user has a measurable hearing loss or not. No audiogram is created during the fitting process. Each individual preset is predefined and safe and cannot lead to over-amplification due to an incorrect hearing test procedure. This approach allows the device to be classified as a preset OTC hearing aid, as opposed to self-fitted OTC hearing aids, which reduces costs and time to market for manufacturers. I came up with the BSP idea during the development of our BeHear headset series. However, in a new version presented at the conference, we have refined our strategy and incorporated our accumulated customer experience. In the new version, the choice of the best sound point is more obvious and scientifically based, but still allows a fairly precise fit to individual preferences for most hearing losses.

BT: Let's talk price points. It seems that current OTC options are available at price points comparable to many low-end prescription hearing aids which come with at least a minimum amount of professional service. What do you think the average retail price for a pair of OTC hearing aids needs to be to make it a more appealing option?

AG: 200 dollars, maximum 300 dollars. I see no reason why they should cost more. People should be able to try and buy over-the-counter hearing aids at drug stores.

BT: Besides price, what else is limiting the demand for OTC hearing aids?

AG: Price is an important factor, but not the only one. The average price of an iPhone is 900 dollars, and about 120 million of them are sold every year. That's the price of OTC hearing aids, but how many are sold? People will pay a price if they want and need something. We've already talked about the limitations of hearing aids as we know them today. Many

need hearing aids, no one wants hearing aids. OTC devices integrating hearing enhancement need to do more, be more efficient and look cooler than traditional hearing aids to increase demand.

BT: How do you see the Apple AirPods affecting the marketplace?

AG: We examined the performance of the AirPods and found that their performance for mild to moderate hearing loss is comparable to that of the best hearing aids without DNN processing. However, power consumption is a major limitation of AirPods as OTC hearing aids for all-day use. An even bigger limitation is the sealed earbud design, which is very uncomfortable. This limits the use of the AirPods for situational hearing enhancement only. This is probably why Apple has not released exact numbers on how many of these people are using the AirPods Pro as a hearing aid. There is no public data or estimate of the actual number of users utilizing the hearing aid feature. My impression is that AirPods as OTC hearing aids remain a niche overall, but I could be wrong.

BT: I've heard you talk about the concept of Zero-Stigma. What do you mean by that? What needs to occur for is to reach Zero-Stigma as it relates to hearing aid use?

AG: There are 3 stigmas associated with hearing enhancement devices:

1. Appearance – No association with aging or disability.
2. Self-awareness – No discomfort in acknowledging own hearing needs.
3. Social interaction – No perception of being 'distracted' or 'not present'

The first two points are relevant to conventional hearing aids, both prescription and over-the-counter. The third point relates to earbuds like the AirPods Pro, which look like earplugs.

Zero-Stigma devices must not have any of the above features. If it seems impossible, then the Luxottica (Nuance Audio) hearing glasses are an example. I believe that open, wireless earbuds with amplified ambient awareness have the potential to be another type of Zero-Stigma device.

BT: How do you think newer and better OTCs will change the demand for prescription hearing aids?

AG: Unfortunately, the number and percentage of people with hearing loss is increasing rapidly. Over-the-counter devices are good for simple cases of hidden as well as mild to moderate, maybe even moderately severe hearing loss. People try them first and notice improvement. When they feel the benefit of hearing amplification, they may want more and be psychologically ready for more. Then they will ask a hearing care professional for help. Eventually, the number of hearing aids prescribed will increase.

BT: What advice do you have for audiologists in private practice? How can they prepare for changes in the market as OTC evolves?

AG: There will be changes in the hearing aids market, be ready for them. Not only new self-administered devices will be introduced during the next 3-4 years. New, AI based approaches to fitting the hearing aid devices are coming. Audiologists need to be prepared. It is not the first time in history. When cars arrived, carriage drivers feared for their jobs. And yes, the carriages vanished. But drivers didn't disappear.

Audiology is entering a similar shift. Devices are changing as consumer tech are becoming hearing aids. But that doesn't mean audiologists will vanish. It means their role will evolve.

One key direction: selling services instead of devices. Just as the transportation industry moved from owning a carriage to paying for the ride, hearing care may move from selling hardware to providing personalized assessment, tuning, and lifelong hearing support.

BT: How can people learn more about Alango Technologies?

AG: The best is to visit our web site https://alango.com or follow our LinkedIn page. ■

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CLINICAL BULLETIN #5

Brian Taylor, Au.D.

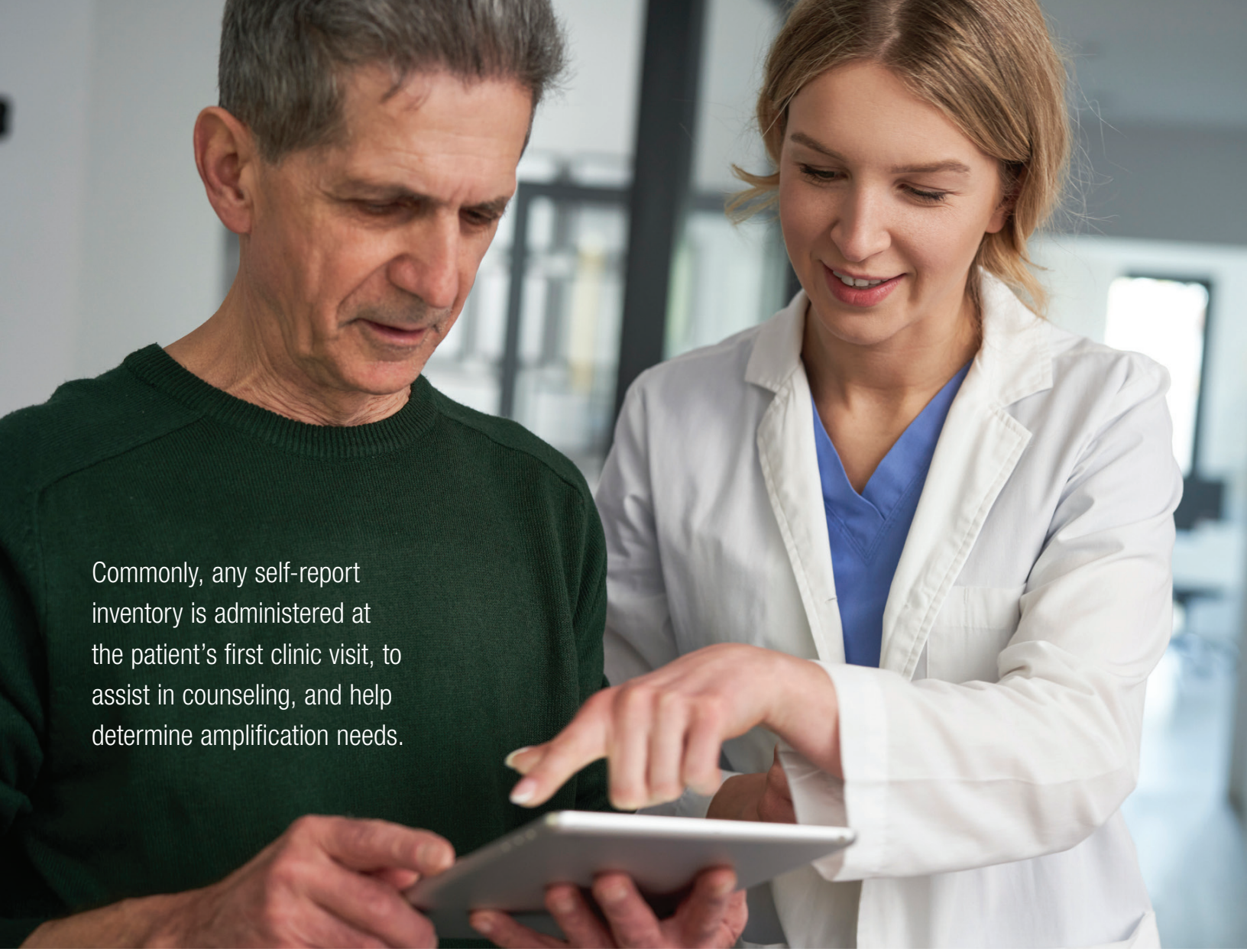
Using the Revised Hearing Handicap Inventory Self-Report in the Clinic

Hearing-related psychosocial health is one of the meaningful outcomes endorsed by NASEM, the focus of the lead article in this issue of *Audiology Practices*. The self-report the NASEM committee recommends to measure this dimension of patient outcome is the Revised Hearing Handicap Inventory (RHHI). Only a few years ago, the HHIE and the HHIA were merged to form a new single scale (Cassarly, et al, 2020). The new scale was dubbed the Revised Hearing Handicap Inventory.

Here we discuss how to integrate this self-report inventory into clinical practice.

As the name suggests, a self-assessment inventory is completed by the patient and reflects their individual thoughts and beliefs regarding the given topic. Most self-assessment inventories could be used as an outcome measure, and some are specifically designed as such. For example, here we look at the Revised Hearing Handicap Inventory (RHHI; a scale replacing the HHIE and HHIA). This is a scale that measures the hearing-related psychosocial health that might be caused by a hearing loss – an outcome that the NASEM committee says should be assessed in the clinic.

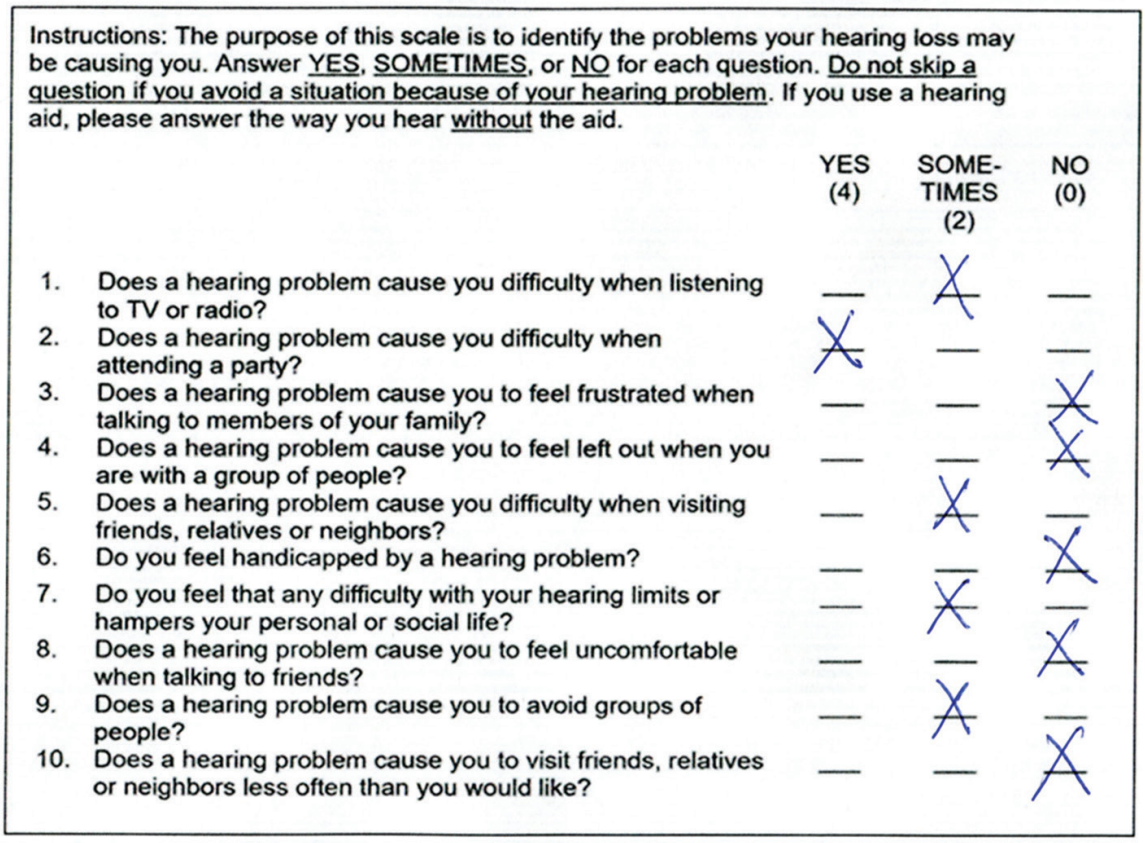
Commonly, any self-report inventory is administered at the patient's first clinic visit, to assist in counseling, and help determine amplification needs. However, this scale also can be used as an outcome measure—given again to the patient after several weeks of hearing aid use, to determine if the use of hearing aids has a positive impact.



In the clinic, the 10-item screening version is all you need, as this has been shown to have good reliability. Research has also shown the RHHI-S will give you results very similar to the HHIE-S, which tend to be very similar the HHIA-S (Cassarly, 2020). By the way, if you don't happen to have the RHHI-S handy, using the HHIE-S or the HHIA-S is still much better than not using anything to measure hearing-related psychosocial health factors at all.

Shown in Figure 1 on the following page are the RHHI-S findings for a patient who has essentially normal hearing through 1000 Hz bilaterally, sloping down to 50 dB at 3000-6000 Hz, with right and left earphone QuickSIN scores of 2-3 dB SNR Loss. We usually consider RHHI scores of >6 as suggestive of hearing problems, so a score of 12 places him in the mild category, and coupled with the audiometric findings, suggests that he is a good candidate for hearing aids. If you do fit him with hearing aids, it also provides five areas to focus on when you use this same scale as an outcome measure. In basic terms, a score of 6 or higher on the RHHI would be an indication that hearing aids and other interventions should be considered – regardless of the degree of hearing loss. In fact, a recent study involving 581 adult participants indicated that the RHHI-S is similar to the pure-tone audiogram at predicting hearing aid use (Dillard, Matthews and Dubno 2024). In that study at 4-frequency (0.5, 1.0, 2.0 and 4.0 KHz) pure tone average of 32.5 dB HL or worse predicted hearing aid use the same as a score of 6 or higher on the RHHI.

In addition to using this assessment to help determine hearing aid candidacy, it is useful to administer this inventory following hearing aid use. It is then possible to determine if psychosocial improvements have occurred. The audiologist can focus on areas where pre-fitting problems were noted (see Figure 1). For example, the unaided score on the RHHI in Figure 1 is 12. When the RHHI is re-administered 1-2 months after the hearing aid fitting, you would expect a lower score which would be an indication of psychosocial improvement, and your work in the clinic using the RHHI would align with the recommendations of the NASEM committee.



Instructions: The purpose of this scale is to identify the problems your hearing loss may be causing you. Answer YES, SOMETIMES, or NO for each question. Do not skip a question if you avoid a situation because of your hearing problem. If you use a hearing aid, please answer the way you hear without the aid.

		YES (4)	SOME-TIMES (2)	NO (0)
1.	Does a hearing problem cause you difficulty when listening to TV or radio?		X	
2.	Does a hearing problem cause you difficulty when attending a party?	X		
3.	Does a hearing problem cause you to feel frustrated when talking to members of your family?			X
4.	Does a hearing problem cause you to feel left out when you are with a group of people?			X
5.	Does a hearing problem cause you difficulty when visiting friends, relatives or neighbors?		X	
6.	Do you feel handicapped by a hearing problem?			X
7.	Do you feel that any difficulty with your hearing limits or hampers your personal or social life?		X	
8.	Does a hearing problem cause you to feel uncomfortable when talking to friends?			X
9.	Does a hearing problem cause you to avoid groups of people?		X	
10.	Does a hearing problem cause you to visit friends, relatives or neighbors less often than you would like?			X

Figure 1. The RHHI-S, completed for a sample patient with a score of 12.

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Stephanie Czuhajewski, MPH, CAE, Executive Director of the Academy of Doctors of Audiology (ADA) noted, "It's important to not only learn from our own colleagues in audiology through meetings like AuDacity, but also to step outside our specialty to understand how other private practice owners successfully deliver exceptional care while managing a thriving small business."

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The Six Pillars of Lifestyle Medicine:

Enhancing Hearing and Balance Across the Lifespan

Amyn M. Amlani, Ph.D.

Introduction

The prevalence of chronic hearing loss and vestibular dysfunction increases with age, significantly impacting social participation, quality of life, and risk of falls. As such, addressing modifiable lifestyle factors offers a promising, holistic prevention and management approach. Lifestyle medicine (LM), anchored in six interrelated pillars, focuses on preventive and therapeutic lifestyle behaviors.[1] This article describes how six pillars—nutrition, physical activity, stress management, restorative sleep, avoidance of risky substances, and social connection—can be applied effectively to maintain and improve hearing and balance function. It also discusses the implications of comorbid conditions such as diabetes, thyroid disease, and kidney dysfunction, and underscores the vital role of interprofessional collaboration in comprehensive care.

Nutrition:

Whole-Food, Plant-Predominant Diets and Auditory Health

Nutrition is the cornerstone of lifestyle medicine, emphasizing minimally processed, plantrich dietary patterns.1 Dietary quality correlates with auditory outcomes: a prospective study of nearly 62,000 adults found that adherence to healthy behaviors—including diet quality—was associated with reduced risk of incident hearing loss.[2]

Mechanistically, nutrients—such as antioxidants—may protect against noise-induced and ototoxic injury. For age-related hearing loss (presbycusis), preliminary models suggest lifestyle interventions may help attenuate progression, though genetic and environmental contributors complicate attribution.[3]

Furthermore, comorbidities such as diabetes, metabolic syndrome, and related conditions—common contributors to hearing and balance impairment—are responsive to **nutrition-based interventions.** For example, nutritional strategies targeting obesityrelated metabolic changes (e.g., via low-fat diets, omega3 fatty acids, alphalipoic acid supplementation) have been shown to confer protective benefits against age-related hearing impairment.[4]

Physical Activity:

Movement's Broader Balance and Hearing Benefits

Routine physical activity is central to Lifestyle medicine, improving cardiovascular function, metabolic health, and resilience. Exercise may influence hearing and balance directly: an animal study demonstrated exercise improved auditory thresholds histologically and electrophysiologically.[5]

Moreover, physical activity enhances vestibular compensation, strength, coordination, and mobility, reducing fall risk in individuals with balance dysfunction. In the elderly, who are prone to vestibular decline, exercise serves dual preventive and rehabilitative roles. Where bone health and fall prevention intersect, LM-informed exercise (weightbearing, strength, balance training) is instrumental.[6]

Stress Management:

Neuroendocrine Impact on Auditory Systems

Chronic stress can impair immune function and contribute to metabolic, cardiovascular, and neuroendocrine dysregulation.[7] Although direct studies linking stress reduction interventions with improved hearing or vestibular outcomes are limited, the systemic benefits—improved microcirculation, reduced inflammation—may bolster cochlear and vestibular resilience. Additionally, stress often disrupts sleep and social engagement, so addressing stress may synergize with other pillars.[8]

Restorative Sleep:

A Foundation for Neurosensory Health

Sleep deprivation is tied to a cascade of health disturbances, including insulin resistance and systemic inflammation.[9] Disrupted sleep may exacerbate neurovascular compromise, which could, in turn, affect auditory and vestibular structures. Sleep disturbances are also closely associated with tinnitus. Poor sleep is a well-recognized factor that can intensify the distress

caused by tinnitus. At the same time, troublesome tinnitus can itself contribute to diminished sleep quality, leading to a self-perpetuating cycle.[10] Although specific research on sleep's impact on hearing/balance remains sparse, optimizing sleep is integral in comprehensive lifestyle medicine and supports restorative neural repair.[11]

Avoidance of Risky Substances:

Protecting Auditory Integrity

Avoiding tobacco, excessive alcohol, and recreational drugs comprises another key lifestyle medicine pillar – avoidance of risky substances. Smoking is a well-known ototoxic agent, and excessive alcohol impairs vestibular function.[12] Minimizing exposure to these substances reduces cumulative toxicity to the inner ear and neural pathways, especially in individuals using ototoxic medications (e.g., in diabetes, arthritis, and cancer treatment).[13]

Social Connection:

Hearing, Balance, and Community

Social connection is a cornerstone of lifestyle medicine, with mounting evidence that strong interpersonal relationships improve **emotional well-being, cognitive function, and resilience** across the lifespan.[14] Conversely, social isolation and loneliness are increasingly recognized as major public health risks, comparable in mortality impact to smoking and obesity. For individuals with hearing or balance disorders, the stakes are especially high: untreated sensory decline often precipitates withdrawal from social participation, setting in motion spirals of loneliness, depression, and mobility restriction.[15]

Hearing loss, for example, has been independently associated with accelerated cognitive decline and increased risk of dementia, with social isolation acting as a mediating factor.[16] Similarly, vestibular dysfunction and fear of falling can limit engagement in community activities, compounding isolation. These psychosocial consequences emphasize the need to integrate **social engagement strategies** into clinical management.

On the positive side, fostering social connection promotes adherence to hearing and balance interventions. Individuals who maintain active networks are more likely to adopt hearing aids, pursue vestibular rehabilitation, and sustain communication strategies.[17] Group-based vestibular rehabilitation programs not only improve balance but also provide peer support that reinforces adherence and reduces stigma. Community activities, such as group exercise, music ensembles, or educational workshops, extend these benefits, integrating physical, cognitive, and social health.

From a lifestyle medicine perspective, social engagement also **amplifies the effectiveness of other pillars**. Social networks reinforce health-promoting behaviors such as physical activity, nutrition, and adherence to sleep routines. Support groups can also buffer stress, provide accountability in avoiding risky substances, and enhance motivation for long-term behavioral change.[18]

Clinically, audiologists and interprofessional partners can encourage social connectedness by:

- Referring patients to **support groups** for hearing loss, tinnitus, or vestibular disorders.
- Collaborating with community organizations to create inclusive environments (e.g., implementation of induction loop systems and/or Auracast technology, accessible exercise programs).
- Incorporating **family members and caregivers** into care plans to support communication strategies.
- Leveraging digital platforms such as teleaudiology, online support groups, wearable devices, to sustain social connection when physical participation is limited.

Ultimately, prioritizing social connection within hearing and balance care aligns with lifestyle medicine's holistic mandate: it not only improves mental health but also establishes a **supportive context for implementing the other five pillars**. By positioning social connectedness as both a therapeutic tool and a protective factor, clinicians can help patients sustain independence, reduce risk of cognitive decline and depression, and improve overall quality of life.

Conclusion

Lifestyle medicine and its six pillars offer a robust framework for preventing and managing hearing and balance disorders across the lifespan. Nutrition, activity, stress management, sleep, risky substance avoidance, and social connectedness collectively support neurosensory health and resilience. Interprofessional collaboration—uniting audiology, lifestyle medicine, primary care, and chronic disease teams—is essential. By embracing this approach, clinicians can address root causes, enhance quality of life, and safeguard hearing and balance in an aging, multi-morbid population.

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Dr. Amlani holds a Bachelor of Science degree in Communication Disorders from the University of the Pacific, a Master of Science degree in Audiology from Purdue University, and a PhD degree in Audiology/Psychoacoustics with a minor in Marketing and Supply Chain Management/Economics, from Michigan State University. ■

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- Recognize when to refer for imaging and how to communicate findings with interdisciplinary teams
- Improve clinical decision making using radiologic data

Cerumen Management & Foreign Body Removal (Rita Chaiken, Au.D., Jiovanne Hughart, Au.D.)
Advance your skills with evidence-based techniques for safe and effective in-office care.

- Identify anatomical landmarks, risk factors, and contraindications
- Compare tools and techniques for cerumen and foreign body removal
- Apply decision-making criteria and documentation practices for procedural care

Medical Decision Making, Documentation, and Evaluation & Management in Audiology (Kim Cavitt, Au.D.)
Build your proficiency in documenting audiologic care that meets payer and regulatory expectations.

- Define components of medical decision making in audiology
- Identify documentation requirements to support coding and medical necessity
- Describe how E/M principles relate to audiologic diagnosis and treatment
- Understand time-based vs. complexity-based coding in audiology
- Integrate E/M into your clinical workflow and billing practices

Who Should Participate?

This three-course series, available to MAA and ADA members, is designed for audiologists with a foundational understanding of key clinical and procedural concepts, who seek to deepen and refresh their knowledge.

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Attend AuDacity 2025

September 25–28, 2025 at the Washington Hilton Hotel

Hosted by the Academy of Doctors of Audiology (ADA) since 2016, the AuDacity Conference is the premier annual event designed for audiologists seeking to lead, innovate, and connect. Held each fall, AuDacity draws practitioners, thought leaders, educators, and industry partners together for several days of dynamic programming, hands-on learning, and meaningful collaboration.

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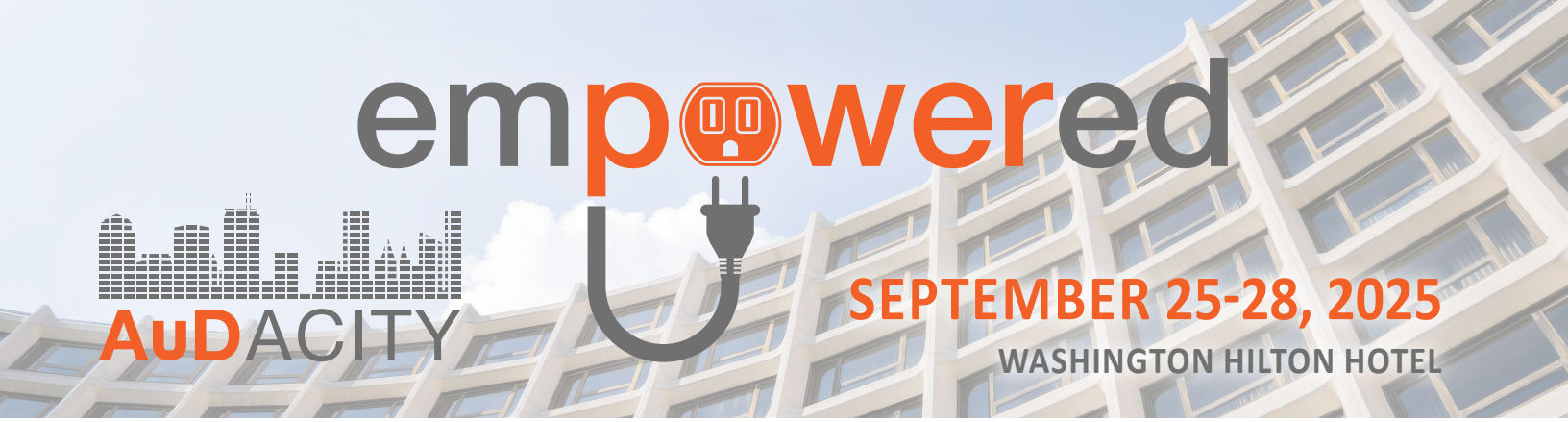
AuDACITY empowered

See the AuDacity schedule on the next page



WEDNESDAY, SEPTEMBER 24, 2025	
5:00 PM - 8:00 PM	Lobby Day Packet Pickup and Registration
THURSDAY, SEPTEMBER 25, 2025	
7:00 AM - 8:00 AM	MAAIA Overview and Legislative Briefing Speakers: Amyn Amlani, Ph.D., Stephanie Czuhajewski, MPH, Alicia Spoor, Au.D.
8:00 AM - 4:30 PM	Lobby Day
11:00 AM - 4:00 PM	Technology Specialist/Audiology Assistant Workshop Sponsored by: Phonak
4:30 PM - 5:30 PM	Meaningful Outcome Measures in Adult Hearing Health Care: A Report from the National Academies of Sciences, Engineering, and Medicine Speaker: Nicholas Reed, Au.D., Ph.D.
5:30 PM - 7:00 PM	ADA Member Meeting
7:00 PM - 9:00 PM	Opening Reception and Dinner in the Exhibit Hall
FRIDAY, SEPTEMBER 26, 2025	
7:00 AM - 8:00 AM	Breakfast in the Exhibit Hall
8:00 AM - 8:30 AM	President's Address & Awards Speaker: Amyn Amlani, Ph.D.
8:30 AM - 10:00 AM	Keynote Presentation: Rebel Health: The Patient-Led Revolution in Medical Care Sponsored by: WSAudiology Speaker: Susannah Fox
10:00 AM - 10:30 AM	Break in the Exhibit Hall & "Rebel Health" Book Signing
10:30 AM - 12:00 PM	General Session: Advancing AI in Audiology: Predictive, Generative, Prescriptive, and Agentic Speaker: Lucy Orr-Ewing
12:00 PM - 12:15 PM	Business Plan Competition, Presentation 1 Presenter: Kyla Ethington
12:15 PM - 1:45 PM	Lunch in the Exhibit Hall/MAA Member Meeting
1:45 PM - 3:15 PM	General Session: A Dentist, an Optometrist, and a Veterinarian Walk into an Audiology Conference Sponsored by: Care Credit | Speakers: Dr. Brian Harris, DDS; Brianna Rhue, OD, FAAO; Melissa Carnes Rose, Au.D.; Kathy Wiederkehr, V.M.D.
3:15 PM - 3:30 PM	Business Plan Competition, Presentation 2 Presenter: Heysell Cruz Pacas
3:30 PM - 4:00 PM	Break in the Exhibit Hall
4:00 PM - 4:15 PM	Business Plan Competition, Presentation 3 Presenters: Sarah Bayer, Casey Martin
4:15 PM - 5:45 PM	General Session: Medical Imaging for the Audiologist Speakers: Kevin Berger, MD; Melissa Segev, Au.D.; Alicia Spoor, Au.D.
5:45 PM - 6:00 PM	Business Plan Competition, Recap and Selection Presenters: Sarah Bayer, Kyla Ethington, Casey Martin, Heysell Cruz Pacas
6:00 PM - 7:00 PM	Reception in the Exhibit Hall

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SATURDAY, SEPTEMBER 27, 2025	
7:00 AM - 8:00 AM	Breakfast in the Exhibit Hall
8:00 AM - 9:30 AM	AI and Audiology Outreach (Part 1): Enhancing Consumer Outreach with AI-Driven Strategies Speaker: Michelle Carroll
	Effectively Deploying Assistants and Dispensers in Your Practice to Optimize Outcomes Speakers: Amyn Amlani, Ph.D.; Alyssa Ricevuto, Au.D.
	Marketrak25: Industry Landscape Speakers: Bridget Dobyan, Executive Director, Hearing Industries Association; Thomas Powers, Ph.D., Powers Consulting, LLC
	Recruiting Best Practices and Strategies Speaker: Steve Hughbanks
	Speaking Their Language: How to Position Yourself as the Go-To Audiologist for PhysiciansSpeaker: Katie Armatoski, Au.D.
8:00 AM - 1:00 PM	Student Track Sponsored by: Starkey
9:30 AM - 10:00 AM	Break in the Exhibit Hall
10:00 AM - 11:30 AM	AI and Audiology Outreach (Part 2): Breaking the Sound Barrier: AI, Prompt Engineering & Health Literacy Strategies to Revolutionize Hearing Healthcare Marketing & Advocacy Speakers: Maansi Aghera, Au.D.; Nora Visscher-Simon, Au.D.
	Mastering Crucial Conversations: Proven Strategies for Navigating High-Stakes Conversations Resulting in Stronger Relationships Speaker: Laurel Gregory, MA
	Optimal Hearing Aid Fittings with Auditory and Cognitive Processing in Mind Speaker: Heidi Hill, Au.D.
	Pharmaceutical Intervention for Cisplatin-Related Ototoxicity Speaker: Katy Mawson, Au.D., CCC-A
	The Social Consequences of Hearing Loss: Are Hearing Aids Enough? Speaker: Brian Taylor, Au.D.
11:30 AM - 1:00 PM	Lunch in the Exhibit Hall
1:00 PM - 2:30 PM	Advanced Cerumen Management Workshop Speakers: Rita Chaiken, Au.D.; Jiovanne Hughart, Au.D.
	Hearing Aids in Motion: Integrating Falls Risk Technology into Audiology Practice Speakers: Justin Burwinkel, Ph.D.; Dave Fabry, Ph.D.
	Innovations with Speech in Noise Assessment: The Present and the Future Speaker: Matthew Fitzgerald, Ph.D.
	Lifestyle Medicine Marketing: Making the Audiology Connection to Connectedness Speakers: Sheena Burks, Au.D., MBA; Jill Davis, Au.D.; Brian Taylor, Au.D.
	Why Auracast Now, and How to Advocate for it in Your Communities Speakers: Andrew Bellavia
2:30 PM - 3:00 PM	Break in the Exhibit Hall
3:00 PM - 4:30 PM	Advanced Cerumen Management Workshop Speakers: Rita Chaiken, Au.D.; Jiovanne Hughart, Au.D.
	AI-Powered Aural Rehab: In Clinical Practice Speakers: Miles Aron, Ph.D.; Rick Carlson, MBA
	Hearing Aid Technology in Sensitive Compartmented Information Facility (SCIF) Environments Speaker: Kimberly Jenkins, Au.D., CCC-A
	Introduction to Vestibular Assessment: Core Principles & Clinical Practices to Evaluating Dizzy Patients Speaker: Chris Zalewski, Ph.D.
	State Advocacy: Scope Modernization Speakers: Jana Brown, Au.D.; Blair Casey; Stephanie Czuhajewski, MPH; Bryan Greenaway, Au.D.; Alicia Spoor, Au.D.
05:30 PM - 06:30 PM	Closing Reception
SUNDAY, SEPTEMBER 28, 2025	
8:00 AM - 9:45 AM	Beyond the Ringing: Real Talk about Tinnitus (Part 1) Speakers: Jason Leyendecker, Au.D.; Emily McMahan, Au.D.
	Legal Issues in Audiology (Part 1) Speaker: Brandon Pauley, ESQ.
	The 2026 Hearing Aid Service Code Changes and Resulting Considerations Regarding Network Participation Status (Part 1) Speaker: Kim Cavitt, Au.D.
9:45 AM - 10:00 AM	Break
10:00 AM - 11:30 AM	Beyond the Ringing: Real Talk about Tinnitus (Part 2) Speakers: Jason Leyendecker, Au.D.; Emily McMahan, Au.D.
	Legal Issues in Audiology (Part 2) Speaker: Brandon Pauley, ESQ.
10:00 AM - 12:00 PM	The 2026 Hearing Aid Service Code Changes and Resulting Considerations Regarding Network Participation Status (Part 2) Speaker: Kim Cavitt, Au.D.

2026 Hearing Aid Service CPT Codes Update

BY KIM CAVITT, Au.D.

These 5 current codes for hearing aid services will be deleted on 1/1/2026:

- 92590: Hearing aid examination and selection; monaural
- 92591: Hearing aid examination and selection; binaural
- 92592: Hearing aid check; monaural
- 92594: Electroacoustic evaluation for hearing aid; monaural
- 92595: Electroacoustic evaluation for hearing aid; binaural

New codes have been established: These codes were created and shepherded by the American Academy of Audiology and the American Speech-Language-Hearing Association.

New CPT codes: *(please note that the Xs in the code are placeholders; the final code numbers will be released between August and October, 2025)*

Hearing Aid Evaluation

- CPT code 9X01X: **Evaluation for hearing aid candidacy**, unilateral or bilateral, including review and integration of audiologic function tests, assessment, and interpretation of hearing needs (for example, speech-in-noise, suprathreshold hearing measures) discussion of candidacy results, counseling on treatment options with report, and, when performed, assessment of cognitive and communication status; **first 30 minutes**
- CPT code 9X02X: **Evaluation for hearing aid candidacy**, unilateral or bilateral, including review and integration of audiologic function tests, assessment, and interpretation of hearing needs (for example, speech-in-noise, suprathreshold hearing measures) discussion of candidacy results, counseling on treatment options with report, and, when performed, assessment of cognitive and communication status; **each additional 15 minutes**

Hearing Aid Selection

- CPT code 9X03X: **Hearing aid selection services**, unilateral or bilateral, including review of audiologic function tests and hearing aid candidacy evaluation, assessment of visual and dexterity limitations, and psychosocial factors, establishment of device type, output requirements, signal processing strategies and additional features**, discussion of device recommendations with report; first 30 minutes**
- CPT code 9X04X: **Hearing aid selection services**, unilateral or bilateral, including review of audiologic function tests and hearing aid candidacy evaluation, assessment of visual and dexterity limitations, and psychosocial factors, establishment of device type, output requirements, signal processing strategies and additional features, **discussion of device recommendations with repor**t; **each additional 15 minutes**

Hearing Aid Fitting

- CPT code 9X07X: **Hearing aid fitting services**, unilateral or bilateral, including device analysis, programming, verification, counseling, orientation, and training, and, when performed, hearing assistive device, supplemental technology fitting services; **first 60 minutes**
- CPT code 9X08X: **Hearing aid fitting services**, unilateral or bilateral, including device analysis, programming, verification, counseling, orientation, and training, and, when performed, hearing assistive device, supplemental technology fitting services; **each additional 15 minutes**

Hearing Aid Follow-Up

- CPT code 9X09X: Hearing aid **post-fitting follow-up services**, unilateral or bilateral, including confirmation of physical fit, validation of patient benefit and performance, sound quality of device, adjustment(s) (for example, verification, programming adjustment(s), device connection(s), and device training), as indicated, and, when performed, hearing assistive device, supplemental technology fitting services; **first 30 minutes**
- CPT code 9X10X: Hearing aid **post-fitting follow-up services**, unilateral or bilateral, including confirmation of physical fit, validation of patient benefit and
- performance, sound quality of device, adjustment(s) (for example, verification, programming adjustment(s), device connection(s), and device training), as indicated, and, when performed, hearing assistive device, supplemental technology fitting services; **each additional 15 minutes**

Validation/Verification

- CPT code 9X11X: Behavioral verification of amplification including **aided thresholds functional gain, speech in noise**, when performed
- CPT code 9X12X: Hearing-aid measurement, **verification with probe-microphone**
- CPT code 9X13X: Hearing device verification, **electroacoustic analysis**
- CPT code 9X14X: Hearing assistive device, **supplemental technology fitting services** (for example, personal frequency modulation (FM)/digital modulation (DM) system, remote microphone, alerting devices

What providers could these code changes impact the most:

- The in-network provider who offers and/or bills an unbundled or itemized hearing aid delivery.
- In-network providers of health plans, payers and insurers who recognized 92590-92595 and/or who recognized hearing aid services represented by 92700 (unlisted otorhinolaryngological procedure or service) or V5299 (hearing service, miscellaneous) as non-covered. This could include, but is not limited to:
  - » Commercial health plans and insurers, specifically Blue Cross Blue Shield Association and Aetna health plans.
  - » State Medicaid programs.
  - » State Early Periodic Screening, Diagnosis and Treatment (EPSDT) programs.

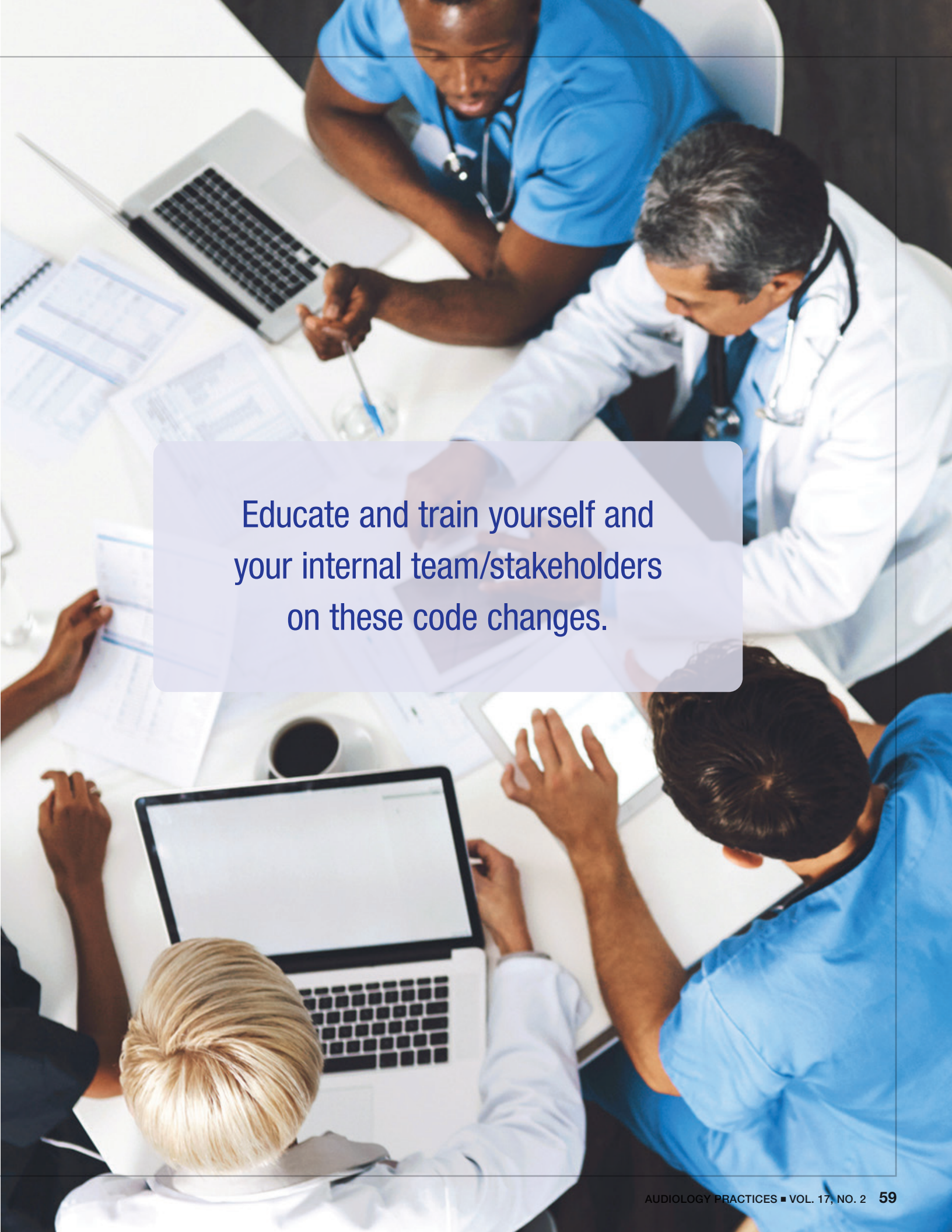
- » State Vocational Rehabilitation programs.
- » State and federal Worker's Compensation programs.
- » VA Community Care.

What providers could these code changes impact the least:

- The provider, whether offering a bundled, unbundled, or itemized delivery, who is out of network for every health plan, payer, and insurer except for traditional Medicare.
- The provider who never utilized 92590-92595 and/or never provided services represented by 92700.
  - » These providers only use HCPCS V-codes (such as V5010, V5011, and/or V5020) to represent and bill for hearing aid related services.
    - ☐ Please note that, if this has been your process, there are billing situations where you may have left revenues on the table.
- It is uncertain if or how these code changes will impact hearing benefit/care plan or third-party administrator professional fees and billing policies and allowances.

What will an audiology practice need to do as a result of these coding changes :

- Educate and train yourself and your internal team/ stakeholders on:
  - » The new code set and its appropriate usage for your practice and care delivery model.
  - » The requirements of appropriate use of each code.
  - » Medical necessity.
  - » Documentation of timed codes, especially as it relates to use of add-on codes.
  - » Reporting requirements of some of the codes within the code set.
- On January 1, 2026, delete 92590-92595 from your superbill, electronic or paper, and chargemaster.
- Calculate your breakeven rate based upon overhead/ expenses or budgetary requirements.
  - » Will want to add a profit margin to this based upon practice financial needs and goals.
  - » Practices will need this to determine if they can financially sustain network participation.
- Review Medicaid allowable rate schedules for your state(s) (available online) and, when in-network, request allowable rate schedules for all health plans and associated payers and insurers.
  - » 92590-92595 allowable rates are available now.
  - » The new code set could be available, from health plans, insurers, and payers as early as open enrollment (October/November); some may not be available until first or second quarter 2026.
  - » Some allowable rate schedules are available online (UnitedHealthcare and some BlueCross Blue Shield Association plans) and others can be requested through the health plan portal or provider support. Please note that this is not a quick or easy process.
    - ☐ Determine if and how each health plan, payer or insurer recognizes the new codes in the new code set.
- Estimate how much time (for non-time-based codes) it takes to provide a specific service or procedure in isolation.
- Compare your practice's breakeven/breakeven plus profit rate and estimated time to the allowable rates provided by a health plan.
- Create an analysis for each specific health plan and product and determine (by querying practice data and metrics and considering financial needs) if:
  - » Your practice can financially sustain participation in each specific health plan.
  - » Your practice can operationalize the health plan medical policies, prior authorization requirements, allowable codes, and allowable rates.
  - » Your practice can sustain the potential loss of patients and in-network referrals if your practice would choose to terminate network participation.
- Make an informed business decision regarding network participation for each specific health plan.


Educate and train yourself and
your internal team/stakeholders
on these code changes.

» If you decide to remain in-network,

- ☐ Practices have to learn how to operationalize and monetize each specific health plan.
- ☐ Practices have to create the necessary forms and revenue cycle processes.
  - – Good faith estimate.
  - – Notice of non-coverage.
  - – Upgrade waivers (when allowed by contract).
  - – Insurance waivers.
- ☐ Bill the patient privately for non-covered items and services.
- ☐ Itemize hearing aid service claims for most hearing aid benefit situations.
- ☐ Collect all patient responsibilities at the date of service.
  - – Unmet deductibles.
  - – Applicable co-payments and co-insurance.
  - – Usual and customary rate of prior notified non-covered services.

» If you decide to go out of network,

- ☐ Terminate network participation in accordance with terms of health plan agreement terms.
- ☐ Notify patients of network on-participation status at the time of scheduling.
- ☐ Do not accept assignment on out of network insurance claims.
- ☐ Collect usual and customary rate (except for Medicare Advantage diagnostic claims) for all items and services at the date of service.
- ☐ Submit claims as a patient courtesy to the health plan. ■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PRESIDENT'S MESSAGE

Continued from page 3

The reasons are familiar: lack of training reinforcement after graduation, inefficient workflows, limited public awareness, and payment models that fail to reward quality. Implementation science addresses these by pairing the "what" of standards with the "how" of sustainable adoption. It offers strategies such as targeted professional development, clinic process redesign, data feedback systems, and—critically—policy advocacy to remove systemic barriers.

This is where professional autonomy enters the equation. Autonomy is the authority to practice independently, making clinical decisions based on training and judgment without unnecessary oversight. It is the ability to order relevant imaging or lab work, to initiate treatment plans, and to be reimbursed directly for the full range of services provided. Autonomy is not a symbolic title; it is the infrastructure that enables best practices to be fully implemented.

Without autonomy, audiologists often find their decisions filtered through providers and third-party administrators less familiar with hearing and balance care, or drowned out by social media talking heads whose opinions carry more visibility than expertise. This fragments services, delays interventions, and compromises adherence to audiology-specific standards. At the federal level, Medicare policies currently classify audiology as a diagnostic-only supplier. This lack of recognition of audiologists as limited license practitioners under Medicare, is a prime example of how policy constrains both autonomy and implementation. Requiring a physician order for services that audiologists are fully trained to perform is not simply inefficient—it diminishes patient access and reinforces outdated perceptions of our role.

Autonomy also has a cultural dimension. Even when granted expanded legal authority, a profession must be ready to exercise it with confidence, responsibility, and accountability. This requires a culture where advocacy is a core competency, not an optional skillset. It demands that graduate programs prepare clinicians to navigate healthcare policy, economics, and interprofessional systems as adeptly as they perform diagnostic evaluations.

Policy advocacy is the throughline connecting these three pillars. Strong practice standards give legislators and regulators confidence in the safety and effectiveness of our care. Implementation science ensures those standards move beyond aspiration to become operational realities in every setting. Autonomy, secured and defended through legislative change, creates the environment in which best practices can be fully applied.

An integrated policy agenda for audiology must link these elements explicitly. When a new standard is proposed, such as the recent expansion of over-the-counter (OTC) hearing aids, it should be accompanied by a detailed implementation plan addressing provider training, clinic infrastructure, regulatory alignment at both state and federal levels, and sustainable reimbursement pathways. Equally essential is advocacy for scope-of-practice modernization—not as an afterthought, but as a core requirement—ensuring that every audiologist can fully deliver on these standards without artificial restrictions. The Academy of Doctors of Audiology supports integrated policy agenda by providing members with the Audiology Practice Accreditation Standards. A revised edition will be available for member review at the 2025 AuDacity Conference.

Such integration would also make our case to policymakers stronger. Legislative committees want to know not just *why* a scope change or reimbursement policy is justified, but *how* it will be operationalized in ways that improve patient care and system efficiency. Demonstrating that we have the standards, the implementation plan, and the professional readiness to deliver makes a far more compelling argument than any one element in isolation. The ADA Lobby Day preceding AuDacity 2025 offered participants the opportunity to speak with one unified voice, to highlight our qualifications and training, and advance our profession's place in the healthcare system.

The risk of inaction is clear. Without integrating standards, implementation, and autonomy into a coherent advocacy strategy, we leave gaps for less-qualified providers, retail models, and technology companies to fill. We allow payment models to reward product sales over professional services. We make it harder to recruit the next generation of clinicians into a profession perceived as restricted and undervalued.

The path forward is equally clear. Define and maintain rigorous, evidence-based practice standards. Invest in the systems, training, and policy changes needed to implement them consistently. Secure the legislative and regulatory authority to practice fully and independently. Present this as a unified case to lawmakers, payers, and the public: that audiologists are not only ready, but essential, to meeting the nation's hearing and balance care needs.

The profession's measure will not be in the documents it publishes or the policies it aspires to win, but in its ability to deliver consistent, high-quality, independent care to every patient, in every setting. That will only happen when standards are enacted in practice, implementation is prioritized alongside innovation, and autonomy is recognized as both a professional right and a public health necessity.

The moment to align these efforts is now. The systems that will define audiology for the next generation are being shaped today—in legislative chambers, in payer negotiations, in interprofessional collaborations, and in the choices we make in our own clinics. If we bring standards, implementation, and autonomy together under a single advocacy agenda, we can secure a future where audiology is not merely part of the healthcare system, but a trusted and indispensable entry point for hearing and balance care. ■

EDITOR'S MESSAGE

Continued from page 5

Over the short term (start this week): Don't over-rely on the traditional audiogram. We know it has limitations and that other tests need to be used in combination with it in order to make clear decisions on diagnosis and treatment. When an individual presents with complaints of an inability to hear in noisy places, even when their hearing test is normal, believe them; after all, 10-percent or more of the adult population has the same problem.

Over the medium term (start next month): Use validated self-reports like the Revised Hearing Handicap Inventory (RHHI) as spelled out in two articles in this issue of *Audiology Practices*. In combination with the RHHI, speech in noise tests like those spelled out in our lead article are a great addition to any clinician's repertoire.

Over the long term (start within the next year): Urge professional organizations to adopt new clinical guidelines for this population. Besides finding an accurate label for this condition, extended high-frequency audiometry, oto-acoustic emissions and other diagnostic tests must be considered as part of the standard assessment process.

These hearing concerns might be challenging but they should not be unexplained.

Reference

Kamerer, A. M., Barker, B. A., Meadows, M. A., & Lewis, C. E. (2025). Experiences of people with unexplained hearing concerns seeking hearing healthcare in the United States. *International Journal of Audiology*, *64*(8), 813–822. ■

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