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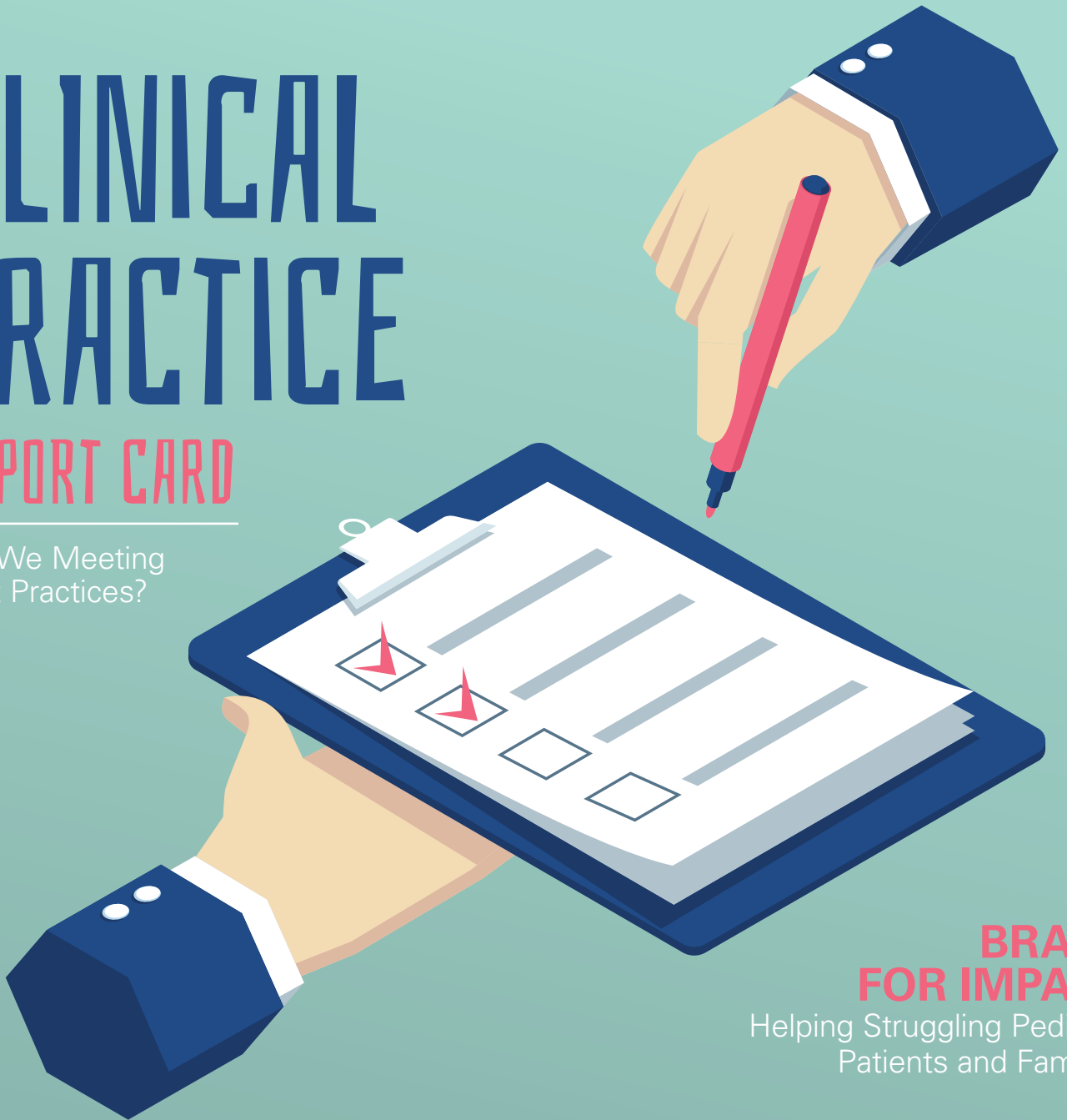
TODAY

The magazine of, by, and for audiologists

CLINICAL PRACTICE

REPORT CARD

Are We Meeting
Best Practices?



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Helping Struggling Pediatric
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"NORMAL" HEARING AND HEARING COMPLAINTS

Perspectives on
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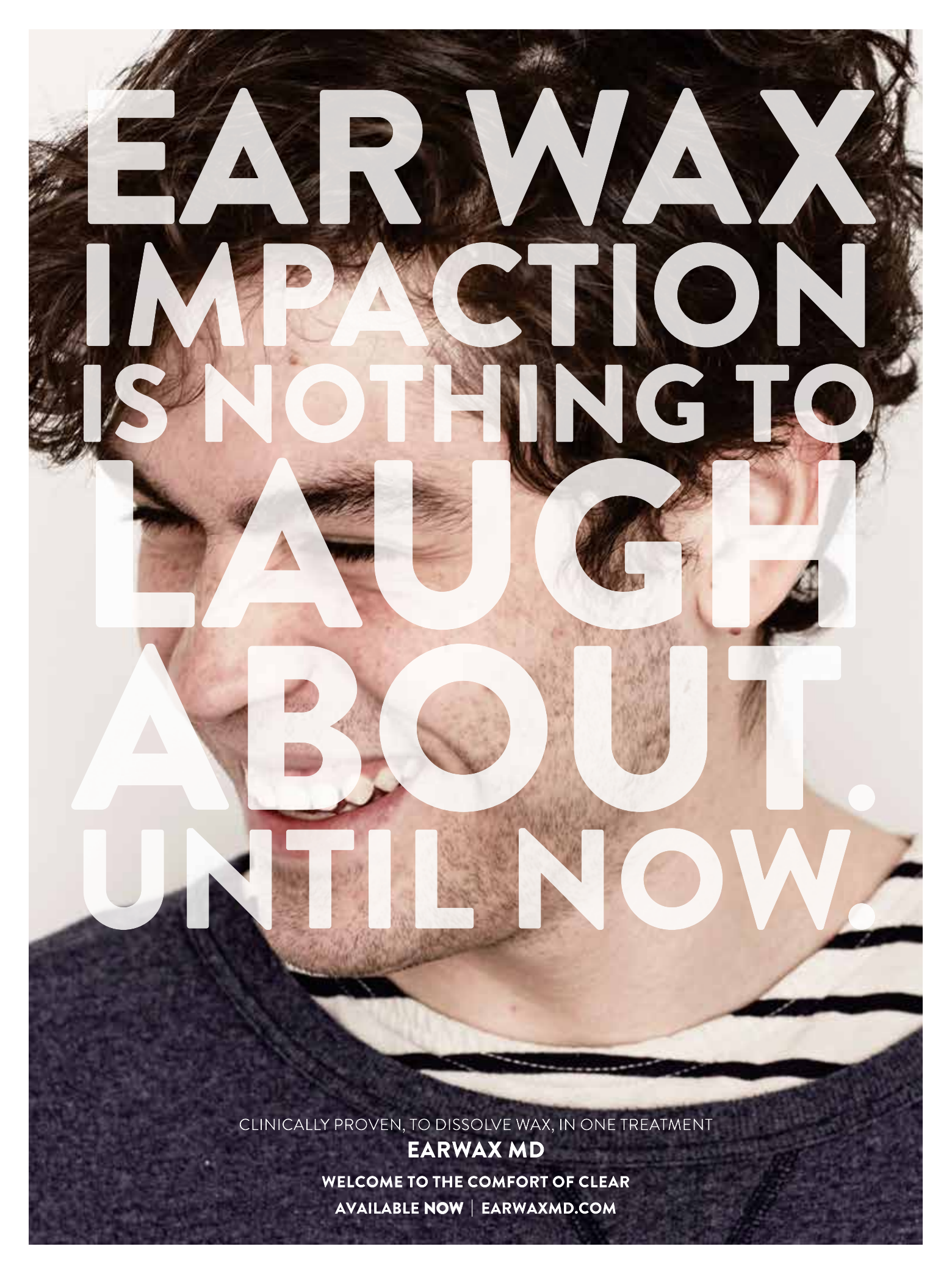
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Nov/Dec 2017
Vol 29 No 6

14

Clinical Practice Report Card: Are We Meeting Best-Practice Standards for Adult Hearing Rehabilitation?

For enhanced clinical service delivery, it is helpful to look at current practice patterns, how our services compare to those provided by our peers, and how both of these measure up to best-practice standards. This article presents the findings of a survey of services provided in the delivery of adult audiological rehabilitation care.

By John Greer Clark, Cassie Huff, and Brian Earl

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Hidden hearing loss refers specifically to the reduced amplitude of sound-evoked neural responses that occurs with loss of synapses that connect the inner hair cells to the auditory nerve, so the patient's audiometric difficulties are hidden behind a normal audiogram.

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The American Academy of Audiology publishes *Audiology Today* (AT) as a means of communicating information among its members about all aspects of audiology and related topics.

AT provides comprehensive reporting on topics relevant to audiology, including clinical activities and hearing research, current events, news items, professional issues, individual-institutional-organizational announcements, and other areas within the scope of practice of audiology.

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New Beginnings, New Behaviors

While I begin this new chapter as the 28th president of the American Academy of Audiology, I am astutely aware of the giants who have preceded me in this role and their enduring positive influence on the profession of audiology. I find myself musing about how far (and not so far) we have come; despite audiology being a relatively young profession. Indeed, over the decades, audiology has come through a variety of threats and opportunities; all have brought their own unique challenges and rewards. Over the decades, many of those threats and opportunities have influenced our aims as a professional community.

A recent *Dallas Morning News* interview of war correspondent Sebastian Junger detailed his proposal that “pro-social” behaviors ensure community longevity and survival. Quite literally, if hardships and adversity triggered antisocial behaviors there would be no society. I couldn't help but relate his perspectives to unifying our own professional community.

To be clear, I am not referring to each audiologist pledging sole allegiance to only one organization, because the various audiology societies regularly communicate about collaborative initiatives that promote the profession of audiology as a whole. Rather, I refer to individuals who are united to the audiology community. Each time we encounter extreme circumstances (most recently as Hurricanes Irma and Harvey), we witness our audiology

community unite to support displaced colleagues in the community. But, we need to stay united daily to ensure our community endures and survives these especially rocky terrains we find ourselves in.


With a closer look (below) you will note a variety of behaviors identified by various sociologists and psychologists that are known to successfully generate and maintain community unity:

- You're special, but NOT special... work at not letting the sense of being different get in the way of belonging.
- Surround yourself with like-minded people.
- Ditch judgment—it creates barriers between us and our community.
- NO BLAME!
- Make pro-social steps by taking care of each other.

If we commit to these pro-social behaviors, our profession will only grow more unified.

Over the past few months, you may have heard and/or read about the Academy Board offering our members many opportunities as a result of the new Academy organizational structure. I am pleased to share that ALL of the many recent openings have been filled by every member who volunteered through



our Academy Volunteer Manager system (through the Audiology Community). As the Academy Board moves forward with new initiatives, we will continue to identify many more volunteer opportunities for our members. After all, by sharing the work load within the structure, our community continues to build strength and unity in a pro-social manner. 

Jackie Clark, PhD
President
American Academy of Audiology

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The Beep that Keeps Me Up at Night

By L. Felicia Reimann and Lindsey E. Jorgensen

It is 2:00 am. I am searching through my house to find the smoke alarm that is running out of battery. Why does it always seem to go off at 2:00 am?! This sound is familiar to many of us; however, most alerting devices (alarm clocks, smoke alarms, carbon monoxide detectors, weather monitors, etc.) have one thing in common: alerting users with a high-pitch auditory signal. This raises a significant concern. Patients who are deaf or are hard of hearing may not be able to hear an alerting signal unaided, which puts their lives at risk and can make them less independent.

In 2015, 1,345,500 fires were reported in the United States, causing 3,280 civilian deaths, and 15,700

civilian injuries. These numbers mean that in 2015, a house fire was reported every 86 seconds (National Fire Protection Association, 2017). Hopefully the call was not to a home with a hearing-impaired individual who did not hear the smoke alarm.

According to the National Fire Protection Association, from 1980 to 2011, the percentage of fatal home fire victims 65 years of age or older increased from 19 percent to 31 percent (Ahrens, 2014). In 2010, the beginning of the “baby boomer” generation started turning 65. One in three adults age 65–74 years have presbycusis, putting them in the high-risk category for not hearing fire safety devices, but many are also at higher risk due to vision impairment

and mobility issues. Alerting devices are not top of mind for patients, but should be a recommendation for patients of any age with hearing loss whether they are ready to aid their hearing loss or not.

Smoke Alarms

Smoke alarms are used to provide early warning of fire, allowing for a better opportunity to escape a burning building. In homes with no or non-working smoke alarm, the death rate per 100 reported fires was more than twice as high (1.18 deaths per 100 fires) compared to homes with working smoke alarms (0.53 deaths per 100 fires) (Ahrens, 2015). Not being able to hear a working

smoke alarm is as beneficial as a non-working system; this is the reality for individuals who are deaf or hard of hearing. Residential smoke alarms typically have a frequency output between 3500–4000 Hz, with a required sound pressure level of at least 85 dB when measured at a distance of 10 feet from the source. Adults with presbycusis typically have a sloping hearing loss; even if the smoke alarm is in working condition, it is unlikely they will hear the alarm or wake to it while sleeping. This is the dangerous reality many patients unknowingly live in.

The smoke alarm is just one example of an alerting device, but shows the dangers of not hearing alerting devices. There are three different stimulants for alerting devices—auditory, visual (lights), and tactile (bed/pillow shakers). Some manufactures make alerting devices with a combination of stimulants (i.e., devices with an auditory signal and strobe lights). It is also important to understand the differences available for each device. For example, alerting devices are available with lower frequency tones, amplified tones (greater than 85 dB), strobe lights of different intensity and frequency, and bed shakers with various vibration patterns and intensity of vibration.

In a study by Bruck and Thomas (2007), where individuals were tested on their ability to wake to a variety of smoke alarms, the following conclusions were drawn:

1. The low frequency 520 Hz tone presented at 75 dBA awoke 92 percent of hard-of-hearing participants, while the same tone presented at 95 dBA awoke 100 percent of participants, which was significantly more effective than the 3100 Hz tone presented at 75 dBA, which awoke only 56 percent of participants.
2. When presented alone, the bed shaker and pillow shaker devices awoke 80–83 percent of the participants. Of important note is that participants age 60 or over were less likely to awaken to the bed shaker than those younger than age 60.
3. The strobe light, when presented alone, only awoke 27 percent of participants.

Safety and Independence

While I did eventually find the beeping alarm and changed the battery, I now have a new concern that keeps me up at night—will my patients awake if the alarm goes off at their house? As audiologists, our role is to help others hear and communicate, therefore, it is important to remember how our patients live their daily lives, which includes times without their devices. It is important to

remind our patients of the dangers of not being able to hear an alerting device such as a smoke or carbon monoxide alarm.

Equally important is our responsibility to help patients lead independent lives, this includes being able to live safely in their homes. Patients should be encouraged to have alerting devices that can alert them unaided in each room of the house, and an alerting device with two different stimulant types that can wake them from sleep in the bedroom. Armed with this information, I hope all audiologists will sleep well knowing their patients are safe both awake and asleep. 🎧

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- National Fire Protection Association. (2017) An overview of the U.S. fire problem.

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November 6

Meeting

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November 6-7

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December 1-2

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Here's what's trending!



The early development of communication pathways in the brain is fundamental to this improvement, whether by speech, sign language, or both. An early understanding and use of spoken or signed, and written, language, is critical to proper development of the language, auditory, and speech areas of the brain.

Published on September 3 at 11:10 am

Why is it important to teach about hearing protection at such an early age? Here are five important reasons.



Published on September 6 at 12:01 pm



How our moving eardrums affect what we hear is unclear, says Groh. One theory for why the eyes and ears move together in this way is that it helps the brain make sense of what we see and hear.

Published on September 10 at 9:15 am

Attending AAA 2018 in Nashville, TN? The official hashtag is **#AAACConf18**. Make sure to use that in your social media posts and tell us what you are most looking forward to seeing!



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CLINICAL PRACTICE

REPORT CARD

Are We Meeting Best-Practice Standards for Adult Hearing Rehabilitation?

BY JOHN GREER CLARK, CASSIE HUFF, AND BRIAN EARL

FOR ENHANCED CLINICAL SERVICE DELIVERY, IT IS HELPFUL TO PERIODICALLY LOOK AT CURRENT PRACTICE PATTERNS, HOW OUR SERVICES COMPARE TO THOSE PROVIDED BY OUR PEERS, AND HOW BOTH OF THESE MEASURE UP TO BEST-PRACTICE STANDARDS.

Professional introspection is a primary road to growth and surveys of professional practice offer a window to our performance. Development and refinement of clinical protocols and services over the years have enhanced treatment outcomes for millions of individuals with hearing loss. One means of continually improving services is to periodically survey how clinicians practice.

In the past, a series of surveys determined which diagnostic procedures and practices were common among audiologists (Martin and Pennington, 1971, 1972; Martin and Forbis, 1978; Martin and Sides, 1985; Martin and Morris, 1989; Martin et al, 1994; Martin et al, 1998). These and other research (e.g., Mueller and Picou, 2010; Wiley et al, 1995) suggest that a majority of audiologists use tests and procedures that are not supported by clinical evidence.

We recently conducted an online survey of randomly selected members of the Academy focused primarily on clinical practices that support adult hearing rehabilitation. With a survey delivery to 1,220 audiologists followed by two reminder requests for survey completion, the survey yielded only 88 responses. In spite of this disappointingly low response rate, likely attributed to the increasing requests for survey participations that appear in in-boxes, we believe that the responses are representative of practicing audiologists. Those responding represent a variety of practice settings from all regions of the country and reflect a wide diversity in years of practice. The results of this survey provide a glimpse into areas in which

audiology could improve to enhance the hearing rehabilitation services we provide to our adult patients.

RESPONDENT DEMOGRAPHICS

Forty-one percent of those responding to our survey graduated with a doctor of audiology (AuD) degree, 14 percent graduated prior to the AuD and currently hold a master's degree, and 38 percent graduated with a master's degree and later went back to school to earn an AuD. Eight percent hold a doctorate degree other than an AuD.

Ninety-two percent of responding audiologists are certified by either the American Board of Audiology (29 percent) or the American Speech-Language-Hearing Association (63 percent). Eighty-four percent work primarily with the adult population. Thirty-four states were represented, along with six survey participants who practice outside of the United States. These six participants' responses were included in this survey analysis, as they are members of the Academy and therefore have access to the Academy's practice guidelines.

The majority of the sample, or 79 percent, have practiced six years or more as an audiologist (FIGURE 1). Approximately 37 percent reported employment within a medical setting

and 32 percent within a private practice (FIGURE 2), proportions commensurate with Academy demographics (AAA, 2016). Approximately 10 percent of survey respondents work part-time defined as 20 hours or fewer per week; 19 percent work more than 20 hours, but fewer than 35 hours; and 70 percent work 35 hours or more per week.

SURVEY RESPONSES

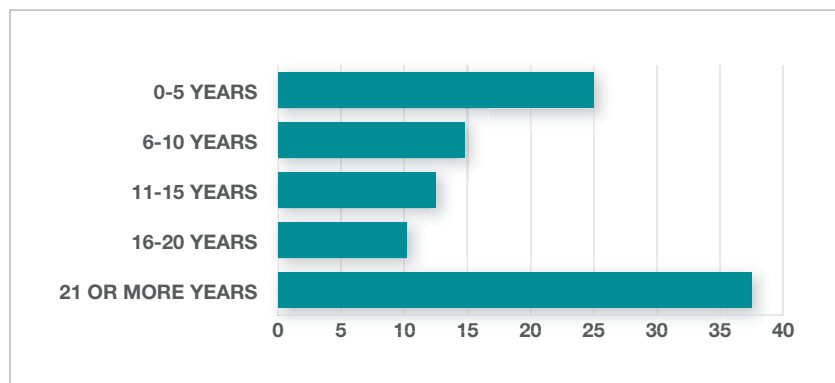
Responses were attained relative to patient evaluation, aspects of the hearing aid fitting process, and the provision of follow-up services that might augment communication success beyond that attained from use of hearing aids alone. The following presents responses, along with comparisons, of noted practice conventions to established best-practice patterns.

SELF-ASSESSMENT MEASURES

Common procedural terminology defines comprehensive audiometry as air- and bone-conduction threshold testing along with speech-threshold and speech-recognition assessment. From a hearing rehabilitation perspective, clinical guidelines recommend more.

Clinical best practice emphasizes the value of exploring the patients' perceptions of the impact of their hearing loss (AAA, 2006). These measures are also instrumental in motivational engagement counseling to help patients find their own internal motivation to move forward with recommendations when such motivation is lacking (Clark et al, 2012; Clark and Weiser, 2014). Repeat administration of self-assessment measures following intervention provides needed documentation of the value of audiologists' work and

FIGURE 1. Percent of Survey Respondents' Years in Clinical Practice

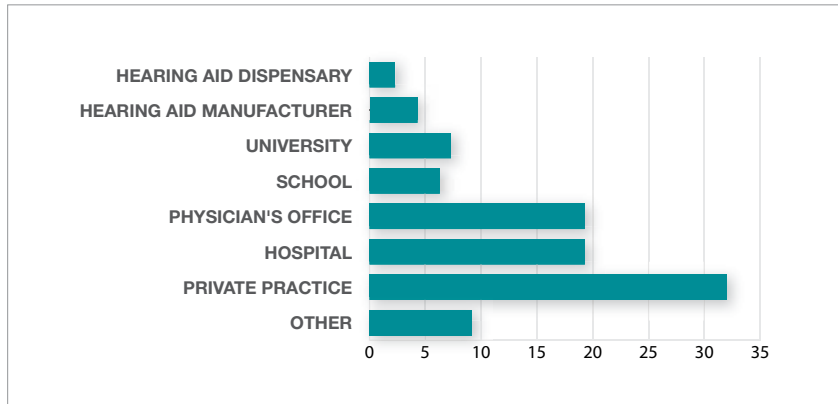


the benefit treatment has provided to their patients (AAA, 2006).

Survey respondents were asked how often they used pre-treatment, self-assessment measures. Given that these measures have long been advocated as a part of best practice and given the value that they can bring to the rehabilitation process, it is surprising that only 15 percent of respondents use these measures routinely and that 57 percent report using them seldom or never (TABLE 1).

An earlier survey by Pietrzyk (2009) reported that less than 10 percent of audiologists routinely used self-assessment measures at the time of his survey and that more than 40 percent believed that they could outline needed audiological treatment based on the hearing test results alone. It would appear that many audiologists practice as if their patients' perceptions of the degree that hearing loss impacts their lives has little bearing on treatment planning.

A similar frequency of disuse was reported for the employment of self-assessment measures as a post-treatment outcome validation. The findings in TABLE 2 are only slightly better than those of Stika et al (2002) who reported that only 10 percent of audiologists use post-fitting validation questionnaires.



PURE-TONE AUDIOMETRY

Guidelines for pure-tone audiometry have long been in place and have most recently been revised by the American Speech–Language–Hearing Association (ASHA, 2005). These guidelines indicate that supra-aural headphones and insert earphones are both appropriate transducers for threshold measurements by air conduction. That said, the advantages of insert receivers over supra-aural earphones are well established and include greater interaural attenuation requiring less need for masking and less chance for over masking, improved clinical hygiene, and greater comfort.

Results of this survey indicate that the majority, or 70 percent, of responding audiologists use insert earphones as their primary transducer while testing. This is an

FIGURE 2: Percent of Survey Respondents Employed Within Different Practice Settings

Demographic distribution is consistent with AAA (2016) practice demographics showing the majority of audiologists work within a medical setting (hospital or physician's office) followed by employment within private practice.

PERCENT OF RESPONDENTS	FREQUENCY OF USE
15 percent	Always (76 to 100 percent of the time)
13 percent	Often (51 to 75 percent of the time)
16 percent	Sometimes (26 to 50 percent of the time)
30 percent	Seldom (1 to 25 percent of the time)
27 percent	Never

TABLE 1. Respondent Use of Pre-Treatment Self-Assessment Measures

PERCENT OF RESPONDENTS	FREQUENCY OF USE
18 percent	Always (76 to 100 percent of the time)
15 percent	Often (51 to 75 percent of the time)
11 percent	Sometimes (26 to 50 percent of the time)
33 percent	Seldom (1 to 25 percent of the time)
23 percent	Never

TABLE 2. Respondent Use of Post-Treatment Self-Assessment Measures

increase from the 24 percent use rate for inserts reported in the Martin et al (1998) clinical practices survey.

The ASHA (2005) guidelines recommend routine testing of 3000 Hz and 6000 Hz for pure-tone air-conduction audiometry to ensure identification of any potential early signs of hearing threshold shifts due to noise. Our survey results indicate that a majority of the sample, or 70 percent, routinely test 3000 Hz and 6000 Hz by air conduction in an initial evaluation.

SPEECH-RECOGNITION TESTING

The use of recorded stimuli when completing speech recognition measures has long been recommended as the preferred means of testing (e.g., Roeser, 2013). Audiologists are slow to change but improvement in clinical practice is seen in this area over the past 20 years. While only six percent of audiologists reported using recorded materials in the survey by Martin and colleagues (1998), we found that 52 percent of the participants in the current survey use recorded material for speech

recognition testing. As clinical audiometers are replaced over time with instruments that have built in, easily accessible sound files, we anticipate these numbers will continue to climb.

SPEECH-IN-NOISE ASSESSMENTS

A primary complaint from those with hearing loss is difficulty hearing in the presence of background noise (Kochkin, 2010). Given this, it is not surprising that patients may wonder why their hearing is most often only assessed in a quiet sound booth. Not only does speech-in-noise testing increase the face validity of a hearing assessment, the results provide valuable information for the clinician whose task is to help patients set appropriate expectations for rehabilitation outcome, choose appropriate technologies to improve these outcomes, and assess the degree of benefit received from intervention.

In spite of the benefits of performing speech-in-noise tests, only 15 percent of those surveyed reported that they regularly test with a competing signal (TABLE 3). When speech-in-noise assessments were completed, the majority of responding audiologists reported using the QuickSIN (48 percent). The second most commonly used measure was the hearing-in-noise test (HINT) at 13 percent with the remaining using one of several other options.

TABLE 3. Frequency of Use of Speech-in-Noise Testing

PERCENT OF RESPONDENTS	FREQUENCY OF USE
15 percent	Always (76 to 100 percent of the time)
14 percent	Often (51 to 75 percent of the time)
17 percent	Sometimes (26 to 50 percent of the time)
39 percent	Seldom (1 to 25 percent of the time)
16 percent	Never

ASSESSMENT OF UNCOMFORTABLE LISTENING LEVELS

Consideration of a patient's frequency-specific uncomfortable listening levels (UCL) is considered best practice (AAA, 2006) to ensure the prevention of amplification-induced threshold shifts and maintenance of comfort for amplified sounds, thereby reducing amplification rejection. The use of normative data (Pascoe, 1988) generated by hearing aid fitting software is often recommended as a means to save valuable clinical time that could be utilized better in other aspects of the fitting and rehabilitation process (Dillon, 2012).

Our survey results revealed 43 percent of respondents utilize normative default data for approximation of frequency-specific UCL for a patient's given hearing loss. Thirty percent measure UCL for frequency-specific signals and twenty-four percent reported they measure UCL for speech. Three percent indicated they were unsure what they do in this area.

VERIFICATION OF HEARING AID FITTING

It has long been recognized that reliance on hearing aid laboratory fitting software calculation based upon the average dimensions of the adult human ear can falsely represent the accuracy of a hearing aid fitting. Most hearing aid fittings vary significantly from prescribed settings when

PERCENT OF RESPONDENTS	FREQUENCY OF USE
55 percent	Always (76 to 100 percent of the time)
8 percent	Often (51 to 75 percent of the time)
12 percent	Sometimes (26 to 50 percent of the time)
15 percent	Seldom (1 to 25 percent of the time)
10 percent	Never

fitting accuracy is based on software calculations with no subsequent verification (e.g., Aazh and Moore, 2007; Sanders et al, 2015). While probe-microphone verification of hearing aid fittings has been a part of every best-practice guideline for hearing aid fittings promulgated over at least the last 20 years (Mueller, 2014), Mueller and Picou (2010) report that these measures are only routinely made (greater than 50 percent of the time) by approximately 40 percent of audiologists.

Despite research data supporting the use of probe-microphone measures and the fact that these measures are considered best practice in hearing aid fitting, only about half, or 55 percent, of participants in this survey report that they always utilize real-ear, probe-microphone measures when performing a hearing aid fitting (TABLE 4).

While the findings of this survey are slightly better than the 2010 use rates reported by Mueller and Picou, they are still surprisingly low. While many report that they do not have the equipment available, Mueller and Picou found that 45 percent of

TABLE 4. Frequency of Use of Probe-Microphone Measures

PERCENT OF RESPONDENTS	FREQUENCY OF USE
13 percent	Always (76 to 100 percent of the time)
38 percent	Often (51 to 75 percent of the time)
36 percent	Sometimes (26 to 50 percent of the time)
10 percent	Seldom (1 to 25 percent of the time)
3 percent	Never

TABLE 5. Frequency of Hearing Assistance Technologies (HATs) Discussions

PERCENT OF RESPONDENTS	FREQUENCY OF CP INVOLVEMENT
27 percent	Always (76 to 100 percent of the time)
38 percent	Often (51 to 75 percent of the time)
24 percent	Sometimes (26 to 50 percent of the time)
8 percent	Seldom (1 to 25 percent of the time)
3 percent	Never

TABLE 6. Communication Partner (CP) Involvement in Audiologic Rehabilitation Process

respondents to their survey who had the equipment did not use it routinely in their hearing aid fittings.

HEARING ASSISTANCE TECHNOLOGIES

Hearing aids alone do not meet the communication needs of every patient and many would benefit from use of augmentative hearing assistance technologies (HATs), also known as assistive listening devices. In addition, many patients who are not yet ready for hearing aids find HATs helpful in select situations. As noted by Academy guidelines, treatment begins with selection of appropriate amplification and HATs (AAA, 2006).

When survey participants were asked how often they discuss hearing assistance technologies with their patients, nearly 50 percent failed to present information about HATs with many of their patients (TABLE 5). When asked about personal sound amplification products (PSAPs), 31

percent of survey respondents indicated that some form of PSAP was available through their practice.

Assessment tools can assist in determining the need for and the selection of the variety of HATs as recommended by the Hearing Loss Association of America (2010). These assessment tools are particularly helpful for patients who often do not provide detailed information about the situations in which they struggle to hear or communicate.

As with any assessment, a hearing assistance technologies needs assessment (e.g., Clark and English, 2014) guarantees that all important areas are addressed consistently. When survey participants were asked whether they use an assessment tool or questionnaire to facilitate discussion or selection of hearing assistance technologies, 94 percent reported that they do not.

AUDIOLOGY AIDES

The use of support personnel has long been endorsed by professional audiology associations as a means to increase productivity and reduce costs of service delivery (AAA, 1997; ASHA, 1998). A dozen years ago, Sullivan (2004) reported that 28 percent of Academy members took advantage of the support available through employment of audiology aides. Our data suggests that this

TABLE 7. Number of Appointments in the Hearing Aid Procurement Process

SKAFTE (2000) SURVEY	CURRENT SURVEY
1 visit—1 percent	1 visit—2 percent
2 visits—18 percent	2 visits—13 percent
3–5 visits—77 percent	3 visits—44 percent
	4 visits—28 percent
	5 visits—11 percent
6 or more visits—4 percent	6 or more visits—1 percent

rate of use of support personnel has not increased substantially with only 32 percent of survey participants indicating they work with an audiology assistant or technician.

PROVISION OF AUDIOLOGICAL REHABILITATION SERVICES

The remainder of survey questions examined how frequently services were provided that might help patients attain greater success than might be attained through amplification alone. Given that communication is most often an exchange between two or more individuals our first question asked how frequently a primary communication partner was present during patient appointments.

COMMUNICATION PARTNERS

Patients' primary communication partners should be actively involved in the audiological management of adult hearing impairment to gain a greater appreciation of realistic communication expectations and to learn ways they can further enhance successful communication. When our survey participants were asked how often they ensure that a primary communication partner (CP) or family member is present at the time of an evaluation and/or fitting, 27 percent said always (TABLE 6). This low figure is consistent with the report from

PERCENT OF RESPONDENTS	FREQUENCY OF CP INVOLVEMENT
42 percent	Always (76 to 100 percent of the time)
30 percent	Often (51 to 75 percent of the time)
23 percent	Sometimes (26 to 50 percent of the time)
5 percent	Seldom (1 to 25 percent of the time)
1 percent	Never

*Note interpretation caution.

Stika and her colleagues (2002) who noted active spousal involvement approximately 20 percent of the time.

PROVISION OF COMMUNICATION TRAINING

Hearing therapy, or communication training, should be integral to a more comprehensive delivery of audiological services (AAA, 2006) and has long been endorsed by the primary consumer advocacy group for those with hearing loss, the Hearing Loss Association of America, as a recommended adjunct to hearing aid fittings (HLAA, n.d).

Our survey results are consistent with past results from Skafta (2000), demonstrating that the predominant protocol for hearing aid dispensing has not changed much through the years with the process completing most frequently in three visits or fewer (TABLE 7). Greater numbers of audiologists are providing discussion of communication strategies than in the past (TABLE 8). However, given the

TABLE 8. Provision of Augmentative Communication Strategies*

PERCENT OF RESPONDENTS	FREQUENCY OF CP INVOLVEMENT
19 percent	Always (76 to 100 percent of the time)
23 percent	Often (51 to 75 percent of the time)
35 percent	Sometimes (26 to 50 percent of the time)
17 percent	Seldom (1 to 25 percent of the time)
6 percent	Never

TABLE 9. Provision of Communication Management Handouts

PERCENT OF RESPONDENTS	FREQUENCY OF PROVISION
19 percent	Always (76 to 100 percent of the time)
36 percent	Often (51 to 75 percent of the time)
25 percent	Sometimes (26 to 50 percent of the time)
2 percent	Seldom (1 to 25 percent of the time)
5 percent	Never
13 percent	Not sure what clear speech techniques are

TABLE 10. Provision of Clear Speech Instruction

limited time encompassed in three to five clinical appointments, one might suspect that discussions are not in depth and may not entail detailed examples of implementation strategies or an exploration of patients' comfort with using these strategies. Certainly, any discussions would be enhanced with the provision of supplemental handouts to reinforce key points, yet it would appear that these are not provided as often as they could be (TABLE 9).

CLEAR SPEECH TRAINING

Clear speech is a specific communication strategy which has been demonstrated to provide an increase in perceived intelligibility advantage as the listening environment becomes more challenging (Uchanski, 2005). Cassie and Tranquilla (2010) found that even minimal instruction with a communication partner could result in a more clear speaking style improving a patients' speech understanding by 11 to 34 percent. Despite its importance, when audiologists were asked how often clear speech techniques are discussed with patients, only 19 percent said they always discuss clear speech techniques (defined as greater than 75 percent of the time) (TABLE 10).

PROVISION OF INDIVIDUAL/COUPLES COMMUNICATION TRAINING

Our survey results revealed only 15 percent provide any formal, aural rehabilitation training with their patients. Of this number, half provide sessions only infrequently or no more than three times a year. Respondents who do not provide communication training sessions were asked why they choose not to provide these services. The majority, or 47 percent, selected that they do not have time to provide this service, 20 percent do not feel prepared or comfortable providing this service, and 33 percent do not think it is cost effective for their practice. It is part of audiologists' responsibilities to provide patients with this service when needed or to refer the patient to an audiologist who is comfortable providing these services. Many resources are available that provide useful guidance for audiologists in the delivery of both couples and group hearing therapy (e.g., Clark and English, 2014; Idainstitute.com; Wayner and Abrahamson, 1996).

AT-HOME AUGMENTATIVE TRAINING

Computer-based training can help patients to improve overall listening strategies and listening in noise skills or to use available visual cues more effectively. Our surveyed audiologists were asked how often they recommend home computer-based training to improve communication such as those provided through Listening and Communication Enhancement (LACE), Read MY Quips, or Lipreading.org. Only one percent said they recommend this more than 75 percent of the time (TABLE 11).


COMMUNITY AND/OR ONLINE SUPPORT GROUPS

Recognizing that support groups can be beneficial to audiological treatment success for some patients, the Academy guidelines (AAA, 2006) recommend that groups be available to patients. Support groups provide ongoing encouragement and advocacy for individuals with significant hearing loss and their families. It takes very little of an audiologist's time to introduce patients to the available local or on-line support groups that provide opportunities for individuals with hearing loss to connect with other individuals and families, as well as provide access to additional information and/or resources.

Survey results revealed that 45 percent of respondents make patients aware of consumer support groups such as the Hearing Loss Association of America. This is considerably higher than the roughly 20 percent reported by Stika et al (2002). As with the provision of communication strategies, the higher numbers in this survey could reflect the fact that Stika and her colleagues surveyed recipients of care and that information may need to be provided in a more meaningful context for later recall. But it does look like an improvement in this area.

CONCLUSION

Previous studies revealed that clinical practices implemented in the field of audiology may do little to differentiate how hearing aids are dispensed by audiologists when compared to commercial hearing aid dispensers (Mueller, 2003; Kochkin, 2002). This sheds light on the importance of audiologists' need to reflect on their own practices and ensure that they are providing services supported by clinical evidence. By implementing professional-practice guidelines and ensuring that audiologists follow evidence-based protocols, audiologists will differentiate themselves from competitors and foster professional autonomy.

Palmer (2009) points out that audiology's code of ethics is clear that failure to follow best-practice guidelines is a violation of professional ethics. The continuation of inferior practice patterns that do not ensure best outcomes negatively impacts both patients and the profession. Patients expect that professionals are using the latest technologies and established best-practice protocols to ensure satisfactory outcomes. Our survey results suggest that we are clearly improving in our attempts to provide the best rehabilitative care possible. We still have room for further improvement. 

PERCENT OF RESPONDENTS	FREQUENCY OF PROVISION
1 percent	Always (76 to 100 percent of the time)
8 percent	Often (51 to 75 percent of the time)
16 percent	Sometimes (26 to 50 percent of the time)
41 percent	Seldom (1 to 25 percent of the time)
33 percent	Never

TABLE 11. Computer-Based Aural Rehabilitation Training Recommendations

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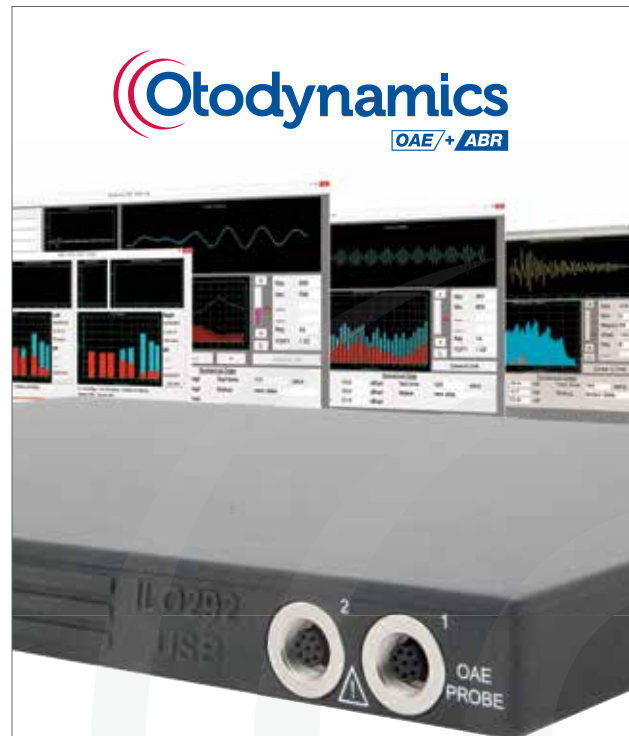
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A hand is shown holding a white paper cutout of a family consisting of a mother, a father, and two children. The background is a close-up of a hand holding a piece of cracked glass. The title 'BRACE FOR IMPACT' is written in large, white, sans-serif capital letters across the top of the image.

BRACE FOR IMPACT

How to Help Your Struggling Pediatric Patients
and Their Families

BY BRIANA HESTER-KEELS



Audiologists can assist families through their journey by giving them the informational and emotional guidance necessary to feel confident in managing their child's condition.

Every audiologist, regardless of his or her patient population, has faced telling parents their child has hearing loss. It may become easier to break the news with practice, but have you ever stopped to think about what might be racing through their minds?

Many parents are completely unaware of the world of hearing loss and are suddenly panic-stricken to think their child may never learn to communicate. Due to the advent of universal newborn hearing screenings, audiologists are delivering this news earlier—usually when new parents are in their most vulnerable state. Both new parents and parents of children with chronic conditions have shown increased levels of anxiety and depression (Matthey et al, 2013; Cousino and Hazen, 2013). Parents of children with hearing loss fall into these categories,

particularly if their child has other comorbidities, and may be at risk for developing mental health disorders.

According to a survey from the National Institute of Child Health and Human Development, one out of eight mothers experience anxiety and depression during pregnancy and/or shortly after having a new baby (National Child and Maternal Health Program). If left untreated, high levels of post-partum depression may even affect infant cognitive development (Koutra et al, 2013). Introducing the diagnosis of a chronic health condition, like hearing loss, during this fragile time can be devastating for new parents. Permanent hearing loss is now commonly identified within the first few weeks of life, with early intervention services beginning within the first few months. Efficient and timely services are critical for good

outcomes but can be an overwhelming source of responsibility for parents.

Is This Really an Issue for Audiologists?

There is a general consensus that hearing loss can affect a family's psychosocial status with anywhere from minor to major impacts on their psyche (Calderon and Greenberg, 1999; Falakaflaki and Kalantarkousheh, 2013; Lederberg and Golbach, 2002; Meadow-Orlans, 1995; Pipp-Siegel et al, 2002; Spahn et al, 2003). In light of the evidence regarding psychosocial changes, more attention should be given to their effects on pediatric quality of life and development.

Depression in mothers of children with hearing loss has been shown to affect the child's psychosocial development as early as two months of age, as depressed mothers are less emotionally available for effective interactions (Cohn et al, 1990). This negativity may increase over time if depression continues, which further limits the child's ability for emotional growth (Cohn et al, 1990). Not only are parent-child interactions strained or absent when anxiety and depression are involved, but these feelings can even affect a parents' ability to manage their child's condition.

In a study by Muñoz and colleagues (2016), a multiple-linear regression analysis found that parents who were severely depressed reported their children used their hearing aids approximately two and a half hours per day less than parents who reported no depression.

Addressing mental-health concerns as an audiologist is a foreign, and, frankly, quite intimidating concept. We place a box of tissues on our desks and cross our fingers that we will be able to care for our patients and their families appropriately, but how many are facing demons?

The Evidence

An unpublished AuD student capstone project that examined the mental health status of parents of children with hearing loss found potentially detrimental effects on pediatric quality of life (Hester-Keels et al, 2017). Participants were parents of children with hearing loss

ages zero to 12 years who attended auditory-oral schools across the country. They were asked about their levels of anxiety and depression within the last several days and their child's quality of life within the past month using questions from the Patient Reported Outcomes Measurement Information System by the National Institute of Health and the Pediatric Quality of Life Parent-Proxy Generic Core Scales 4.0, ages zero-12 years.

Even though 57 percent (n=40/70) of participants reported no symptoms of anxiety, 43 percent (n=30/70) were experiencing anywhere from mild-to-severe anxiety (see FIGURE 1). Approximately 76 percent (n=52/69) of participants were not experiencing symptoms of depression,

but 24 percent (n=17/69) were experiencing mild-to-moderate depressive symptoms (see FIGURE 2). A correlation co-efficient revealed a significant moderate correlation ($r=0.619$, $p<0.0001$) between anxiety and depression scores. A stepwise linear regression model was

significant, with anxiety and depression accounting for 26 percent of the variance ($r^2=0.260$) in total pediatric quality-of-life scores. However, depression was the only significant predictor variable in the model ($p<0.0001$). For every one-point increase in depression scores, there was a 0.83-point decrease in total pediatric quality of life scores ($B=-0.830$).

If parents experience distress in relation to their child's hearing loss that is impacting their quality of life, what preventative measures can we take to avoid further suffering? Audiologists can assist families through their journey by giving them the informational and emotional guidance necessary to feel confident in managing their child's condition. Stress can decrease over time but tends to increase during transitional periods, and having an audiology-based foundation of support can act as an anchor at those times in a child's life.

Not only can audiologists learn to give proper guidance, but parents expect support from their health-care providers. In a study examining chronic parenting stress, Quittner and colleagues (1990) found that, "mothers of deaf children listed health-care professionals more frequently in their networks and attributed a significantly larger percentage of functional and emotional support to these sources (12 percent), as compared with mothers of hearing children (3 percent)." Audiologists who serve

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pediatric populations and their families are in an optimal position to provide assistance by consistently monitoring the families' needs through three main avenues: (1) emotional support, (2) structured education and group support, and (3) psychological support.

Emotional Support

While audiologists are in an ideal position to guide families through their journey from diagnosis to treatment, few are confident in their abilities to provide counseling services. Muñoz et al, (2015) examined how audiologists attend to parents' emotions and found discrepancies between what families wanted and what professionals were able to give.

In a survey of 37 families, 36 percent (n=19) reported their audiologist helped them manage emotions, 53 percent (n=30) provided them with enough time to discuss their emotions, and 57 percent (n=27) helped them understand their emotions. In a related study by Muñoz and colleagues (2016), most parents felt their emotional needs were being met, but 27 percent (n=86) desired for their audiologist to check in with them more frequently regarding support. Even though some audiologists feel comfortable providing emotional support, not everyone has received proper training.

In a study by Meibos et al (2016), only 39 percent (n=131/335) of participating audiologists had received training in screening for symptoms of depression and anxiety, while 76 percent of participants desired more training on the topic. Even though patients approve of and feel comfortable with their providers conducting a mental-health screening, the majority of audiologists fear adverse reactions (Muñoz et al, 2017).

Other health professions have recognized mental health as a critical aspect of comprehensive care, and creating screening measures to address

those needs has been successful (Smith et al, 2016). If audiologists are trained in basic mental health through graduate courses or continuing education, they are likely to be better prepared to notice anxiety and depression, and may be more inclined to take appropriate action.

Structured Education and Group Support

Family-centered care is a staple of a trustworthy health-care system. For any family coping with a child's diagnosis of hearing loss, particularly those experiencing anxiety and depression, structured education and support groups can provide a sense of unity. Unfortunately, many practices rely on the use of informational packets to answer questions in lieu of dedicated counseling sessions.

Meibos and colleagues (2016) surveyed 343 pediatric audiologists and 226 (66 percent) reported not having enough time to address parent emotions during appointments. A critical factor of anxiety and depression in parents of children with hearing loss is the fact that those symptoms may be secondary to the diagnosis of hearing loss. Not all stress can be diminished through knowledge, but conducting structured educational sessions shortly after diagnosis in the areas of auditory development, communication methods, hearing loss, and device use and troubleshooting may help ease the coping process.

By providing structured education in a group setting, parents of children with hearing loss gain easy access to families with similar experiences who can act as personal support. Combining these education sessions with more informal support groups may further ease tension by allowing families to connect with each other and express their emotions openly to an understanding audience. However, many practices may not find group education and support feasible.

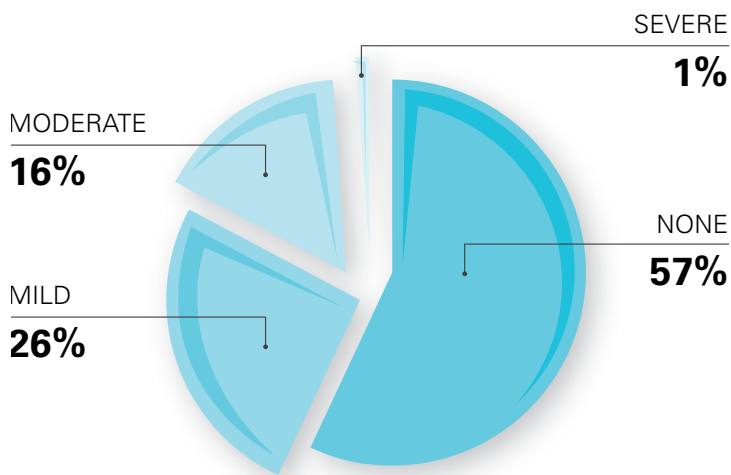


FIGURE 1: Parental Anxiety—Symptom Severity

In the Meibos et al, (2016) study examining parent hearing aid education and support, only 40 percent of audiologists (n=140/349) were able to provide information to families regarding how to connect with other parents of children with hearing loss and find support groups.

Few studies have examined the effects of support groups on parents of children with hearing loss. In Fitzpatrick et al (2008), researchers found not only parent support groups, but simple access to input from other parents, fulfilled their needs regarding “knowledge sharing, practical information about hearing devices and community resources, prognostic information, and hope.” Some parents found emotional support through the group “beyond what could be offered by psychosocial providers in health care.” While leading support groups may be a challenge for some audiologists due to time restraints and/or lack of knowledge, it is important to recognize the positive benefits for patients and their families, and consider creating a safe space for them. Collaborating with psychologists to create support groups may even lead to better outcomes through more consistent device use and better patient/family satisfaction.

Psychological Support

We can provide informational counseling and emotional support regarding hearing loss, but psychological counseling is beyond our scope of practice. However, integrating audiological and psychological services by establishing a working relationship with psychologists can be crucial to detecting anxiety and depression before they become severe enough to warrant a clinical diagnosis.

Fitzpatrick and colleagues (2008) conducted semi-structured interviews with 17 families in Ontario, Canada, regarding their needs following a diagnosis

of childhood hearing loss. Many parents did not have exposure to psychological services unless their child was being considered for cochlear implantation. Parents’ encounters with social workers were also inconsistent due to separation between psychology, audiology, and speech and language pathology departments.

Audiologists can be the first line of defense in recognizing mental-health problems related to hearing loss and provide appropriate referrals not only for parents, but for our pediatric patients. Research regarding the mental-health status of children with hearing loss, particularly those who use listening and spoken language as a primary communication mode, is lacking.

In an article by Dammeyer and colleagues (2010), researchers found that a child’s ability to communicate, regardless of modality, may act as a protective factor against development of psychopathologies in hearing-impaired children. This finding provides further evidence for early detection and intervention, as providing access to sound and establishing strong communication skills through the family’s first language could decrease those risks for future psychological disorders.

In a study of 200 children ranging in ages nine to 15 years of age, Theunissen and colleagues (2011) found that hearing-impaired children reported significantly more symptoms of depression than their normal-hearing peers. In one of the few studies examining anxiety specifically in children with hearing loss (Theunissen et al, 2012), the authors discovered that children with cochlear implants experienced anxieties comparable to their normal hearing peers. However, children with lesser degrees of loss who wore hearing aids reported significantly higher social anxiety, and their parents reported significantly higher general anxiety compared to cochlear implant users and their parents. Children with hearing aids also showed more symptoms of psychopathology than

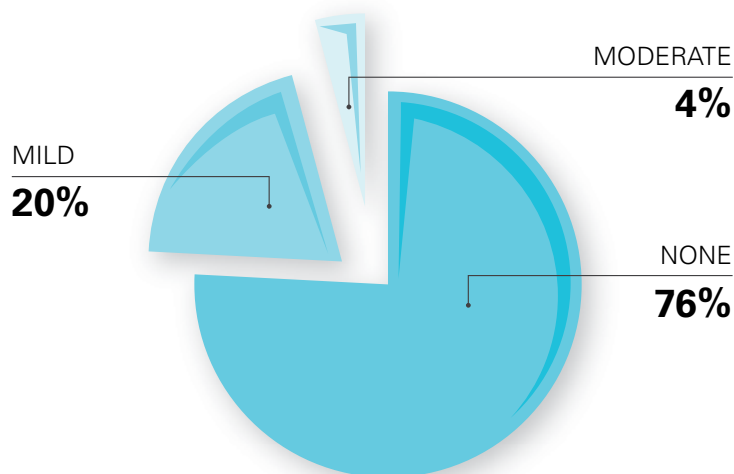



FIGURE 2: Parental Depression—Symptom Severity

their peers with cochlear implants (Theunissen et al, 2015). An extensive literature review has shown that children with hearing aids never perform better than their peers with cochlear implants on measures of psychopathology, even though they have a lesser degrees of hearing loss (Theunissen et al, 2014). When assessing the need for psychological services, broadening resources to children and their families experiencing any degree of hearing loss may assist in reducing emotional difficulties.

Conclusion

Parents of children with permanent hearing loss may be experiencing symptoms of anxiety and depression. Those symptoms may affect their ability to manage their child's condition and can have negative effects on pediatric quality-of-life. Audiologists can be a point of access for care by screening for anxiety and depression regularly, and providing various levels-of-support for patients and their families. It is important to refer to mental-health professionals, when screening results warrant the need. 

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This research was completed as part of a larger capstone project by Briana Hester-Keels, BS, Judith Lieu, MD, and Kay Park, AuD, through the Program in Audiology and Communication Sciences at Washington University School of Medicine, titled "Anxiety and Depression

in Parents of Children with Hearing Loss: Effects on Pediatric Quality of Life." Contact the author at hesterb@wustl.edu for more information.

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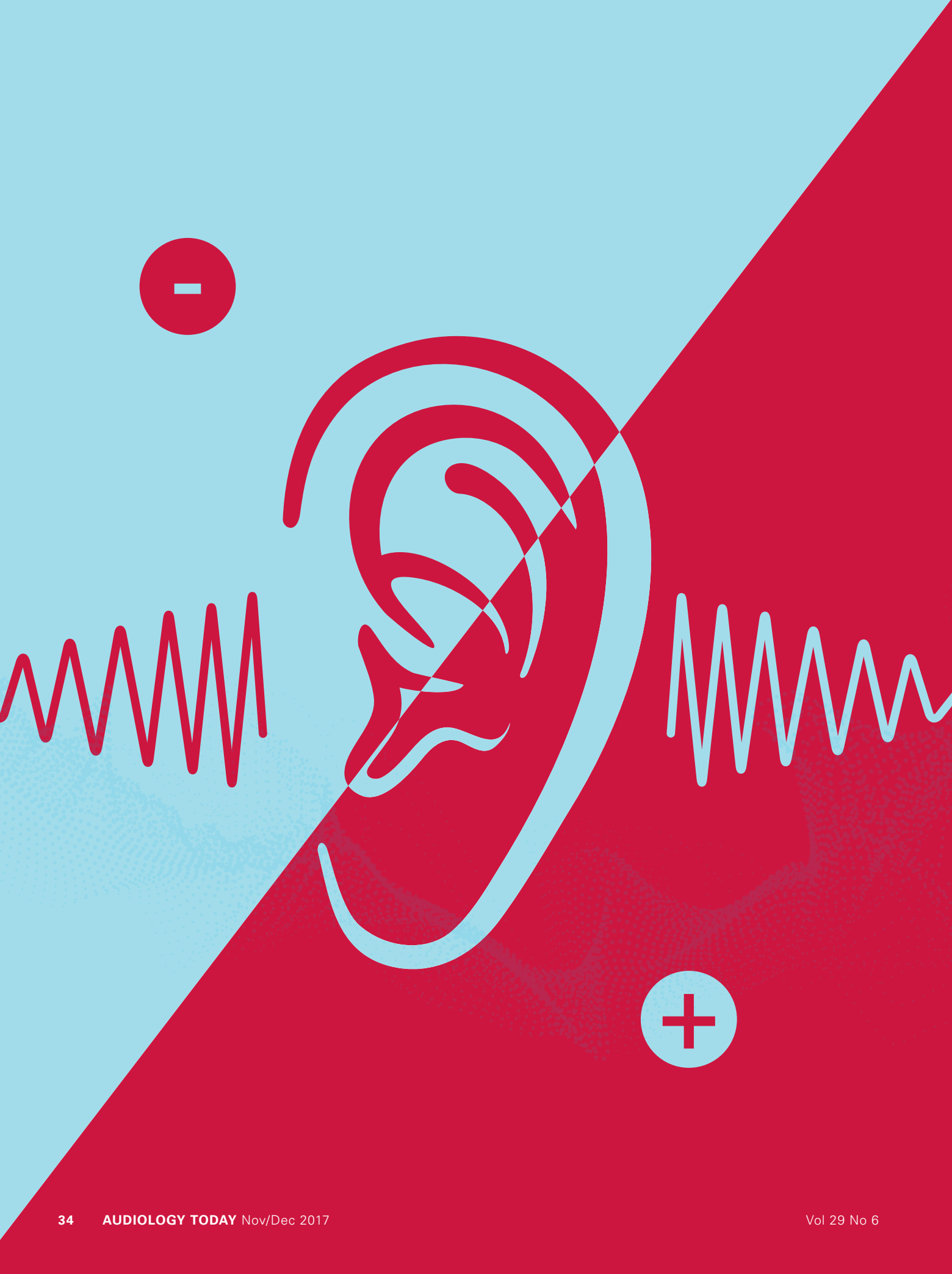
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“Normal” Hearing and Perceived Hearing Complaints

BY CHRISTOPHER SPANKOVICH AND COLLEEN LE PRELL

Hidden hearing loss refers specifically to the reduced amplitude of sound-evoked neural responses that occurs with loss of synapses that connect the inner hair cells to the auditory nerve, so the patient’s audiometric difficulties are hidden behind a normal audiogram.

Hidden hearing loss (HHL) is a popular topic referring to complaints of hearing difficulty or perceived hearing loss despite having “normal” audiometric thresholds. Within the scientific literature, this term has most recently been used to refer specifically to the reduced amplitude of sound-evoked neural responses that occurs with loss of synapses that connect the inner hair cells (IHCs) to the auditory nerve. In other words, the patient’s audiometric difficulties are hidden behind a normal audiogram. However, perceived hearing loss despite normal audiometric thresholds may be a complaint related to numerous factors. The phenomenon of HHL including its epidemiology, pathophysiology, and clinical implications are under intense study and debate. In this review, we will address these subjects with primary emphasis in adult populations. Recent reviews of the work in animals and implications for patients are available, e.g., Liberman et al (2017). In addition, the review of this topic by Pienkowski (2017) is clinically oriented, and is highly recommended to the interested reader.

Epidemiology of HHL

Epidemiology refers to the study of patterns and causes of health and disease. To establish common epidemiological outcomes such as

prevalence and determinants (factors that predict or are associated with outcome of interest), we must operationally define HHL. Here, we will define HHL as perceived hearing loss despite normal audiometric thresholds, i.e., normal hearing. Which raises the question, what is “normal hearing?” This sounds simple enough, but can be quite complex. The majority of epidemiological studies in the literature utilize the four-frequency pure tone average (PTA5124) of 500, 1000, 2000, and 4000 Hz and cutoff for normal PTA at greater than or equal to 20 or 25 dBHL.

Currently, no large population-based study has examined extended high frequencies, i.e., greater than 8000 Hz, although several large data sets have become available. The reason that it is important to consider EHF frequencies is that depending on how you define “normal hearing,” you may over or under estimate the prevalence of HHL. Furthermore, even if an individual has “normal” hearing, that does not mean they have not acquired some threshold shift, as 10 years ago their hearing may have been as much as 15–20 dB better (lower thresholds) even if current thresholds are still within many common definitions of “normal” hearing.

What do we know about HHL epidemiology? Anecdotally, patients presenting with this phenotype to otolaryngology and audiology practices (normal audiometric thresholds and reported hearing difficulty) are not uncommon. Gates et al (1990), analyzed data from the Framingham Heart Study reported 20.2 percent of those who self-reported hearing loss had a pure-tone average less than 26 dB HL (PTA=0.5, 1.0, and 2.0). Hind et al (2011) suggested one to five percent of children and adults under the age of 60 have difficulties understanding speech, particularly, in noisy challenging environments despite normal

thresholds (defined as < 20dB HL at 0.5, 1.0, 2.0, 3.0, 4.0, 6.0, and 8.0 kHz). More recently, Tremblay et al (2015) analyzed data from the Beaver Dam Offspring Study (BOSS) and found that 12 percent of participants had normal audiometric thresholds but reported hearing difficulty (defined as < 20dB HL at 0.5, 1.0, 2.0, 3.0, 4.0, 6.0, and 8.0 kHz). Interestingly, the prevalence estimates are consistent with suggested prevalence accounts of auditory neuropathy spectrum disorder (ANSD) in pediatric populations (Berlin et al, 2010).

Pathophysiology

Hearing difficulty despite normal audiometric thresholds is not a new concept. Numerous names have been suggested (e.g., King-Kopetzky syndrome, obscure auditory dysfunction, etc.). So what causes HHL? Again, this is as complicated as explaining what causes age-related hearing loss (for which age itself may only be a small factor). We have many potential factors that may contribute to HHL, both auditory and non-auditory.

AUDITORY PERIPHERAL DEFICITS

Changes in cochlear mechanics (amplification and non-linearity) can be observed prior to changes in audiometric thresholds (for review see Dhar et al, 2012). Animal studies have indicated thresholds may be insensitive to loss of the outer hair cells when up to 20–30 percent of outer hair cells are damaged (Bohne et al, 1992; Davis et al, 2005). In addition, changes in neural integrity can also be observed prior to changes in audiometric thresholds. There can be significant loss of afferent neural function without obvious changes to audiometric threshold (Kujawa et al, 2009; Lobarinas et al, 2013; Schuknecht et al, 1953). In addition, auditory neuropathy spectrum

disorder (ANSD) represents a spectrum of pathologies with sites of lesions ranging from inner hair cells to the auditory nerve and displaying compromised neural function (neuropathy to dys-synchrony) despite (at some point) normal cochlear function as measured by otoacoustic emissions and cochlear microphonic (Starr et al, 1996).

AUDITORY CENTRAL DEFICITS

Central auditory issues can include temporal processing deficits, tinnitus, hyperacusis, etc. Central auditory processing disorder (CAPD) is broadly defined as a deficit in the processing of information that is specific to the auditory modality (Jerger et al, 2000). Central auditory deficits should be considered in patients presenting with HHL complaints. It also makes sense that persons with tinnitus would report hearing difficulty even in the absence of other hearing issues (e.g., speech understanding in noise). The very presence of tinnitus may create an impression that something is wrong with a person’s hearing.

NON-AUDITORY FACTORS

Cognitive function, neuropathy/health issues, head/brain injury, stroke, attention deficit and hyperactivity disorders (e.g., attention deficit/hyperactivity disorder), and medications are all factors that may contribute to HHL complaints.

Clinical Evaluation and Management

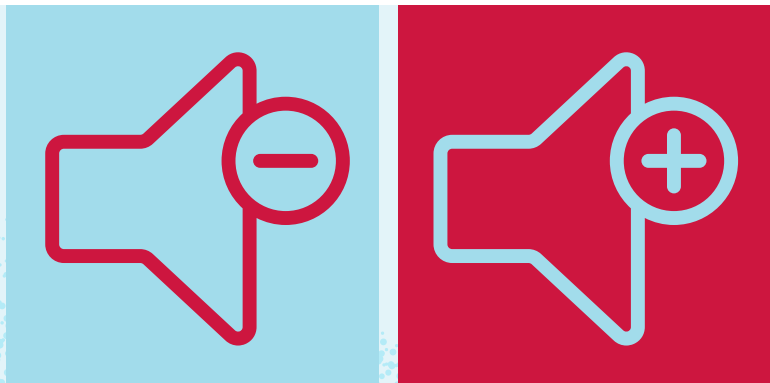
How do we evaluate and manage these patients? First, we must determine if the patient truly has normal hearing (how you define normal hearing is important). For the purpose of this writing, if the patient has thresholds equal or below 25 dBHL at 250–8000 Hz without notching (e.g.,

thresholds at 2000 and 8000 Hz 10 dB better than at frequencies of 3000, 4000 or 6000 Hz), we will call it normal. To get to this point you needed to perform an audiogram, but let’s step back to the case history. What are the complaints? Do they have tinnitus? Do they have sound sensitivity or other abnormal auditory perceptions? A tinnitus patient may report hearing difficulties, even with normal audiometric thresholds, simply due to the fact that they have tinnitus. Are the reported difficulties primarily in noise? Is the patient on medication, or have other co-morbidities that may influence attention, awareness, cognitive function, etc., all of which are expected to contribute to difficulties in challenging listening conditions?

Self-assessment measures of hearing are positively correlated with psychophysical measures of auditory function. Numerous options exist. Self-assessment measures can determine the perceived impact on quality of life and help differentiate complaints. The authors most commonly use the Hearing Handicap Inventory for the Elderly and Adults (HHIE and HHIA) short versions (Newman et al, 1991; Newman et al, 1988) and the Tinnitus and Hearing Survey (Henry et al, 2015).

Let’s move on to diagnostic evaluation. It is plausible that a patient with HHL may have reduced cochlear function, neural function (including pre-synaptic, synaptic, and neural), central auditory processing, and/or non-auditory deficits. A good place to start is with the patient’s complaints.

For example, a common complaint in this patient population is difficulty understanding speech in noisy environments. Speech-in-noise testing (e.g., QuickSIN, word-in-noise test) may be good places to start. This testing may confirm the patient’s perception or performance may be within the normative range. Speech-in-noise test selection should be



Noise-Induced Synaptopathy and HHL

Permanent peripheral damage observed after noise exposure previously thought to be benign is the underlying driver of recent discussions about HHL. Data from animals and human temporal bones show that neural degeneration can be observed with minimal loss of hair cells (in addition to the classic observations of neural degeneration accompanied by and thought to result from loss of the hair cell targets). Animals raised in quiet lose a subset of the afferent neural innervation with age, with the primary compromised population of cells being the higher-threshold low-spontaneous-rate neural fibers (Schmiedt et al, 1996). In addition, animals that are exposed to noise that elicits a robust temporary threshold shift (TTS), from which there is a complete recovery of neural thresholds, have compromised suprathreshold neural response (e.g., reduced ABR wave-I amplitude) secondary to the immediate loss of synapses and delayed neuronal loss that occurs later with aging of the damaged cochlea (Kujawa et al, 2006; Kujawa and Liberman, 2009).

However, this synaptopathy is dependent on both the noise dose and the corresponding severity of the TTS (Fernandez et al, 2015) and the noise required to elicit synaptopathy appears exceedingly greater with higher animal species (e.g., mouse 100 dB octave band of noise for two hours and non-human primate 108 dB 50 Hz band of noise for four hours) (Valero et al, 2017). Data from Hickox et al (2017), Fernandez et al (2015), Jensen et al (2015) and Lobarinas et al (2017) are consistent in that TTS of less than 30 dB at 24 hours post noise exposure did not result in synaptopathy, whereas exposures resulting in greater than or equal to 40 dB TTS at 24 hours post noise exposure did result in synaptopathy and wave-I amplitude changes. It has also been shown that synaptopathy has the potential to influence signal-in-noise performance in different listening conditions (Lobarinas et al, 2017). The human evidence is more complicated. Human temporal bone studies do support the existence of synaptic and neural loss with minimal evidence of hair cell loss (Makary et al, 2011; Viana et al, 2015). However, these studies not only lack measures of audiometric threshold and function, but noise history information is also mostly unavailable. Even if noise history were known, a major challenge for studies that rely on histology in the

absence of functional data is that intact cells do not always indicate functioning cells.

In other words, an ear that looks normal, as OHCs are present, may not be normal if there is damage to stereocilia that is not revealed in whole-mount processing. In the small number of studies specifically including temporal bones of individuals with known noise exposure history, the analyses have shown either limited loss of neural populations and primary loss of hair cells or damage to both hair cells and neural populations, but not damage to neural populations alone. Though these earlier studies did not examine synaptic elements (Igarashi et al, 1964; McGill et al, 1976). The challenge of mixed pathology in human cochlear tissues has recently been discussed in detail by Hickox et al (2017).

Beyond temporal bone studies, there were several studies in humans examining physiological markers of HHL; these studies included participants with normal thresholds (thresholds of 25 dB HL or better) between 250–8000 Hz. Stamper et al (2015) demonstrated a relationship between reported noise history and ABR wave-I amplitude. However, the relationship was not conserved with variation in recording site (mastoid vs. canal) and was significantly influenced by sex [males tend to have smaller ABR amplitude independent of noise exposure history, but males also tend to report higher noise exposure creating risk for confound] (Stamper and Johnson, 2015). Since then, Prendergast et al (2016), Spankovich et al (2017), Fullbright et al (2017), and Grinn et al (2017) have all failed to replicate the originally reported relationship between noise and ABR wave-I amplitude in other young adult populations exposed to similar patterns of recreational noise.

Liberman et al (2016) examined individuals with higher and lower noise exposure, assessing conventional pure-tone thresholds, but also EHF thresholds, DPOAE amplitude, AP and SP amplitude, and performance on a hearing-in-noise test. They found persons with higher noise exposure had an altered SP/AP ratio, poorer extended high frequency thresholds, and poorer hearing-in-noise. Interestingly, the AP was not significantly different; rather the SP was larger in the higher noise group. Bramhall et al (2017) found evidence of lower wave-I amplitude in veterans and non-veterans with higher noise exposure. Bramhall et al (2015) had considered the possibility that wave-I amplitude may be related to performance on the QuickSIN test, however, relationships were statistically significant only when pure-tone average was in the model.

In summary, data supports the existence of synaptopathy with age and noise exposure in animals and humans. What remain unclear are the risk criteria and timeline for humans and determinant factors that may influence susceptibility. ¹¹

based on patient ability. Although some of the easier tests may have a ceiling effect, the word-in-noise and QuickSIN tests are considered more challenging tests with the potential to reveal evidence of more subtle issues (Wilson et al, 2007). The WIN may further minimize confounding factors such as memory and attention as it involves repeating single words rather than sentences.

Site of lesion testing may provide some further insight. For differential diagnosis of HHL, you should include middle-ear testing, extended high-frequency threshold tests, otoacoustic emissions (both distortion product and transient and possibly multiple levels), OAE suppression, and auditory-evoked potentials (e.g., neural auditory brainstem response, electrocochleography, complex-ABR, middle and late auditory-evoked potentials).

Possible etiologies to consider or rule out include middle-ear dysfunction or history of chronic middle-ear dysfunction (potential amblyopia see Whitton et al, 2011) subclinical cochlear dysfunction, auditory neuropathy spectrum disorder, central auditory deficits, and tinnitus/sound sensitivity. In addition, medical pathologies such as space-occupying lesions should be excluded.

Test battery considerations in addition to comprehensive audiometric evaluation and speech-in-noise testing with more commonly available equipment and material include the following

Elevated extended high-frequency thresholds (i.e., > 8.0 kHz): These have been associated with reduced speech understanding in noise (Badri et al, 2011; Liberman et al, 2016).

Otoacoustic emissions (OAEs): These include distortion product and transient-evoked otoacoustic emissions. Numerous studies suggest that OAEs are sensitive to small amounts of OHC loss despite limited changes

to thresholds. In particular TEOAEs may be sensitive to subtle changes in cochlear amplification.

- Consider also examining DPOAEs at multiple levels L1/L2=65/55 dB SPL and 55/40 dB SPL. Compare findings to normative data (suggest collection only on subjects with normal thresholds and limited noise history).

Tympanometry and middle-ear muscle reflexes (MEMR): These may have normal admittance with absent or elevated MEMR may be suggestive of neural dysfunction/pathology such as ANSD.

Auditory-evoked potentials: These have been a primary measure in differential diagnosis of sensory versus neural pathology. Absence of the auditory brainstem response (ABR) despite presence of cochlear responses (OAEs and CM) is suggestive of ANSD.

- Comparison of response with condensation and rarefaction stimuli can help differentiate cochlear and neural responses as CM reverses direction with polarity changes, while neural responses do not (Berlin et al, 1998). More subtle effects have been suggested for the compound action potential (CAP)/wave-I amplitude (reduced amplitude) and summing potential/action potential ratio (SP/AP) (larger ratio). However, wave-I amplitude in the literature supporting evidence of compromised neural response are mostly within 1 to 1.5 standard deviations of the normative data (Spankovich et al, 2017) and data examining SP/AP ratio have mainly been driven by changes in the SP (Lieberman et al, 2016 and Grinn et al, 2017).
- Complex ABR (brainstem response called the

frequency-following response, which is driven by the ability to follow a longer-duration stimuli) or middle and late AEP (e.g., MMN, P300) measures may also provide some insight into dysfunction and are an underutilized tool. There is a wealth of literature and on-line courses on applications of auditory-evoked potentials in diagnosis of central auditory deficits (see Atcherson et al, 2015) for recent review).

A tinnitus patient may report hearing difficulties, even with normal audiometric thresholds, simply due to the fact that he or she has tinnitus.

Central auditory processing disorder (CAPD): There are variable approaches to the diagnostic CAPD battery, but in general five broad types of measures are included (Weihing et al, 2015).

- Dichotic processing
- Temporal processing
- Monaural low-redundancy
- Binaural interaction
- Spatial processing

Checkout the *Handbook of Central Auditory Processing Disorder Volume 1* for more information on CAPD diagnostics (Musiek et al, 2013).

Other cognitive screening: An additional measure to consider is a cognitive screen. Numerous options exist, see Beck et al (2016) for a recent review.

“Hidden hearing loss may not be so hidden.”

The etiology underlying HHL will likely influence management recommendations. For example, evidence supporting a central auditory processing deficit may prompt auditory training exercises and environmental modifications. In cases where significant noise history is reported, hearing conservation approaches should be discussed in an effort to prevent additional damage. Nonetheless, even if we identify evidence of subtle cochlear dysfunction, synaptic or neural loss, at this time there is no way to regenerate these elements. So, what can we recommend?

1. Protect Your Ears: Though the jury is out on risk for noise-induced synaptopathy in humans, noise as a risk factor is a preventable determinant of hearing loss in general. Valero et al (2017) found evidence of synaptopathy in non-human primates (monkeys), but the level of exposure was 108 dB SPL for four hours, not taking into account the narrow-band nature of the noise used in the study, which may theoretically increase risk for damage, this would be a noise dose of over 600 percent according to OSHA

regulations and over 10,000 percent with NIOSH recommended exposure guidelines. We may expect humans to be even less susceptible to this damage. No matter, use of hearing protection around loud sounds is always “sound” advice (Dobie et al, 2016).

- 2. Recommend Auditory Training:** Depending on the outcomes of the test battery proposed earlier, specific auditory training recommendations may be made. Numerous computer-based options exist and choice of training is dependent on the target population and specific deficits being targeted. Depending on the tool, there is mixed data on the generalization of auditory training, but those incorporating combined auditory-cognitive training (Ferguson et al, 2015) and using stimuli with frequent communication patterns (Tye-Murray et al, 2016) have been suggested to increase real-world translation. See Wiehing et al (2015), Olson (2015), and Musiek and Chermak (2013) for further review.
- 3. Pick Up an Instrument:** Musical experience may have a profound influence on auditory skills and speech-in-noise ability. Older normal-hearing musicians have faster brainstem timing and greater representation of speech syllable harmonics compared to age-matched peers. However, passive music listening does not get the job done, rather active engagement is necessary. Check out the work of Nina Kraus and colleagues for more information (great review article Anderson et al, 2013).
- 4. Practice Basic Communication Strategies:** We are all familiar with basic

communication strategies, i.e., environmental strategies, repair strategies, advocacy, clear speech, etc. We are all familiar because they can help.

5. **Implement Healthy Living:** Eating healthy, exercise, and healthy living (e.g., not smoking) are not likely to resolve current HHL complaints. However, healthy living can potentially reduce the risk of developing hearing loss and tinnitus (Spankovich et al, 2013, 2017), as well as perhaps preventing cognitive decline (Phillips 2017).
6. **Use Mild Gain Amplification/Remote Microphone:** Would a hearing aid help someone with “normal” hearing and speech-in-noise difficulty? The literature on the effectiveness of hearing aids in real-world noisy environments suggests features such as noise reduction and directional microphones may buy a few additional dB of signal to noise (see review by Beck et al, 2016). In addition, there is the potential benefit of reduced listening effort (Wendt et al, 2017) and self-perceived benefit. Nonetheless, the most effective means to improve SNR in a noisy background is use of a remote microphone coupled to a closed ear-level device.

Conclusion

A comprehensive examination is critically important for patients reporting difficulty hearing in noise, or other deficits that might be identified as a “hidden hearing loss.” After a comprehensive evaluation, HHL may not be so hidden. Though site of lesion testing is near and dear to most audiologist, once significant pathology is ruled out, the key concern is how we manage these patients to improve their communication concerns.

Though there is great interest in the specific pathophysiology contributing to HHL complaints, in humans there will likely be numerous factors at play. A large acute loss of synaptic elements after TTS in humans has not been demonstrated to date. Based on the human electrophysiological and psychophysical data to date, correlates of synaptopathy (because we cannot directly measure synaptopathy *in vivo*) are not highly evident in young adults, suggesting that loss of synaptic and neural elements may take high levels of TTS (as in rodent models), or potentially, repeated exposures over an extended time. If humans require higher levels of TTS or noise dose or repeated exposures over time to develop synapse loss and corresponding functional deficits, there will

be a corresponding increase in the risk for concomitant cochlear damage (i.e., hair cell loss).

If pathology is both sensory (affecting hair cells) and neural (affecting synapses or neurons), we have a term for this type of hearing loss (sensorineural), and the question is then rehabilitating both the sensory and neural loss components using hearing aids, noise-reduction processing, and auditory training. Specific site of lesion diagnostics will become even more important as sensory and neural regenerative treatments become clinically feasible. However, until that time we still have tools at our disposal to help these patients. ⁵

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It's no coincidence that in one of his most recent webinars, titled "Hearing Loss and Associated Comorbidities," noted researcher and lecturer Dr. Harvey Abrams addresses social isolation and loneliness first in the long list of co-morbidities.

In a 2016 study by Johns Hopkins and the University of Oklahoma (Sung et al, 2005), researchers measured loneliness in 145 participants using the UCLA Loneliness Scale and found that hearing loss was significantly correlated with greater loneliness. In addition, a 12-year review of the Taiwan National Health Insurance Research Database (NHIRD), comparing more than 25,000 patients, suggested that hearing loss is also an independent risk factor associated with depression regardless of age, gender, and co-morbidities.

By minimizing that silent barrier of hearing loss and reconnecting patients with the outside world, specifically addressing loneliness and isolation factors, hearing health-care professionals may be able to lower a patient's odds of being diagnosed with major depressive symptoms and disorders.

You can download Dr. Abrams' whitepaper "Hearing Loss and Associated Co-morbidities," by visiting HamiltonCapTel.com/AT1117B.

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Technology for Awakening Hard-of-Hearing People During Fire Emergencies

By David Albert

Smoke alarms are an essential component in home fire safety, but what if someone cannot hear his or her alarm's lifesaving alert?



Most residential fire fatalities occur during the night hours when a person's response time is delayed due to sleep. This problem is magnified for those who are deaf, hard of hearing, children, or have presbycusis which effects their ability to hear high frequencies. Presbycusis is the most common type of hearing loss and affects over 40 percent of 65-year-olds and nearly 100 percent of people 85 or older.

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David Albert, MD, is the founder of Lifetone Technology, in Oklahoma City, Oklahoma.

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Billing and Coding the Vestibular Evaluation

By Alyssa Needleman

The vestibular evaluation can include a number of different procedures, and coding for these evaluations can often be confusing. There are several current procedural terminology (CPT®) codes that should be considered when completing your evaluation.

Basic Vestibular Evaluation

The American Medical Association (AMA) (2016) has identified several CPT codes that are considered

“bundled.” A bundled code includes procedures that are most often billed together. Instead of billing all of the individual procedures, just the one bundled code would be reported. The *basic vestibular evaluation (92540)* is a bundled code, defined as including

- **92541**, Spontaneous nystagmus test with eccentric gaze fixation nystagmus, with recording,
- **92542**, Positional nystagmus test, minimum of four positions, with recording,
- **92544**, Optokinetic nystagmus test, bidirectional foveal and peripheral stimulation, with recording, and
- **92545**, Oscillating tracking test, with recording.

These procedural components must be included in their entirety, including a minimum of four positional tests. If all four of these procedural components are not completed on a patient in a single encounter, it is inappropriate to use the bundled 92540 code. Instead, you report the individual codes for the procedures that were performed. However, since the intent of the basic vestibular evaluation is bundled to include four components, when filing the claim for this evaluation a modifier must be added to indicate the procedure was not completed as intended.

In such a situation in which all four of the procedures of the vestibular evaluation were not completed, a modifier 59 would be added to each of the individual codes that were performed to indicate that they were separate and distinct diagnostic procedures to indicate a *distinct procedural service*. When using the modifier 59, make sure there is appropriate documentation in the report as to why the full basic vestibular evaluation was not performed. Always remember, it is inappropriate to unbundle the vestibular evaluation code for the sole



purpose of higher reimbursement by billing the components separately.

Dix-Hallpike

There is no specific CPT code for “Dix-Hallpike.” This maneuver is typically considered a positional component of **92542**, *positional nystagmus test, minimum of four positions*. As noted earlier, CPT code 92542 is also included as part of the basic vestibular evaluation (**92540**). If performed in isolation, 92542 should be reported with the modifier 59 to indicate a distinct procedural service.

Caloric Irrigations

In 2016, in an effort to reduce coding confusion, CPT code 92543, *caloric vestibular test, each, with recording*, was deleted. Two codes were created in its place.

- **92537**, *Caloric vestibular test with recording, bilateral; bithermal, (i.e., one warm and one cool irrigation in each ear for a total of four irrigations)*
- **92538**, *Caloric vestibular test with recording, bilateral; monothermal, (i.e.,*

one irrigation in each ear for a total of two irrigations)

These CPT codes (92537 and 92538) cannot be reported together on the same date of service. In the event four irrigations were attempted but only three irrigations were actually performed, 92537 (bilateral, bithermal caloric vestibular test) should be reported with the modifier 52 to indicate a *reduced procedural service*. In the unlikely event that six irrigations were completed to include ice water calorics, 92537 should be reported with the modifier 22 to indicate an *unusual procedural service*, requiring significantly more time than usual.

Vestibular-Evoked Myogenic Potential (VEMP)

There is currently no specific CPT code for VEMP testing. In March 2017, the U.S. Food and Drug Administration (FDA) approved the Eclipse with VEMP system for the intended use of assessment of vestibular function (U.S. Food and Drug Administration, 2017). This is an important first step in demonstrating

that VEMP testing is not an experimental/investigational procedure and beginning the process of developing a CPT code for VEMP. Since there is no CPT code available, the AMA, in the March 2011 issue of *CPT Assistant*, directed providers to use CPT code **92700**, *unlisted otorhinolaryngological service or procedure*. Whenever billing an unlisted code such as 92700, it is important to consult your third-party payer guidelines for additional documentation requirements necessary for submission with the claim.

Rotary Chair

Rotary chair testing is typically billed with **92546**, *sinusoidal vertical axis rotational testing*, billing one unit per plane of testing. This code should only be billed if your office has a room with a rotary chair. It is inappropriate to use this code for active head rotation tests such as VAT or VORTEQ, for headshake or spinning in an office-type chair. It is best to check with your third-party payer on billing multiple units. Additionally, some payers may require inclusion of the serial number of the rotary chair in your



report documentation to demonstrate use of the rotary chair unit.

Computerized Dynamic Posturography

Dynamic posturography testing is typically billed with **92548**, *computerized dynamic posturography*. Just as with rotary chair testing, this code should only be billed if your office has a room with a dynamic platform, though there is no standard set for this. It is inappropriate to use this code for measuring falls on foam. It is best to check with your third-party payer for whether or not they will reimburse for this procedure. Additionally, some payers may require inclusion of the serial number of the dynamic platform posturography system in your report documentation to demonstrate use of the dynamic platform.

The following cases illustrate some coding scenarios of these procedures in your vestibular assessment.

Case 1

You are completing a vestibular evaluation on a patient with a neck injury. Due to this injury, the patient cannot complete any positional tests. You complete the gaze, optokinetic, and oscillating tracking tests. You also are able to complete warm and cool irrigations in both ears. You would include the following codes with the modifier on your claim form:

- **92541-59**, Spontaneous nystagmus test, including gaze and fixation nystagmus
- **92544-59**, Optokinetic nystagmus test
- **92545-59**, Oscillating tracking test
- **92537**, Caloric vestibular, bilateral; bithermal

When using the modifier 59, make sure there is appropriate documentation in the report as to why the full basic vestibular evaluation was not performed. Always remember, it is inappropriate to unbundle the vestibular evaluation code for the sole purpose of higher reimbursement by billing the components separately.

Case 2

You are completing a vestibular evaluation on a patient with dizziness complaints. You complete the gaze, optokinetic, oscillating tracking tests, positionals head right and left, and Dix-Hallpike right and left. You complete warm caloric irrigations in both ears, which were completely normal, so cool irrigations were not performed. You also complete a cervical VEMP. You would include the following codes on your claim form:

- **92540**, Basic vestibular evaluation
- **92538**, Caloric vestibular, bilateral; monothermal
- **92700**, Unlisted otorhinolaryngological procedure


Case 3

You are completing a battery of vestibular assessments on a patient with significant dizziness and balance complaints. You complete the gaze, optokinetic, oscillating tracking tests, positionals head and side right and left, and Dix-Hallpike right and left. You complete warm and cool irrigations in both ears. You also complete both cervical and ocular VEMP, computerized dynamic posturography, and rotational chair testing of the horizontal and vertical axes. You would include the following codes on your claim form:

- **92540**, Basic vestibular evaluation
- **92537**, Caloric vestibular, bilateral; bithermal

- **92546**, Sinusoidal vertical axis rotational testing, quantity of 2
- **92548**, Computerized dynamic posturography
- **92700**, Unlisted otorhinolaryngological procedure

Conclusion

This article is meant to provide an overview of billing and coding for vestibular evaluation. It is important to note, however, that insurance coverage, whether it is through Medicare or private payers, does not dictate clinical practice. In many cases, procedures like VEMPs, active head rotation, and saccade testing may be billed directly to the patient. For additional guidance on vestibular assessment, visit the Academy's website, www.audiology.org/practice_management/coding/vestibular-testing. 

Alyssa Needleman, PhD, is the clinical director and an associate professor at Nova Southeastern University in Fort Lauderdale, Florida. She is also a member of the Academy's Coding and Reimbursement Committee.

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Go Ahead, Call Lois Lane Back!

By Deanna Meinke

“Hello, my name is Lois Lane and I’m from the Daily Planet News. We are running a story about hearing loss in superheroes and I would like to interview you. Please return my call as soon as possible.”

You listen to the voice mail message, thrilled that the newspaper has contacted you with an opportunity to promote audiology and hearing health care, yet it has been some time since you reviewed the literature relative to kryptonite ototoxicity and barotraumas. What can an audiologist do to assure a successful interview?

Return the Call Promptly

Journalists work under tight deadlines, often minutes rather than hours, and appreciate a contact that responds in a timely manner. Courtesy will go far in developing a relationship with media representatives, especially in the long term. Often you are able to schedule the interview with some advance notice and if the reporter will give you some indication of the questions they are interested in, you may have time to adequately prepare.

Clarify the Topic and the Context

Ideally this is done prior to consenting to an interview. It is certainly appropriate to consider the issue(s) and get back to the reporter if there is any doubt about immediate participation. In some cases, a reporter is inquiring about a broad issue, such as “hearing loss,” another time it may be a specific type of hearing loss or it may be to get the local story spun off of a topic getting national media attention. The recent

flurry of articles regarding iPods and noise-induced hearing loss is a good example of this. An Associated Press (AP) reporter covered the broad-spectrum information about the music-induced hearing loss issue from experts in the field, whereas a local reporter focused on community information with local personalities and experiences. Across the country, audiologists in many cities and towns were contacted by local media to discuss the issue.

Consider Who You Are Representing

Are you representing the audiology profession as a whole, a national/state/local professional organization, or your employer or practice? Explain this in your response to the interviewer.

Be Factual

Provide accurate and verifiable information, with citations when requested. Some publications are verified by independent fact-finding services. It is best not to speculate, guess, or exaggerate answers, especially when pressured to do so.

Distinguish Personal Opinion

There are times when personal experience and opinion is welcomed and contributes to a story. It is best to distinguish personal perspectives from factual knowledge. An argumentative attitude is not constructive; however, it is certainly acceptable to disagree or correct misinformation.

Stay Focused on the Interview

Remember to stay on topic from the beginning to the end of the interview. Just because a tape recorder is turned off, does not mean the interview is completed or you will not be quoted. A cooperative nature will be well received and a “no comment” or refusal to answer a question may become suspicious to the interviewer. Know that there is no such thing as “off the record.” Reporters have no obligation to honor anything told in confidence.

Access the Experts

Provide the journalist with the best opportunity to write an excellent piece. If you are not the appropriate contact for the story, refer him or her to a colleague with clinical and/or research experience in the area of interest. In some cases, you can offer to gather additional information to answer a question appropriately. A story that has been written from multiple sources of information is often preferable. Reporters may be more likely to return to you for future stories, once they recognize the networking resources you can provide.

If the story placement comes through the Academy, consult with the Academy communications team prior to any referrals to other colleagues. The Academy has a speaker’s bureau and may have other members who fit the expert profile for the story.

Have a Realistic Outcome

It is always possible when talking with the media that you may be misquoted at some point in time. Don't lose sleep over this inevitability or limit your interactions with the media for fear of this possibility. The positive impact you can have on the public far outweighs the risks. There are some strategies that can help avoid this.

- Consider having a list of talking points on various topics if you are routinely contacted by the press. An interview can be followed up with an e-mail re-emphasizing key points.
- At times, I personally offer to send reporters a list of Internet resources and references for key scientific articles. If you have authored an article on the topic, sending a copy to the interviewer may also help avoid errors.
- Share the information in a manner that is simple and direct, without the use of jargon or acronyms. It is not realistic to ask to see a story in advance or to have an opportunity to correct misinformation due to the short timelines between draft and final proof. If you

do secure a commitment to review a draft article, then it is imperative that you be available to meet the publication deadlines.

- A reporter also does not control when a story will run and their deadlines may change according to editor demands. Nor does a reporter control the editing. A lengthy interview and detailed reporting may be whittled down to one or two sentences in the final product due to space, advertising, or other unrelated publication issues. Requesting a copy of the final publication is certainly acceptable.
- If there are serious errors in the story (major facts, statistics, or attributions that are incorrect), reach out to the reporter ASAP and let him or her know. If the story is online, it can often be corrected immediately and before anything runs in print. If it's a television or radio segment, it may have an online version that can be corrected or, sometimes the outlet will re-run the segment with the corrected information.

Educate and Motivate

An interview becomes an opportunity to share knowledge. Tell a story that makes someone want to know more and to explore the issue with greater passion and curiosity. Bring the story to life! Avoid abstract statistics and convert them to recognizable entities. A national statistic of 12 percent of children with noise-induced hearing loss between the ages of 6 and 19 years becomes a specific number of children in your local city or town when the actual census of youth attending school in your community is used for the calculation.

A patient with a specific disorder might consent to discussing their personal experience with a reporter or you can invite them to visit your facility for clinical demonstrations. Have a reporter fit an earplug, listen to a hearing aid, watch a newborn hearing screening, etc., whenever the opportunity fits with the timeline and the availability of the experience.

Ultimately, you become the superhero for the journalist and the communication is enhanced for the benefit of the public and the profession. Go ahead, call Lois Lane back! 🦸

Deanna Meinke, PhD, is a professor in the Department of Audiology and Speech-Language Sciences, at the University of Northern Colorado, in Greeley, Colorado.



Calling All Story-Tellers!

By Therese C. Walden

Some of the best stories are told when we gather with friends and family for the holidays. We laugh, we cry, we celebrate snapshots of our lives. Those meaningful moments are what we remember and carry with us.

Imagine if we could create those amazing feel-good moments when the general public thinks of an audiologist. Imagine that by sharing powerful patient stories, stories that present real-life challenges living with hearing and balance issues, and stories of success that resonate with the public, that we could reframe how people viewed hearing and balance wellness.

“The American Academy of Audiology is asking you to tell a story.”

Let’s share with the world the best of what it means to be an audiologist.

We need to tell our patients’ stories. Audiology needs to proclaim to the world the benefit of early identification, treatment, and management of hearing and balance problems. Much of the general public, health-care providers, regulators, and legislators are not aware of the amount of care an

audiologist can provide for individuals with hearing and balance deficits.

Many don’t know that untreated hearing and balance problems have been linked to cognitive decline and fall risks in the older patient, and undiagnosed hearing loss in children has been linked to an impact on reading and language development that can follow the child for years.

Many don’t know that a lifetime of exposure to hazardous noise, both on the job and recreationally, can lead to significant hearing loss. Many don’t know that although more than 95 percent of infants have their hearing checked before three months of age, one in six infants and children will have some amount of handicapping hearing loss.

We need to tell our stories of success on behalf of these individuals and all the people we serve. Many

people don’t even know what an audiologist is...in 2017! We have to take control of our message and one way to do that is to ask our patients to share their journeys back to hearing and balance wellness.

The American Academy of Audiology Foundation is asking you to tell a story—specifically, tell a story about a patient of yours who has successfully regained their hearing and/or balance function. We know you have many stories of your patients that can tell about the



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Why Audiology? The Post-Baccalaureate Student Journey

By Emily Lundberg

Although many audiology students enter graduate school with a bachelor's degree in communication sciences and disorders or speech language hearing sciences, some students find audiology after obtaining a bachelor's degree in another field. For these students, post-baccalaureate classes are often required for admission to graduate school.

For me, the moment of truth came after the completion of a tour performing in a rock band. I had a bachelor's degree in music, interests in audio engineering and cochlear implants, and a concern about noise exposure. At the time, I was not sure what my next step in life should be, but after some research and discussions with friends

and family, the answer was obvious: I wanted to become an audiologist.

What Is a Post-Baccalaureate Audiology Student?

Post-baccalaureate students have a bachelor's degree in a field outside of speech language hearing sciences and are working on the prerequisite courses required for entrance to a graduate program in audiology. Starting this year, the Student Academy of Audiology (SAA) includes post-baccalaureate students in its undergraduate associate membership category. This unique population of students will strengthen and diversify our membership base.

What Does an Audiology Post-Baccalaureate Program Include?

For prospective audiology students, a post-baccalaureate program can provide an academic foundation in speech, language and hearing processes, and a background orientation to disorders of communication. Many schools that offer undergraduate degrees in communication sciences and disorders and speech language hearing sciences offer post-baccalaureate classes. Post-baccalaureate programs can vary in semester hours, coursework, and duration. Some are local and in-person, and some are online and remote.

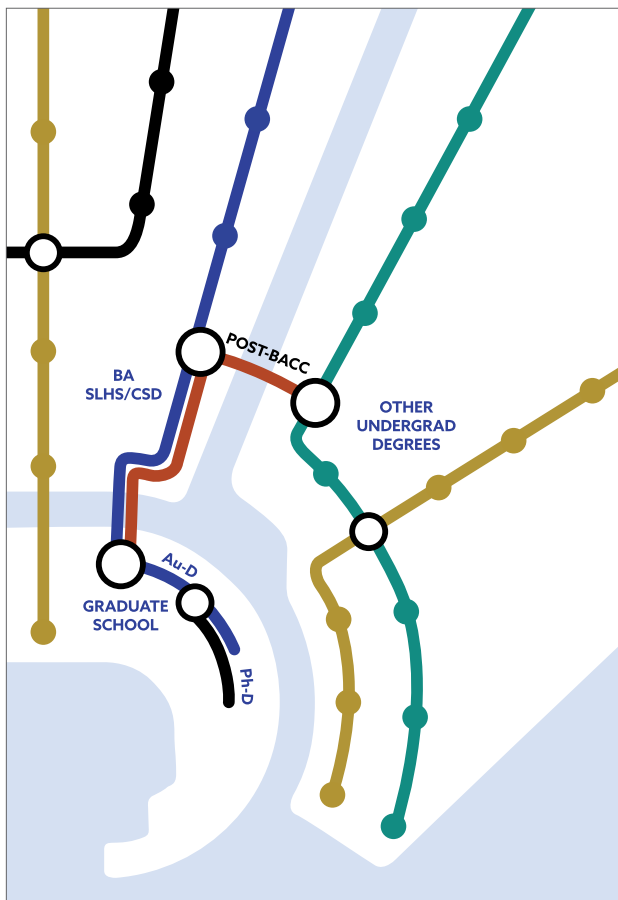
Benefits of Pursuing a Post-Baccalaureate

Advising support and mentorship: In most post-baccalaureate programs, students are provided with an advisor who can assist with career guidance and preparation of competitive applications to audiology programs (including audiology-specific letters of recommendation).

Class interconnection: Post-baccalaureate classes can offer students the opportunity to meet and work with other students pursuing coursework to apply for audiology programs.

Downsides to Pursuing a Post-Baccalaureate

No guarantee: Completion of post-baccalaureate coursework does not guarantee admission to graduate programs.



It can be a risk for students pursuing a second career.

Financial aid: Many post-baccalaureate programs provide financial aid exclusively through student loans, so students with a bachelor's degree in another field may find these programs financially prohibitive.

Why Audiology?

While establishing the new SAA post-baccalaureate student membership category, we turned to some individuals who know and understand this path best: SAA members who have been through the post-baccalaureate process. In an effort to learn more about their paths we asked one question, why audiology?

Computer Scientist Turned Audiologist

Eric Brown already had a successful 16-year career as a computer

programmer when he found himself at a crossroads. Unhappy as a programmer, he sought the advice of a career counselor, and decided to make a change. Following a battery of aptitude tests, the results pointed to a career in health care. Eric was hesitant.

"Coming out of high school, I intended to become a family practice physician," Eric says, "In my first year of medical school, I ended up failing three courses. I dropped out of school before they kicked me out." Despite these past experiences, Eric quit his job. Inspired by his father's own journey with amplification and the idea of working with people and technology, Eric began post-baccalaureate coursework at Indiana University. Eric is currently a third-year AuD student at Purdue University. "I find purpose and enjoyment in working

with people and making a difference," says Eric.

Maybe You Would Like Speech–Language Pathology

With a background in human biology and two years of work experience, Hanna Sawher went to a counselor's office to explore options for a career path that utilized her biology degree. When she asked what human biology could turn into, the answer was "nothing really... except maybe you would like speech pathology," says Hanna. She had never heard of speech pathology, but after learning that speech-language pathologists (SLPs) can work with children, Hanna signed up for post-baccalaureate classes.

Hanna's first class was Audiology 101. "The professor said, 'You are all here to become SLPs, but I will turn



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one of you into a doctor of audiology,' recalls Hanna. "That one person was me, and from that morning on, I chose audiology." After two years of post-baccalaureate coursework, Hanna is currently in her fourth year as an AuD student at the University of Wisconsin.

I Want to Help Veterans

After graduating with bachelor's of science, Julia Slifko was prompted by the events of September 11 to serve on active duty for the United States Air Force. "I intended to make the military my career," Julia says, "but during my last deployment, this all changed." In 2011, Julia ran to aide two soldiers during an attack. The next day, Julia was informed both soldiers were alive, and the tourniquet she applied to one of the soldier's legs had saved his life. "This event and news gave me an epiphany," says Julia, "I wanted to help veterans full-time in a medical profession."

Upon learning that hearing loss is one of the most common military service-related injuries, Julia began her path to audiology. After finishing her military enlistment in 2014, Julia enrolled in post-baccalaureate courses at The Ohio State University. Julia is currently pursuing her AuD at the University of Pittsburgh and counts her blessings every day. Her dream is to become an audiologist at a Veteran's Affairs hospital.

The Post-Baccalaureate Professor Perspective

Dr. Jessica Rossi-Katz, Metropolitan State University of Denver professor, has worked with undergraduate and post-baccalaureate students in speech language hearing sciences. "With respect to post-baccalaureate students," Dr. Rossi-Katz says "many come in to our prerequisite program intensely focused on a single goal—getting into graduate school. With

traditional undergraduate students, there is often more room to explore." The post-baccalaureate experience goes beyond taking the classes needed to apply for graduate school. It is also about obtaining the experiences needed to take the next step, and sometimes those experiences are just as critical.

The post-baccalaureate process can be difficult, but many students who have made the journey agree that it is worth it, and they are happy to have found audiology. 🎧

Emily Lundberg is a third-year AuD/PhD student at the University of Colorado. She currently serves as the chair of the SAA Communications Committee.

New Members of the Student Academy of Audiology

Jessica Ali
Yehudit Askarinam
Sarah Baldwin
Hannah Cobane
Kristen Crawford
Sallie Croissant
Ashley Earp
Rebecca Farrell
Morgan Flannagan
Sarah Gittleman
Rene Golden
Hunter Holcomb
Paige Ihrig
Tz-Ching Kao
Meghann Keehner
Monique Lander
Alexis Maney
Brenna Marshall
Elizabeth Palmer
Alexa Patton
Kaley Pennington
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ABA 2018 Board of Governors Nominees

The American Board of Audiometry introduces two new board members who serve from January 1, 2018, through the end of 2020.



Alison M. Grimes, AuD
Board Certified in Audiology
Audiologist
UCLA Medical Center

Please describe your job description/work setting

I am the director of audiology and newborn hearing screening at a major academic medical center. I am primarily in the outpatient environment; though, I do provide some services in the inpatient setting. I supervise two AuD students (fourth year) annually, a staff of 12 audiologists, and am part of the management team at UCLA Health.


Continuously since 2000, I've served on and currently chair the California licensing board for audiologists, speech pathologists, and hearing aid dispensers, under the department of consumer affairs.

I am an instructor for the LEND program in Los Angeles, an assistant clinical professor in head/neck surgery at the DG School of Medicine at UCLA, teach pediatrics residents, and lecture to other medical groups in the health system.

Please explain why you are interested in serving on the ABA Board of Governors

I'm interested primarily because of my long-standing work in licensure, and the intersection between certification and licensure. While licensure is the legal requirement to practice, it is clear that certification (when done well) can serve as a "value-added" designation beyond the license and degree. How this is done is important, and I'd like to be a part of the Academy/ABA's efforts in this arena.

What do you feel you could contribute to the ABA?

I could contribute the perspectives of a licensed board member, the perspectives of an Academy past president, the perspectives of a supervisor/preceptor of fourth-year AuD students, and the perspectives of someone who has hired many audiologists over the years in a variety of settings. 



Joscelyn Martin, AuD, PASC
 Board Certified in Audiology
 Audiologist
 Mayo Clinic

Please describe your job description/work setting

I have practiced nearly 18 years as an audiologist at the Mayo Clinic in Rochester, Minnesota. I serve as coordinator of the newborn hearing screening program, training and supervising the staff that perform the bulk of the screenings. I manage the short- and long-term follow-up needed so that children with hearing loss may receive timely and family-centered diagnosis of hearing loss and treatment strategies. I spend about half of my time each week seeing patients in our hearing aid program. I work with patients of all ages and their families to provide current technology options using evidence-based practices and appropriate verification and validation measurements.


In addition to direct patient care, one of the aspects of the profession that I enjoy the most is serving as a preceptor to students. In our practice, I primarily work with students in their fourth-year externship. It can be very rewarding to help them as they learn to take the knowledge they have acquired in their didactic learning experiences and apply it in real life with the patients in front of them.

Please explain why you are interested in serving on the ABA Board of Governors


While serving as program chair for AudiologyNOW! 2016, I had the opportunity to work with ABA leadership on incorporating the results of the practice analysis into the programming for the conference. I learned a lot about what a practice analysis can do for our profession. Specifically, it was enlightening to discover how valuable such an analysis can be to informing how we plan education offerings that appropriately reflect the daily work and needs of the audiologist.

I have held ABA board certification since 2007, and recently completed the requirements for the Pediatric Audiology Specialty Certification. I have long agreed that our profession would benefit from specialty certifications such as the cochlear implant and pediatrics options available now. I am happy to be able to support that by becoming certified, and would like to do more by getting directly involved.

What do you feel you could contribute to the ABA?

Having served my state organization in a variety of roles, the AAA Foundation as a trustee, the ACAE as a site visitor, and the Academy as a committee volunteer, I bring an understanding of the licensure, certification, and accreditation processes. The organizations that serve audiologists have done much to raise the standards for the profession, but there is still much work to be done. 

What's Happening in ABA!

- In April 2017, five candidates earned the Pediatric Audiology Specialty Certification. Congratulations to Joscelyn Martin, AuD; Nancy McClellan, AuD; Sherry Ralston, AuD; Jenny Rajan, AuD; and Jessica Spratt, AuD.
- In July 2017, three candidates earned the Cochlear Implant Specialty Certification. Congratulations to Kirsten Bock, AuD; Joseph Dansie, AuD; and Dianna L. Hart, AuD.
- The Pediatric Audiology Specialty Certification exam will be held on Wednesday, April 18, 2018, from 9:00 am–11:30 pm at AAA 2018 in Nashville, Tennessee. Applications are due February 18, 2018.
- The ABA Certificate Holder–Audiology Preceptor™ training program is offering a registration discount of 20 percent. Register at www.eAudiology.org and use coupon code TAKE20 to receive the discount. Groups of five to 24 registrations receive an additional 15 percent off already reduced prices.
- ABA's newest Certificate Holder program has launched!
 - **Part 1:** Foundations of Tinnitus Management of the Certificate Holder—Tinnitus Management (CH-TM)™ program is now available at www.eAudiology.org. CH-TM is a comprehensive program designed to provide audiologists with the foundational knowledge needed to assess and manage patients with tinnitus and/or decreased sound tolerance.
 - **Part 2:** Tinnitus Management Principles in Practice will be released this spring. 

2018: A Year of Transition

By Meggan Olek

First and foremost, I would like to acknowledge Doris Gordon, the current executive director of ACAE, who will be stepping down on December 31, 2017.

Doris led the ACAE for almost 15 years with determination and a clear sense of purpose of promoting quality education through standards development and accreditation of audiology programs. Doris was an energetic and committed originator of ACAE. Her steadfast commitment to the preparation of highly competent and prepared clinicians for the audiology workforce elevated the profession. If you have come across Doris in your travels with ACAE, you know that she is a kind and smart professional who has demonstrated great passion and knowledge which ultimately lead to an accomplished ACAE.

With a level of commitment comparable to her development and progress of ACAE, she has supported a successful transition plan for the ACAE operations to the American Academy of Audiology (the Academy).

It has been a pleasure for me to work closely with Doris, as well as Kitty Werner, vice president for public affairs at the Academy, over the past few months in this transition. Not only have we learned the daily administrative aspects of ACAE, but we also have gleaned the history and vision of ACAE. Doris has imparted to us recognition of the critical role of ACAE and an appreciation of the responsibility we have to uphold its high standards. She helped us to understand, as well, that an accrediting body can be a partner with educational programs to advance quality education. I know that no one

can replace Doris as she is, but I can assure the community that we will strive to honor Doris' legacy through a commitment to supporting the leadership in advancing the ACAE mission:

The ACAE serves the public by establishing, maintaining, and applying standards to ensure the academic quality and continuous improvement of audiology education that reflects the evolving practice of audiology.

In looking forward toward continued success and a bright future for ACAE, I'd like to discuss some of the upcoming activities within ACAE:

ACAE Board Meeting

The ACAE board of directors will have an in-person board meeting in Reston, Virginia, on November 8–9, 2017.

Dr. Lisa Hunter, chair, will be leading her final board meeting. With over a decade of service to the ACAE board, Dr. Hunter leaves ACAE in a position of strength. She has overseen the evolution of the accreditation standards and processes, lending her expertise to their refinements. The revised 2016 accreditation standards are now integrated, and an updated accreditation manual is forthcoming.

Also under her tenure, there has been continued outreach to programs in development. Building on Dr. Hunter's work, Dr. Jay Hall will move into the chair role in January 2018. Dr. Hall is a widely recognized educational consultant with

experience in developing audiology programs in the United States and internationally. The November meeting will provide the full board the opportunity to address important ACAE business and to set a path forward in this time of both leadership and staff transition.

Site Evaluator Training Workshop

Following the board meeting, there will be a Site Evaluator Training Workshop in Reston, Virginia, on November 9–10, 2017. The ACAE board and a few other committed audiologists interested in serving as ACAE site evaluators will come together, under the facilitation of Dr. Catherine Palmer, for hands-on training for this essential and unique step in the accreditation process—the site visit.

An integral part of the site evaluator training will be an in-depth review of the 2016 ACAE accreditation standards and their application in the evaluation of a program. With several audiology programs expressing interest in ACAE accreditation and an increase in site visits on the horizon, this training is timely. It will help ensure preparedness and a positive experience of both the site evaluators and the institutions being visited. ACAE believes that, across all aspects of the accreditation process, a cooperative relationship with programs results in improved outcomes for students and the teaching environment.


Interested in becoming an ACAE site evaluator? You can learn more and volunteer today by going to <https://community.audiology.org/>

home. Sign in as a member and then click on “volunteer.”

Third-Annual Clinical Education Forum

ACAE is pleased to announce the continuation of the Clinical Education Forum, in conjunction with AAA 2018, the Academy’s annual conference. The Third-Annual Clinical Education Forum will be held in Nashville, Tennessee, on Saturday, April 21, 2018. The forum will again be jointly planned with the Council of Academic Programs in Communication Sciences and Disorders (CAPCSD).

The purpose of the forum is not only to hear from leaders in the field but to dialogue on innovative practices for the future education and training needs of audiology students. The planning for the forum is under way, and we plan to share more information on the topics and presenters this fall. Save the date of April 21, 2018, and look for more details soon!

The administrative structural changes occurring for ACAE will enhance its operations, and ACAE shall still maintain its independence as a 501(c)(3) organization. The ACAE board will continue its important role in upholding ACAE’s purpose of recognizing, reinforcing, and promoting high-quality performance in AuD educational programs. I look forward to assisting ACAE on its continued journey and success. 

Meggan Olek is the director of accreditation for ACAE.



Advance Your Career

The ABA is offering a certification exam on Wednesday, April 18, 2018, in Nashville, TN, at AAA 2018.

Pediatric Audiology Specialty Certification (PASC) Exam

- Demonstrate to colleagues, patients, and employers that you have a high level of knowledge and expertise.
- Add distinction to your career accomplishments.

Applications due **February 18, 2018.**

www.BoardofAudiology.org



Audiology Advocate

By Adam Finkel

Making a Difference: How to Advocate for Audiology

Contacting your members of Congress is a constitutionally protected right that helps to ensure that the elected official's constituents' perspectives are heard and understood as policy changes are considered. A phrase that is often repeated on Capitol Hill is "if you are not at the table, you are on the menu." Professions without actively engaged members have a more difficult time advancing key legislation and defeating harmful bills. On the flipside, professions who can successfully mobilize to educate their members of Congress on key issues are able to win tough legislative battles.

While getting involved may seem complicated, working with the American Academy of Audiology on legislative matters is simple. The Academy advocates on Capitol Hill for issues including childhood hearing initiatives, protecting scope of practice, NIH funding, and many others. Directly contacting your members of Congress allows the Academy to have a more direct line

to policymakers as they consider legislation that will impact you and your patients.

Educate Yourself on the Issues

Education is key. Follow the Academy's *Audiology Weekly* e-newsletter or visit the Academy's advocacy website for information on the current issues. The website lists any legislation currently in play that impacts the field of audiology, as well as the Academy's stance on the issues. Having specific legislation to advocate for or against makes it easier for your member of Congress to know how he or she can address the issues that are impacting you and your profession.

How to Contact Congress


Now that you understand the issues and want to get involved, contacting Congress is easy. E-mails, mailed letters, phone calls, and social media are all effective methods of communicating with elected officials. First, visit the Legislative Action Center under the Get Involved/Advocacy tab on the Academy's website for assistance. Simply plugging in your address populates the action items with your two Senators and House Representative. From there, sending an e-mail to your members can be done with a few clicks. Be sure to read over the suggested letter and change it into your own language—adding a personal anecdote is a great way to make the message more effective.

You can also call your member of Congress. When making a phone call, be sure to have a rough draft of what you want to say using the Academy's talking points and be respectful of the staffer's time when he or she takes your call. It can be helpful to follow up with an email thanking the staff for his or her time and summarizing your discussion.

The impact of directly contacting a member of Congress as a constituent cannot be overstated. Many members of Congress make decisions on whether to support or oppose issues based on constituent feedback. Members of Congress take constituent correspondence so seriously that most offices employ several staffers just for this purpose.



Tips for Contacting Congress

- **Be confident.** You are the expert in these conversations so remain positive throughout the interaction.
- **Use personal anecdotes and stories to support your argument.** Personal stories help connect important public policy discussions to actual impact on constituents.
- **Stay on track.** Staffers have a limited amount of time. Stick to one or two audiology-related issues to allow for a clear response and a positive conversation.
- **Set political differences aside.** You may not agree with the member of Congress on broad political issues, but that member may be in an important position to advance audiology-related legislation.
- **Follow up after the meeting, phone call, or e-mail to thank the staffer.** This helps ensure that the conversation is continued after your initial contact. Effective advocacy does not happen with just one contact. Oftentimes, it takes multiple contacts to help build a rapport with a member of Congress, so reach out in various ways as new information becomes available.
- **Be up front if you don't know the answer to a question.** If you do not know something, simply say that you will follow up with that information. If you are unable to find the answer on your own, reach out to the Academy's associate director of government relations Adam Finkel at 703-226-1060 or via e-mail at afinkel@audiology.org. 

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We will send you a notification on when registration opens and other important deadlines so that you will be the first to know about AAA 2018.

Opt in to receive text alerts on the latest audiology legislation breaking news, such as the OTC Hearing Aid Provision and more. Text "Advocacy" to 797979. Msg&data rates may apply. To unsubscribe from this list, reply 'STOP' to 797979.

We don't intend on bombarding you with text messages, but to send important, timely, and relevant alerts to help you easily stay in the know about your Academy and the audiology profession.

If you have any questions or concerns, please contact Amber Werner, marketing manager, at awerner@audiology.org.





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ARC18 GENETICS AND HEARING LOSS

APRIL 18 | NASHVILLE, TN | THE FIRST DAY OF AAA

Hearing loss is the most common congenital sensory impairment and birth defect. It has been well established that genetics plays an integral role in more than half of congenital hearing losses. Given the strong relationship between genetics and hearing loss in audiological practice, the Academy continues its commitment to providing audiologists with the latest on genetics research as it relates to hearing impairment in clinical practice through the annual Academy Research Conference (ARC).

This one-day translational conference is chaired by Kathleen Arnos, PhD, who has assembled a world-renowned lineup of speakers to present their latest findings.

www.AcademyResearchConference.org

Funding for this conference was made possible [in part] by 1R13DC016546-01 from National Institute of Deafness and Other Communication Disorders.

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Virginia Commonwealth
University

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with Vestibular
Disorders and
Unilateral Hearing
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Marci Lesperance, MD
University of Michigan

**The Basics of Genetics
for the Clinician**

Lawrence Lustig, MD
Columbia University
Medical Center

**Age-Related Hearing
Loss and Noise-
Induced Hearing Loss:
Old Problems and New
Paradigms**

Cynthia Morton, PhD
Brigham & Women's Hospital,
Harvard University

**From Etiologic
Diagnoses to
Personalized
Therapies for
Hearing Loss**

Arti Pandya, MD
University of North Carolina

**Genetic Testing and
Counseling in the Era
of Precision Medicine**

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For more information about the program, contact Alyssa Hammond at ahammond@networkmediapartners.com.

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*Beck, DL, Le Goff, N. *Hearing Review*, September 2017.

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