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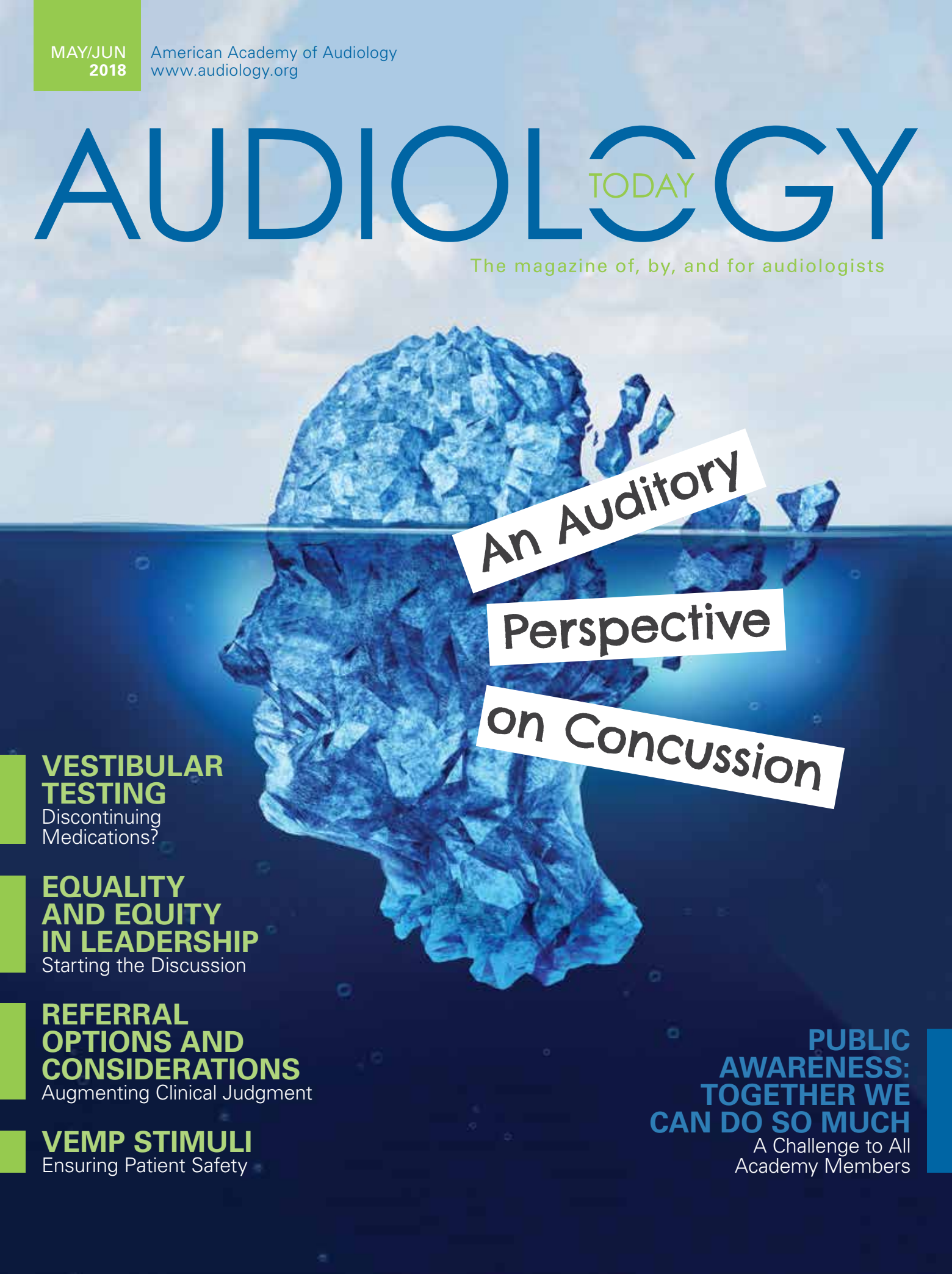
AUDIOLOGY TODAY

The magazine of, by, and for audiologists



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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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Audiology Today (ISSN 1535-2609) is published bimonthly by the American Academy of Audiology, 11480 Commerce Park Drive, Suite 220, Reston, VA 20191; Phone: 703-790-8466. Periodicals postage paid at Herndon, VA, and additional mailing offices.

Postmaster: Please send postal address changes to *Audiology Today,* c/o Membership Department, American Academy of Audiology, 11480 Commerce Park Drive, Suite 220, Reston, VA 20191.

Members and Subscribers: Please send address changes to membership@audiology.org.

The annual print subscription price is $126 for US institutions ($151 outside the US) and $61 for US individuals ($114 outside the US). Single copies are $15 for US individuals ($20 outside the US) and $25 for US institutions ($30 outside the US). For subscription inquiries, telephone 703-790-8466 or 800-AAA-2336. Claims for undelivered copies must be made within four (4) months of publication.

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How Do You Change a Culture?

We now find ourselves in a time and age of self-directed (or consumer-driven) health care within our society. Thanks to "Dr. Google," MANY consumers are experiencing some success in the ability to self-determine their own health needs independently. Health professionals are considered a necessity only when the self-directed care does not yield the expected results. Audiology is now entering into this service delivery that optometry, dentistry, and other health professions have navigated through within their discipline for quite some time. Our next chapter in audiology will begin in earnest in 2020 when the 2017 over-the-counter hearing aid law goes into effect.

We cannot divert nor halt the consumer culture of self-directed hearing health care, but we can move forward with actions that are equally if not MORE critical in light of this new emerging model. Now is the time to preemptively control the narrative about audiology and audiologists as being the experts of hearing and balance care. Over this past year, with the help of our public relations consultants, we have maximized opportunities to promote audiology and the value of audiology with the same consistent message: "See an audiologist! Get your hearing checked!"

Another sustainable way that we MUST move forward is by redirecting and transforming our professional culture. I have shared previously that, when asked many decades ago, some of the very early founders of our profession emphatically stated, "Audiologists are the biggest threat to audiology." It is imperative we recognize that our past selves have lead us to this current culture that will only bring us to conflict and disastrously impede our future. Let's look inward by asking questions that hold telling answers.

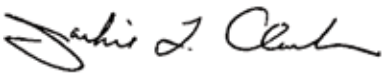
Do we always demonstrate civility and respect for our colleagues and professional organizations? Just because someone conducts assessment or recommends care for patients or operates differently than me, doesn't make them wrong, unethical, or judged as inadequate professionals.

Do we show respect for our patients not only inside the office, but outside? Patients and their families can make remarkable statements, but are these interactions really something we should be publicly sharing extensively on social media? Although some Facebook pages are reportedly exclusive for audiologists, there are nonaudiologists who find their way to those posts. Just because you CAN POST, doesn't mean you should. How do the posts look to our colleagues, patients, families of our patients, the public, or even legislators if they were placed on a large billboard? Social media IS THE largest electronic billboard.

Do we consistently demonstrate our professional VALUE by improving knowledge, skills, and best practices as THE ultimate experts in the delivery of hearing and balance care? I vehemently disagree with

our colleagues who insist they easily obtain all professional information needed through social media in short snippets; holding no value in audiology journals or magazines or informational e-mails.

I deeply thank those many audiologists who maintain civility as impeccable role models of audiological best practices daily. As a doctoring profession, we CAN make a positive impact while we continue to evolve and flourish as long as we remember—we will NOT be defined by our past NOR will our future look like our PAST, UNLESS we allow it!



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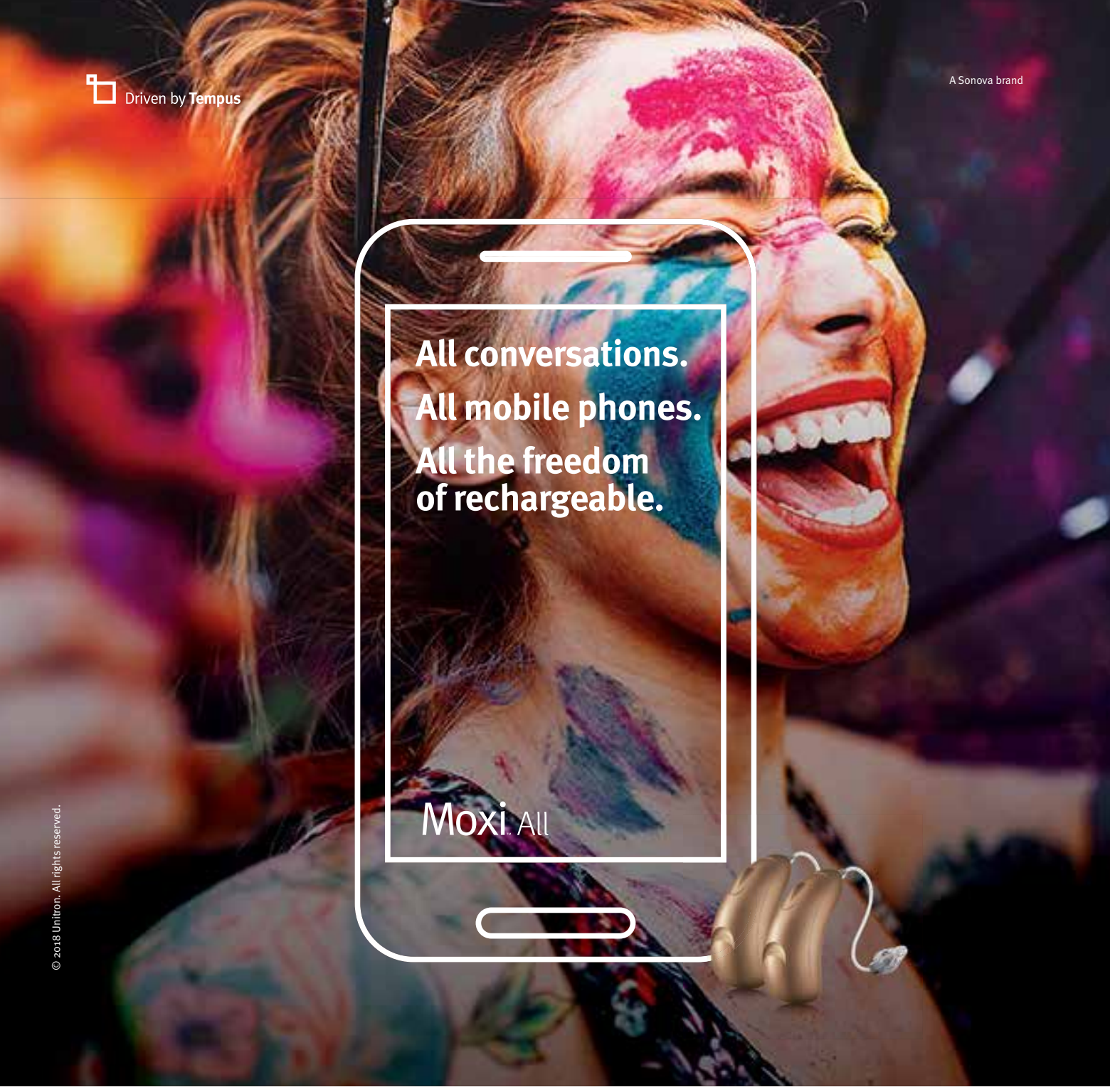

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Top Five Lessons Learned in My First Year as a New Professional

By Bridget Shanahan

I've wanted to be an audiologist since I was a kid. I recall an art project in elementary school to draw a picture of what you wanted to be when you grow up. My classmates were drawing themselves as ballerinas in tu-tus and as movie stars living in Hollywood; I drew myself in a white coat with otoscope in hand.

Last year at graduation, I felt overwhelmed and excited to finally consider myself a practicing audiologist. Now, one year later, I wanted to share the top-five lessons learned in my first year as a new professional with new graduates who will be transitioning from student to clinician.

> "There is no passion to be found playing small—in settling for a life that is less than the one you are capable of living."
>
> *Nelson Mandela*

1 Find a Role That Supports Your Passion

I work as an educational audiologist in a very large school district. I'm beyond thrilled to work with a supportive team of audiologists who enhance my passion for pediatrics and push for the best opportunities for our patients. It's rather easy to find any job in audiology, but it's vitally important to find a position that supports your skills, encourages growth, and fosters a positive learning environment.

2 Tracking Continuing Education Credits

Managing my newly earned continuing education credits has been rather daunting. I was uncertain what information was needed for licensure and certification requirements. The Academy has a CEU registry that stores a record of completed education courses and

certifications (www.audiology.org/professional-development/continuing-education/ce-registry). Academy members can access their CEU registry for free by logging into their profile. For those who are not members, the CEU registry costs only $60 annually. This has been a great resource for tracking my credits and the transcript can be submitted for state licensure.

3 Perfect Your Counseling Skills

In my clinic, we regularly identify a late onset hearing loss in children or evaluate known hearing loss where families did not follow through on previous amplification recommendations. I have found myself changing my counseling style many times over the past few months to better emphasize and convey the educational impact of untreated hearing loss.

I will have in-depth discussions with my co-workers and observe their counseling style during appointments to enhance further my techniques and strategies. It has been a different approach in comparison to the externship year, as I want to maintain best practice standards and offer the best service I can to every family. The Academy is a great resource and offers many counseling tools, such as an audiogram of familiar sounds, hearing aid satisfaction surveys, and ear anatomy posters (www.audiology.org/publications-resources/brochures).

In the past few months, I've provided parents with many resources and handouts regarding their child's hearing loss and its educational impact. I also have been able to provide families with tools they need to follow through with successful use of amplification.

4 Use Your Resources

Nowadays, families rely on the Google search engine more than their own hearing specialists. I've found myself telling patients, "if you are going to Google this hearing loss, please use these websites."

I frequently reach out to organizations such as Hands & Voices, A.G. Bell, State Early Hearing Detection and Intervention (EHDI) Program, nearby audiology and speech-therapy clinics, and parents who formed support groups to learn about programs and upcoming events. I enjoy acting as liaison for my patients to the hearing-impaired community. I encourage new professionals to reach out to local and national organizations and learn about available programs, so that these resources can be passed on to patients.

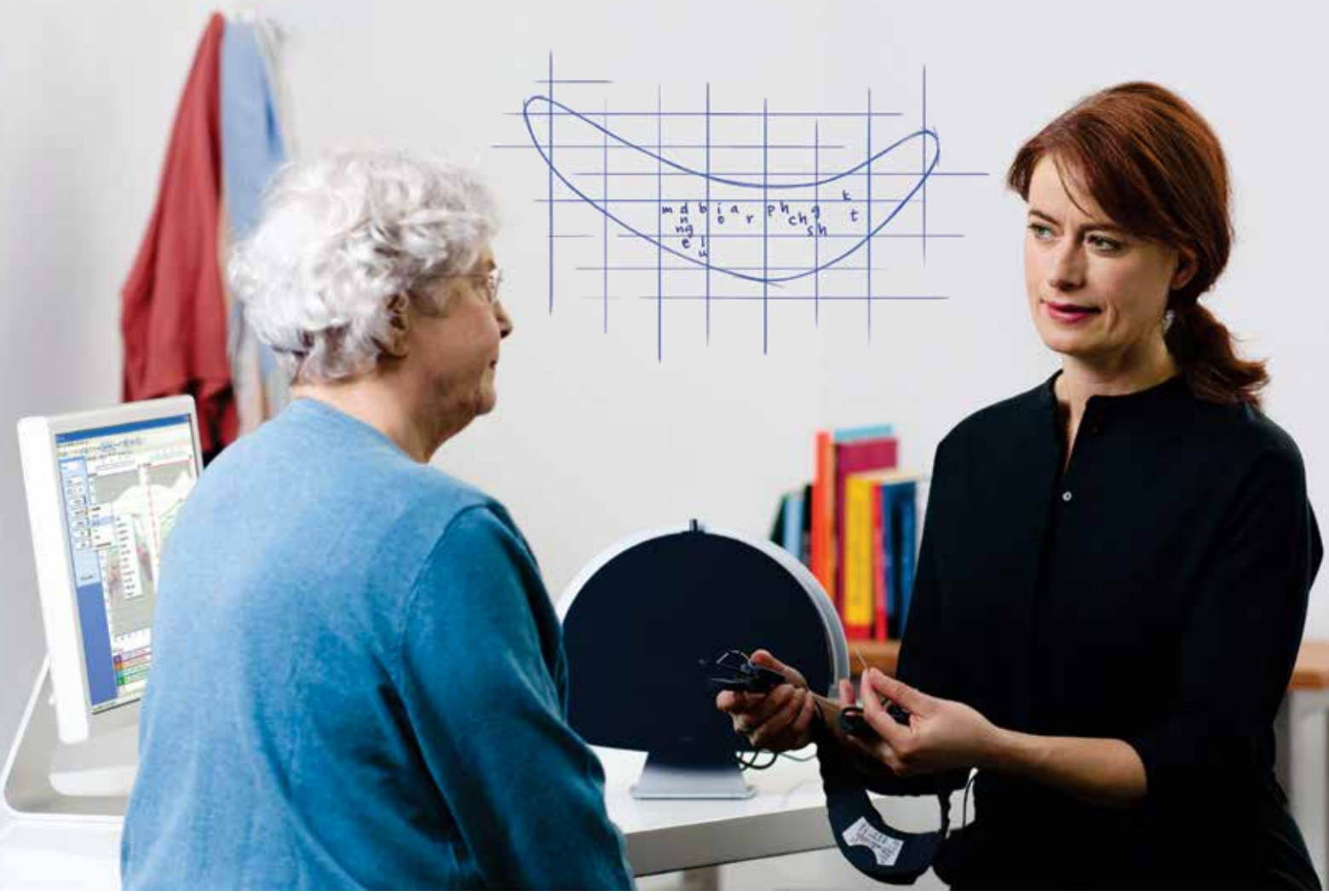
5 Be Active in Our Professional Community

This has been my most valuable lesson. In the past year, I've come across unique and interesting patient cases that needed an outside opinion or referral from other professionals. I've talked with colleagues about office management and gained new insight and perspectives. I've asked for career advice from experienced audiologists and was grateful for their tips and suggestions.

We audiologists are all on the same team, regardless of where we work. I recommend that new professionals join audiology organizations, attend state or national conferences, or participate in community discussions or Facebook groups. Of course, please remember to be cognizant of the need to maintain patient privacy and follow HIPAA regulations when soliciting feedback.

Network with professionals in your state or across the country to build your own professional connections. So far, many of my best memories are collaborating with other audiologists at the national level. Get involved and stay involved.

Bridget Shanahan, AuD, is an educational audiologist in Mesa, Arizona. She is also a member of the Academy's Business Enhancement Strategies and Techniques (BEST) Committee and the Outreach Subcommittee for AAA 2018.



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Web Seminar

eAudiology Web Seminar—Hyperacusis: Underlying Pathologies and Current State of Our Knowledge

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Web Seminar

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June 21–22

Meeting

Rehabilitative Audiology Masterclass
London, United Kingdom

http://tinnitustherapy.org.uk/RehabilitativeAudiologyMasterclass.html

June 28–30

Meeting

AG Bell Convention
Scottsdale, Arizona

https://agbellconvention.com

July

Meeting: Registration Opens

Practice Management Specialty Meeting
January 10–12, 2019
Waikoloa, Hawaii

www.audiology.org/practice-management-specialty-meeting-1

July 25–27

Meeting

Tinnitus and Hyperacusis Therapy Masterclass
London, United Kingdom

http://tinnitustherapy.org.uk/

What's Trending!

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Apple recently proposed adding two additional characters (emojis) to better represent those with a range of hearing loss. This includes a "deaf sign" and an "ear with a hearing aid."

Published on March 26

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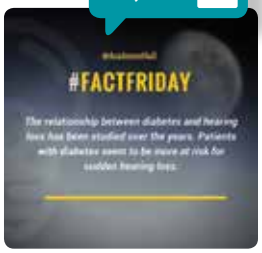

#FactFriday: The Academy has prepared consumer-friendly fact sheets as tools for you to use.

Published on March 16

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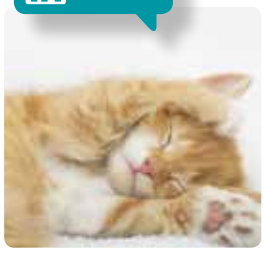

Cats deaf from an early age have increased outgoing connections from the auditory cortex to a midbrain region responsible for directing the animal to a particular location in its environment.

Published on April 3

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537

Audiology students from UT Dallas, Texas Tech, and Lamar University visited Capitol Hill to talk about higher education and health-care policy. #thehill #advocacy #audvocacy #audpeeps

Published on March 9

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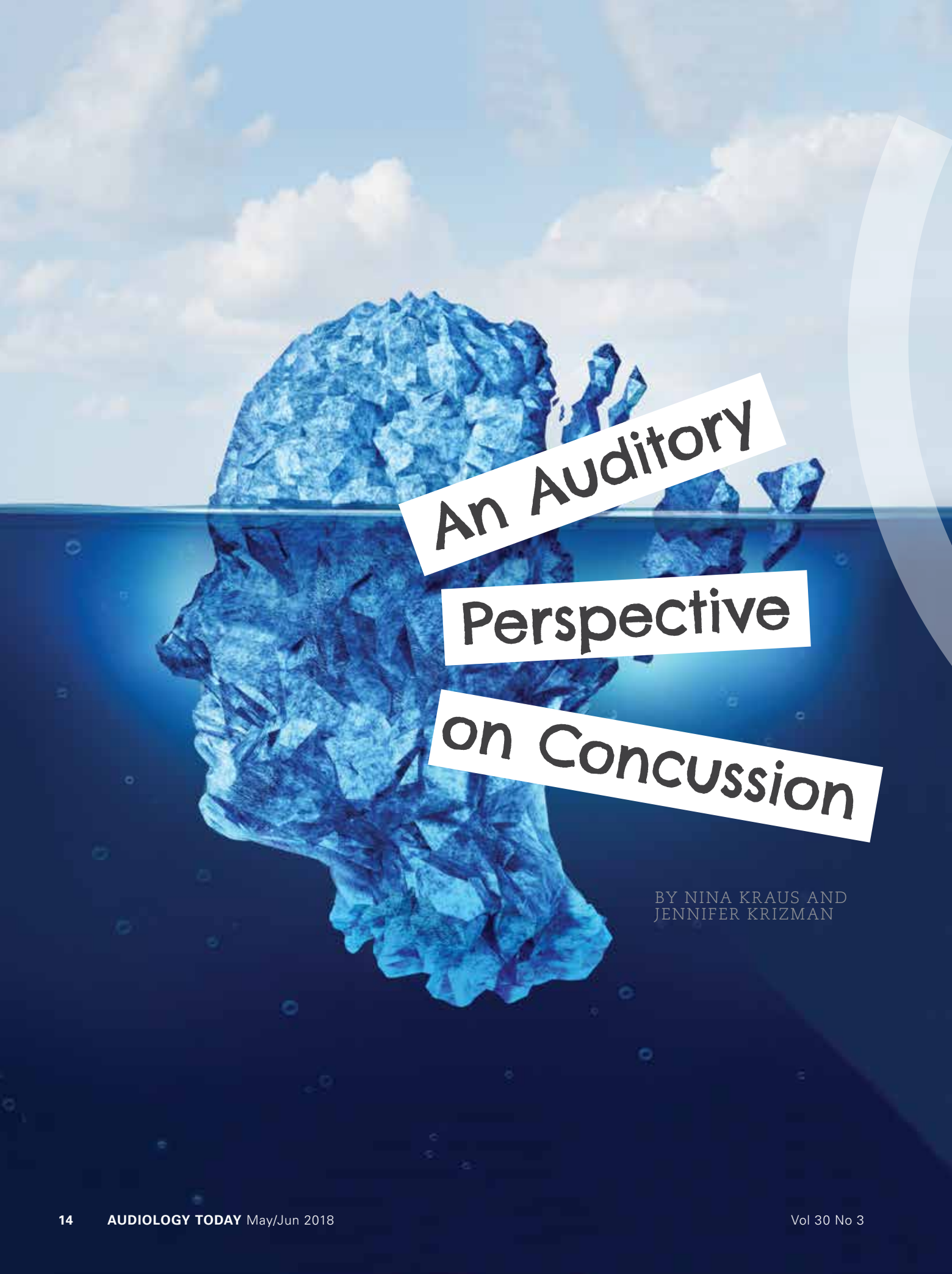

An Auditory Perspective on Concussion

BY NINA KRAUS AND JENNIFER KRIZMAN

CONCUSSIONS ARE a public health crisis. Millions of athletes and thousands of service members a year, for instance, suffer concussive injuries. While more widely known to lead to possible major brain-related problems, such as CTE, concussions also damage the auditory brain, hence the auditory system should also be considered in concussion management.

Americans love football. In early February, more than 100 million viewers tuned in to the Super Bowl to watch the Philadelphia Eagles battle the New England Patriots. Despite a decline of about 7 percent in viewers from the 2017 Super Bowl, this event, like in years past, will likely be the most-watched television event of the year. In fact, Super Bowl viewership can more than double its closest competitor, typically a presidential address or debate.

Why do we love football? Some say it's the violence, that the highlight-reel tackles are what draw in the crowd. And w-e convinced ourselves we were watching a violence that had no consequences. The common thought was that modern helmets and padding prevented players from serious harm and if a player suffered a concussion, the injury was no big deal—the athlete could easily bounce back.

Times have changed. We now know that concussions, though considered mild in comparison to other types of head injury, can have serious—and potentially lasting—consequences for brain health.

What Is a Concussion?

A concussion is a diffuse, nonpenetrating traumatic brain injury (TBI) caused by a sudden external force. TBIs are classified as mild, moderate, or severe, and by definition a concussion is a mild TBI. Although there has been debate over whether a "concussion" is a type

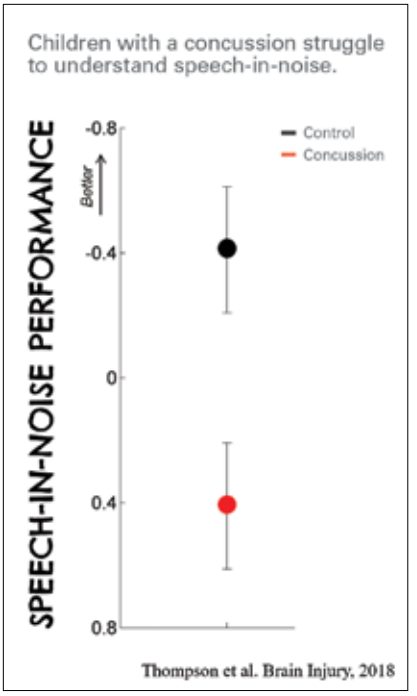

FIGURE 1. During the acute stage of recovery from a sports-related concussion, children have a harder time understanding sentences in noise compared to peers with musculoskeletal injuries.

of injury that is distinct from a "mild TBI," we recognize these terms to be synonymous, in accordance with the Defense and Veterans Brain Injury Center (DVBIC, 2018) and Centers for Disease Control and Prevention (CDC, 2018).

Individuals diagnosed with a sports-related concussion also report auditory complaints.

Symptoms of a concussion are classified into four categories: cognitive impairments, such as difficulty concentrating; physiological impairments, such as blurry vision; emotional problems, such as feelings of sadness or depression; and sleep disturbances. Type and severity of these symptoms can vary substantially, and the same force that causes a concussion in one individual may not cause a concussion in another. Previously, loss of consciousness at the time of injury was required for a concussion diagnosis. However, it is now estimated that consciousness is maintained in about 95 percent of cases, suggesting that a substantial number of concussions may have gone undiagnosed under the previous definition.

Concussions Are a Public Health Crisis

In the United States, 1.6 million to 3.8 million sports-related concussions occur annually. Participants of contact sports such as football or boxing can also experience "subconcussive" injuries. These injuries are not severe enough to cause acute concussion symptoms, but the accrual of concussive and subconcussive events over time are believed to lead to progressive brain atrophy, a disease known as Chronic Traumatic Encephalopathy, or CTE. This neurodegenerative injury, which often does not begin until years after the athlete has stopped playing, leads to mood disorders, cognitive decline, and dementia. For example, Aaron Hernandez, the former NFL tight end convicted of murder in 2015, was found to have one of the most severe cases of CTE when he committed suicide at age 27.

There is no way to know when Hernandez's brain began to deteriorate because CTE can only be diagnosed postmortem; and, there is no way to determine if a player, still active in his or her contact sport, has experienced a "safe" number of hits or eventually will develop CTE.

Concussion, too, is an invisible injury. Because it affects function, not macrostructure, a concussion is undetectable using conventional imaging methods such as MRI or CAT scans. For this reason, concussion diagnosis relies heavily on a patient's symptom reporting. For many professional athletes in contact sports, however, their jobs are tied to their ability to

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sustain hits to the head and so they may try to hide or downplay a head injury to prevent losing their job to another player. This can make sports-related concussion difficult to diagnose.

To overcome the limitations of concussion diagnosis, research has shifted to identifying markers of concussion in oculomotor and vestibular function to provide objective metrics for concussion diagnosis and monitoring. Our work suggests that the auditory system should also be considered in concussion management.

Concussions Are a Military Health Crisis

For today's military, concussions have been named the signature invisible injury of war. Since 2000, nearly 300,000 service members have been diagnosed with a concussion, yet this may underrepresent the true prevalence of concussion in the military. A chief source of concussion is from blast exposure, often resulting from an improvised explosive device, or IED. When a concussion is caused by a blast exposure, other injuries that mask the concussion can occur. For example, posttraumatic stress disorder, or PTSD, is commonly diagnosed in blast-exposed veterans. Because PTSD also can lead to sleep disturbance or anxiety, it is difficult to determine if the blast exposure resulted in PTSD, concussion, or both.

What Does Concussion Have to Do with Hearing?

Simply put, concussion impairs the auditory brain.

The blast wave of an explosive device often results in damage to both the peripheral and central auditory system. Peripheral injuries include perforation of the tympanic membrane, tinnitus, temporary or permanent audiometric threshold shifts, and otalgia. However, the level of peripheral hearing damage does not align with the level of listening difficulties experienced, suggesting that the central auditory system is impaired by the concussive force of the blast wave. For example, nearly half of the blast-exposed veterans treated for concussion at VA hospitals and clinics complained of hearing difficulty, yet only 35 percent of these patients showed elevated audiometric thresholds (Myers et al, 2009). For the remaining 65 percent, the hearing problem did not lie in the ear. Furthermore, veterans with blast exposure who displayed normal audiometric thresholds performed more poorly than veterans without blast exposure on listening skills, including speech perception in noise, speech segregation, and auditory temporal resolution (Gallun et al, 2012). Even after a minimum of four years following blast exposure, veterans struggled on tests of temporal resolution, speech segregation, and temporal pattern perception, despite normal audiometric thresholds (Gallun et al, 2016). These findings align with the broader literature, which shows that the audiogram is not always a predictor of listening abilities, and that the auditory brain is a major contributor to listening abilities across the lifespan.

It's not just when a blast wave causes a concussion that listening problems arise. Individuals diagnosed with a sports-related concussion also report auditory complaints, including ringing in the ears, an inability to ignore distracting sounds or remember and follow oral directions, and difficulty understanding speech in a noisy environment, such as a restaurant or cafeteria (Lew and Guillory, 2007; Musiek et al, 2004; Turgeon et al, 2011). Speech-in-noise difficulties have been observed in concussed adults (Hoover et al, 2017; Vander Werff and Rieger, 2017), and university athletes with a history of concussion were found to perform more poorly than athletes without concussion history on tests that required integrating auditory information binaurally (Turgeon et al, 2011). We have found that during the acute stage of recovery from a sports-related concussion, children have a harder time understanding sentences in noise compared to peers with musculoskeletal injuries (Thompson et al, 2018). We also see that performance on the test declines over time for the concussed children, in contrast to a steady performance by their peers, suggesting that both fatigue and auditory processing problems affect speech-in-noise abilities in concussed children (FIGURE 1).

Why Would the Auditory System Be Affected by Concussion?

The anatomy of the auditory system makes it susceptible to injury. The auditory system has more relays connecting the sensory organ to the brain than other sensory systems and contains some of the longest axonal tracts (e.g., the lateral lemniscus). Axons bidirectionally link each of the auditory relays, traversing between the ear, brainstem, midbrain, and cortex. In addition to blood vessels, axons are believed to bear the brunt of damage from a concussive force. When a force, such as a blast wave or sports-related impact, jostles the brain inside the skull, axons are stretched and sheared by this movement. Shearing and stretching of axons can initiate a dysfunctional metabolic cascade (Giza and Hovda, 2014), which can lead to improper signaling among cells, or potentially death of the injured axon.

The susceptibility of axons to mechanical force, together with the complex interconnectivity of the auditory system and length of auditory axons, make the auditory system a likely site of dysfunction following a head impact. Indeed, axons in the auditory midbrain degenerate following a TBI, even when the force is mild (Jane et al, 1985). The positioning of the auditory cortex in the temporal lobe additionally makes it susceptible to contusions and swelling (Fausti et al, 2009; Taber et al, 2006).

How Does a Concussion Affect the Auditory Brain?

Sound processing is one of the most computationally demanding tasks the nervous system has to perform. It relies on the exquisite timing of the auditory system, which responds to input more than 1,000 times faster than photoreceptors in the visual system. The axon damage, inflammation, and bruising that result from a concussion can disrupt this microsecond-level temporal precision, leading to poorer encoding of sound.

Using the frequency-following response (FFR), a response to complex sounds originating predominately in the auditory midbrain, we have found auditory processing deficits after a concussion. Specifically, the FFR shows delayed and diminished processing of speech sound details weeks after a sports-related concussion in adolescents with postconcussion syndrome (Kraus et al, 2016) and months to years after recovering from a sports-related concussion in collegiate student-athletes (Kraus et al, 2017). In adolescents with delayed symptom recovery, we see poorer encoding of the fundamental, or lowest, frequency, timing delays of peaks that correspond to the periodicity of the fundamental frequency, and smaller responses (Kraus et al, 2016). The legacy of concussion in the recovered collegiate student-athletes was specific to a reduction in fundamental-frequency encoding (Kraus et al, 2017).

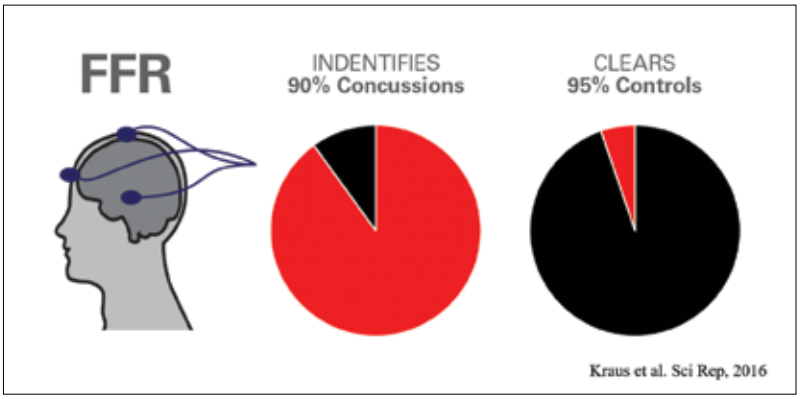

FIGURE 2. Frequency-following response correctly identified 90 percent of the concussed children and cleared 95 percent of the healthy children.

These FFR findings are important for the following two reasons:

(1) In both adolescents with delayed symptom recovery and collegiate student-athletes we observed a poorer response to the fundamental frequency of the speech sound. The fundamental frequency is necessary for conveying pitch, an important cue for perceiving speech in noise. Pitch helps the listener separate the target talker's voice from background noise (Carlyon, 2004). Thus, these findings may hint at reasons for the speech-in-noise difficulties reported postconcussion. In fact, this very measure tracks with speech-in-noise abilities in healthy listeners (Anderson et al, 2010).

(2) In adolescents, we looked at how well the FFR could predict whether the child was concussed. We found that the FFR correctly identified 90 percent of the concussed children and cleared 95 percent of the healthy children (Kraus et al, 2016). The FFR also aligned with symptom severity. Those concussed adolescents with the worst symptoms also had the smallest responses to the fundamental

frequency. And, as the child's symptoms improved, the FFR response recovered, too. (FIGURE 2)

Given the promise of these initial findings, we are continuing this line of research by embarking on a five-year, NIH-funded longitudinal study examining the effects of sports-related concussion and participation in contact and collision sports on auditory processing in male and female collegiate student-athletes.

Applying This Knowledge to the Clinic

Concussions are complex, are sometimes overlooked, and have a broad range of symptoms, which can make concussions difficult to detect and treat. For this reason, concussions must be managed in an interdisciplinary manner. Together with previous research we find that the auditory system is susceptible to damage from a concussion and that this injury can impair listening abilities. Thus, we suggest that audiologists should contribute to this interdisciplinary team. The hearing health of the injured service member or athlete must be considered when treating a concussion. Our hope is that the FFR can provide an objective assessment of auditory brain health that is used in diagnosing and treating concussion.

What Does the Future Hold for Football?

A recent study linking subconcussive hits to CTE in former athletes (Tagge et al, 2018) spurred a call to replace tackle football with flag football for children younger than age 12. Named the Duerson Act, after Chicago Bears legendary football player Dave Duerson, who was diagnosed with CTE following his suicide in 2011, this proposal has gained considerable traction in the Illinois government. It also has fueled a huge debate. For example, a recent editorial by a consortium of sports medicine physicians and researchers has cautioned that the current research does not support ending youth tackle football (Chung et al, 2018).

We must be able to ensure player safety and continue to provide access to sports for children. Playing sports is one of the healthiest things a person can do. It can lead to enhanced mood, physical fitness, social bonding, and a myriad of other positive outcomes. With additional research we can have a better understanding of whether the current risks can be mitigated and if we can make the game we love a safe one.

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This work is supported by the Knowles Hearing Center and NIH 1R01NS102500.

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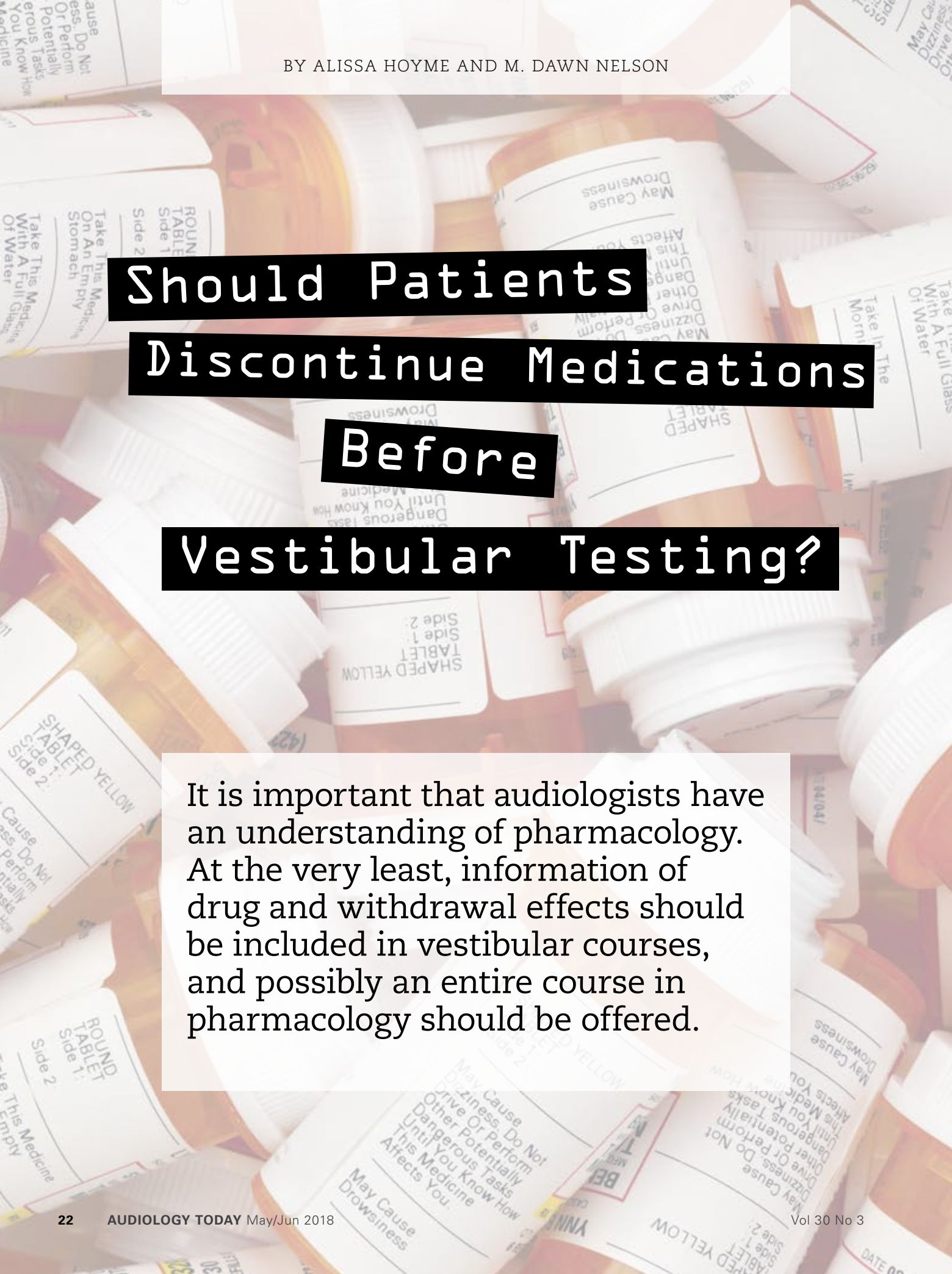
BY ALISSA HOYME AND M. DAWN NELSON

Should Patients Discontinue Medications Before Vestibular Testing?



It is important that audiologists have an understanding of pharmacology. At the very least, information of drug and withdrawal effects should be included in vestibular courses, and possibly an entire course in pharmacology should be offered.

The mandatory cessation of medications before vestibular testing is debatable. Patients seen for vestibular testing commonly are given pre-instructions that include a request to discontinue medications during the pre-evaluation time; typically for two days. It is unclear if these medication restrictions are based on scientific evidence or on tradition. Here we provide evidence for discontinuing or continuing medications and other substances before vestibular testing. We also will discuss how to determine an appropriate timeline for discontinuation of various drugs before vestibular testing. It is imperative that the clinician be aware of the effects of patient medications on vestibular test results for accurate test interpretation.

Currently no universal guidelines exist that specify for how long or from which medications a patient should refrain before vestibular testing. Individual practices must develop their own rules. Drugs that generally are considered to affect vestibular test results include antihistamines, antiemetics, sleeping pills, barbiturates, caffeine, amphetamines, alcohol, marijuana, and tobacco (Hain, 2014). Other clinics do not ask patients to discontinue medications, and clinicians document the medications that the patient is taking and interpret the results accordingly (Beck, 2013).

Designing Pre-Instructions for Vestibular Testing

There are several things to consider when designing pre-instructions for vestibular testing. Drugs that affect vestibular function should be discontinued whenever possible, but there are several categories of drugs that should not be discontinued, namely life-sustaining medications or those with no documented effects on test results. If a life-sustaining medication could affect test results it should be documented in the report. In addition, two issues that have not received enough attention when designing vestibular testing instructions are the potential for withdrawal when abruptly discontinuing medications and the amount of time that the effects of medications persist after a patient stops taking them.

Drugs that Affect the Vestibular System

Vestibular Suppressants

These drugs work by suppressing neuronal activity within the vestibular systems of both sides, which has the clinical effect of reducing the asymmetry between ears (Chabbert, 2016). This vestibular suppression can cause a bilateral weakness during caloric testing.

Antihistamines can suppress the vestibular system and reduce dizziness. Some examples include meclizine (Antivert®), diphenhydramine (Benadryl®), and dimenhydrinate (Dramamine®; Rascol et al, 1995). Scopolamine, an anticholinergic typically used in the form of a transdermal patch, also is used to treat dizziness and motion sickness (Chabbert, 2016). Benzodiazepines reduce anxiety and mimic the action of the inhibitory neurotransmitter GABA in the central or peripheral vestibular system (Chabbert, 2016). Examples of benzodiazepines include diazepam, lorazepam, and clonazepam (Chabbert, 2016). Receptors for several neurotransmitters are found in the peripheral and central vestibular system, and drugs that act on these receptors also have the potential to affect vestibular system function (Soto and Vega, 2010).

Alcohol

Alcohol intoxication can affect the results of several vestibular tests (Goebel et al, 1995). However, positional alcohol nystagmus (PAN) is probably encountered more often in a vestibular clinic. PAN I begins about 30 minutes after drinking begins and lasts for several hours, with nystagmus beating toward the lower ear. After a period of no nystagmus, PAN II begins about five to 10 hours after drinking stops, with nystagmus beating toward the upper ear (Fetter et al, 1999). PAN might even occur beyond 24 hours (Hill et al, 1973). A restriction on alcohol for 48 hours before testing is reasonable given the duration of this effect.

Marijuana

Spector (1974) found an increase in positional nystagmus and a decrease in slow phase velocity during caloric testing in heavy marijuana users. A more recent case describes a patient who presented with vertigo and nystagmus, which were attributed to marijuana use (Kibby and Halcomb, 2013). Dizziness and vertigo have been reported as side effects of medical cannabinoid drugs, and cannabinoid CB1 receptors have been found in the vestibular nuclear complex (Smith et al, 2006).

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Tobacco

Tobacco has the potential to affect test results but only for a very short period of time. Smoking tobacco can cause upbeating nystagmus in the primary position that can be observed with vision denied (Sibony et al, 1987). This effect lasts for about 10 to 20 minutes following smoking. Tobacco smoking also can cause abnormalities in smooth pursuit, lasting about five minutes after smoking (Sibony et al, 1988).

Drugs that Do Not Affect the Vestibular System

Patients often are asked to discontinue drugs for vestibular testing that might not affect the results at all. More research is always needed, but current evidence indicates that patients can continue to take some antinausea medications and allergy medications and consume caffeine before testing. If results are not affected, patient comfort should be prioritized. Shortening the list of drugs to discontinue can also result in fewer canceled or rescheduled appointments.

> In most cases, patients should continue to take medications that have significant negative withdrawal effects.

Ondansetron

Medications for nausea belong to several different drug classes. Many drugs that treat nausea affect the vestibular system via anticholinergic and antihistaminic actions (Chabbert, 2016). Setrons, however, are different and work on serotonin receptors. A common example is ondansetron, which has the brand name Zofran® (Chabbert, 2016). Ondansetron likely has no effect on vestibular test results (Hain, 2014). Patients in the early stage of vestibular neuritis who received ondansetron were found to have better vestibular function than those

DRUG	BRAND NAME	CLASS	HALF-LIFE	DURATION OF ACTION
BENZODIAZEPINES				
Alprazolam	Xanax®	Benzodiazepine	12–15 hours (immediate release), 11–16 ER	
Clonazepam	Klonopin®	Benzodiazepine	17–60 hours	6–12 hours
Diazepam	Valium®	Benzodiazepine	1–12 days	20–80 hours
Lorazepam	Ativan®	Benzodiazepine	10–20 hours	12–24 hours
ANTIHISTAMINES				
Meclizine	Antivert®	Antihistamine	6 hours	
Diphenhydramine	Benadryl®	Antihistamine	2.5–9.5 hours	6–8 hours
Hydroxyzine	Atarax®	Antihistamine	3 hours	4–6 hours
Fexofenadine	Allegra®	Antihistamine (2nd gen)	14.4 hours	
Loratadine	Claritin®	Antihistamine (2nd gen)	8.4 hours (28 for active metabolites)	
Cetirizine	Zyrtec®	Antihistamine (2nd gen)	8.3 hours	
OPIOIDS				
Hydrocodone	Hysingla ER® Zohydro ER®	Opioid	7–9 hours	
Oxycodone	OxyContin®	Opioid	2–3 hours	3–6 hours
Codeine		Opioid	2.5 hours	4–6 hours
Acetaminophen/ oxycodone	Percocet®	Opioid	See individual drugs	
Hydromorphone	Dilaudid®	Opioid	2.5–4 hours	4–5 hours
Acetaminophen/ hydrocodone	Vicodin®	Opioid	See individual drugs	
ANTIEMETICS				
Prochlorperazine	Compro®	Antiemetic	Unknown	3–12 hours
Promethazine	Phenergan®	Antihistamine	Unknown	<12 hours
Scopolamine		Anticholinergic	4.5 hours, 9.5 hours for transdermal	
Ondansetron	Zofran®	Setron	4 hours	
Dimenhydrinate (diphenhydramine/8-chlorotheophylline)	Dramamine®	Antihistamine/stimulant (antiemetic)	1–4 hours	
Metoclopramide	Reglan®	Antiemetic	4–6 hours	1–2 hours
ANTIDEPRESSANTS				
Citalopram	Celexa®	SSRI	35 hours	1–2 days
Fluoxetine	Prozac®	SSRI	2–6 days	
Paroxetine	Paxil®	SSRI	21 hours	
Sertraline	Zoloft®	SSRI	26 hours	
Duloxetine	Cymbalta®	SSNRI	12 hours	
Nortriptyline	Pamelor®	Tricyclic antidepressant	18–24 hours	
Venlafaxine	Effexor XR®	SSNRI	3–7 hours	

DRUG	BRAND NAME	CLASS	HALF-LIFE	DURATION OF ACTION
BARBITURATES				
Phenobarbital	Luminal®	Barbiturate	53–118 hours	
Pentobarbital	Nembutal®	Barbiturate	5–50 hours	
DIURETICS				
Furosemide	Lasix®	Loop diuretic	2 hours	6–8 hours
Hydrochlorothiazide	Microzide®	Thiazide diuretic	6–15 hours	6–12 hours
Triamterene		Potassium-sparing diuretic	1.5–2.5 hours	6–12 hours
HYPNOTICS				
Eszopiclone	Lunesta®	Hypnotic	6 hours	
Zolpidem	Ambien®	Hypnotic	1.5–8.5 hours	
Ramelteon	Rozerem®	Melatonin receptor agonist	1–2.5 hours; 2–5 hours for metabolite	
ANTICONVULSANTS				
Carbamazepine	Tegretol®	Anticonvulsant	25–65 hours (8–29 hours with long-term use)	
Gabapentin	Neurontin®	Anticonvulsant	5–7 hours	
Levetiracetam	Keppra®	Anticonvulsant	6–8 hours	12 hours
Topiramate	Topamax®	Anticonvulsant	21 hours	
Valproate sodium	Depacon®	Anticonvulsant	6–16 hours	
OTHER				
Naproxen	Naprosyn®	NSAID	10–21 hours	7 hours
Ibuprofen	Advil®	NSAID	2–4 hours	4–6 hours
Aspirin		Salicylate (NSAID)	15 minutes to 6 hours	1–4 hours
Acetaminophen	Tylenol®	Para-aminophenol derivative	2–3 hours	3–4 hours
Alcohol		CNS depressant	Varies	
Caffeine		CNS stimulant	3–7 hours	
Nicotine		CNS stimulant	1–3 hours (15–20 hours for metabolite)	
THC/dronabinol	Marinol®	Cannabinoid	Alpha phase: 4 hours, Beta phase: 25–36 hours	

TABLE 1. Shows drugs and their half-lives to illustrate the differences in how long various drugs stay in the body. Duration of action is also given when available. The drugs selected are many that might be of interest in a vestibular clinic.

References for Table

National Center for Biotechnology Information (2017)

Nursing Drug Handbook (2018)

who received metoclopramide, indicating a possible protective effect (Venail et al, 2012). If that is the case, patients should be allowed to keep taking ondansetron during testing.

Second-Generation Antihistamines

Second-generation antihistamines are used as "nondrowsy" allergy medications. Examples include loratadine (Claritin®) and fexofenadine (Allegra®). More research is needed, but patients may be able to continue these medications with no effect on vestibular test results. Second-generation antihistamines have less effect on the central nervous system than first-generation antihistamines (Cheung et al, 2003).

Caffeine

Patients often are asked to discontinue caffeine before testing, but current evidence indicates that this is not necessary. Felipe et al (2005) found that caffeine has no effect on caloric results and that caffeine withdrawal can contribute to an increase in anxiety, headache, vertigo, nausea, and vomiting during testing. The authors argued that allowing patients to continue to consume caffeine contributes to a relaxed but alert state that is ideal for testing (Felipe et al, 2005). Similarly, McNerney et al (2014) found that moderate caffeine consumption does not have a statistically or clinically significant effect on calorics or cVEMPs.

TABLE 2. Shows drug categories for vestibular testing with some examples and a simplified answer as to whether they should be discontinued.

CATEGORY	DISCONTINUE?	EXAMPLES
Known vestibular effects	Yes (if possible)	Alcohol Antidepressants Antiemetics Benzodiazepines First-generation antihistamines Marijuana Opioids Sedatives Tobacco (up to 20 minutes)
Significant withdrawal effects	No (or with caution)	Alcohol (if dependent) Anticonvulsants Antidepressants Benzodiazepines Blood pressure medications Corticosteroids Opioids Statins
No vestibular effects	No	Caffeine Setrons (e.g., Zofran) Possibly second generation antihistamines (e.g., fexofenadine)
Life-sustaining	No	Medications for heart conditions, diabetes, blood pressure, epilepsy, and other chronic health conditions

Withdrawal and Discontinuation Effects

Some drugs can cause withdrawal symptoms when stopped abruptly. The effects can range from mildly unpleasant to life-threatening. Common classes of drugs associated with significant withdrawal include SSRIs (a type of antidepressant), some antihypertensives, corticosteroids, statins, opioids, benzodiazepines, and alcohol (Papadopoulos and Cook, 2006). For many of these drugs withdrawal symptoms begin within one or two days, which is the period of time they are often discontinued before testing.

Benzodiazepine withdrawal can cause seizures, status epilepticus, coma, and death (Hu, 2011). Even in less severe cases, benzodiazepine withdrawal symptoms can include nausea, dizziness, and headaches (Hu, 2011). These symptoms can affect vestibular testing.

Discontinuation effects have long been reported for tricyclic antidepressants, and these effects increasingly are becoming recognized for SSRIs as well (Haddad, 1998). Dizziness, lightheadedness, nausea, headache,

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and lethargy are the most common symptoms of SSRI discontinuation syndrome, with ataxia, vertigo, sensations of being pulled to one side, and "electric shock" sensations with head movements also being reported (Haddad, 1998).

The impact of discontinuing medications before vestibular testing needs to be considered on a case-by-case basis.

Another category of medications commonly known to cause withdrawal symptoms are opioid pain medications, which patients may be asked to discontinue due to their sedating effects. Symptoms of withdrawal include anxiety, increased blood pressure, and nausea (Howland, 2010). While unpleasant, these symptoms are usually not dangerous. Withdrawal occurs primarily with chronic use (Howland, 2010). As with SSRIs, more research is needed to weigh the potential for vestibular effects with the potential for patient discomfort from stopping these medications.

Alcohol withdrawal is usually mild, but in severe cases can lead to delirium tremens and withdrawal seizures, and these more severe forms of withdrawal can be fatal (McKeon et al, 2008). Alcohol should be discontinued before vestibular testing, but alcohol-dependent individuals should be tested after detoxification is complete, which might require medical supervision.

Patients typically are asked to continue taking medications for seizures, but anticonvulsants can be used for other purposes as well, such as pain, migraine, and bipolar disorder (Norton, 2001). Carbamazepine and gabapentin are both common anticonvulsants and have both been shown to affect saccades and postural control (Noachtar et al, 1998). There is the potential for withdrawal symptoms with anticonvulsants, and gabapentin withdrawal can resemble alcohol or benzodiazepine withdrawal (Norton, 2001). Due to the potential for withdrawal effects, clinicians should note in their report if a patient is taking one of these drugs and the results should be interpreted accordingly.

In most cases, patients should continue to take medications that have significant negative withdrawal effects. If these medications have the potential to affect test results, the fact that a patient is taking them should be noted in the report. If these drugs must be discontinued, they should be tapered under the supervision of the patient's physician.

Drug Half-Life and Duration of Action

The amount of time that different drugs stay in the body varies widely. Stopping a drug 48 hours before testing can be excessive for some drugs and not nearly long enough for others. The half-life of a drug is defined as "the time necessary for the amount of drug present in the body, or its concentration in serum or plasma, to fall by 50 percent" (Greenblatt, 1985). While half-life itself has limited utility, it is one of the most common pharmacokinetic properties listed in drug references.

The duration of action, that is, the length of time that the level of a drug is high enough to be effective but not so high that it is toxic (Rosenbaum, 2017) may be a better way to represent the length of the effect of a drug. FIGURE 1 illustrates the concept of duration of action.

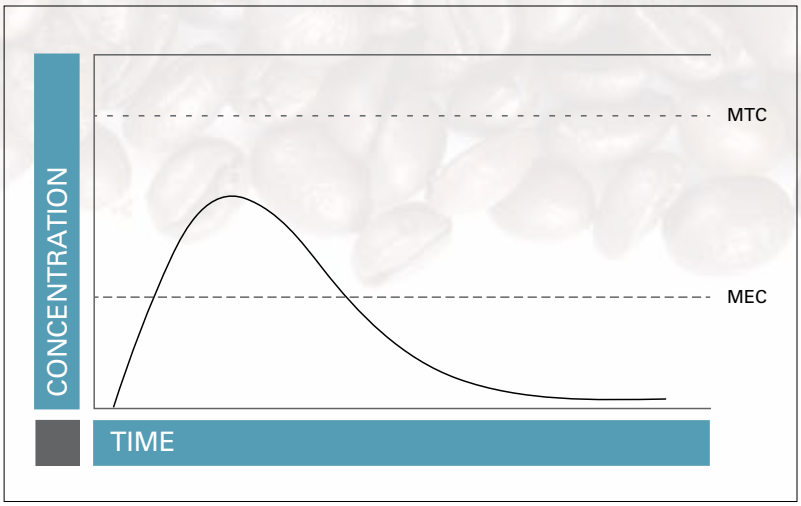

FIGURE 1. Duration of action, that is, the length of time that the level of a drug is high enough to be effective but not so high that it is toxic.

TABLE 1 shows drugs and their half-lives to illustrate the differences in how long various drugs stay in the body. Duration of action is also given when available. The drugs selected are many that might be of interest in a vestibular clinic.

Evidence-Based Pre-Instructions for Vestibular Testing

Medications can be grouped into four categories when designing vestibular test instructions: (1) medications with known vestibular effects, (2) life-sustaining medications, (3) medications with serious withdrawal effects, and (4) medications with no vestibular effects. Some drugs can fall into more than one category. TABLE 2 shows drug categories for vestibular testing with some examples and a simplified answer as to whether they should be discontinued.

Conclusion

The impact of discontinuing medications before vestibular testing needs to be considered on a case-by-case basis. It is important that audiologists have an understanding of pharmacology. At the very least, information of drug and withdrawal effects should be included in vestibular courses, and possibly an entire course in pharmacology should be offered. By asking patients to discontinue medications, we are making recommendations that have implications that affect patient safety. Patients should be encouraged to discuss any concerns about discontinuing medications with their primary care physician or pharmacist. It is also important to understand the effects of medications that patients are allowed to continue taking during testing so that the results can be accurately interpreted.

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Starting the Discussion About Equality and Equity in Leadership

BY THERESE WALDEN, HILLARY SNAPP, KARI MORGENSTEIN, AND LAUREL GREGORY

As the emerging professional works to further her or his career, biases surrounding leadership attributes and promotion are hurdles that must be faced not only in audiology but all professions and occupations. Even seasoned professionals must remain aware of how bias (including outdated gender roles) affects their advancement and the advancement of others and how that influences the workplace.

> It is our choices that show what we truly are, far more than our abilities.
>
> *– J.K Rowling (Billionaire Author)*

Gender increasingly is recognized as a determining factor in the ability to achieve success in the workplace. This is observed not only with compensation, but with professional advancement and leadership opportunities. Longstanding evidence exists detailing the considerable differences in pay between men and women. While it might seem as though women have made great advances in overcoming these disparities with rising visibility of "glass ceiling breakers" such as Sheryl Sandberg, Oprah Winfrey, and others, the truth is that little has changed for most women.

Pay inequities continue to exist across the spectrum. In almost every occupation and profession, women are paid less than their male counterparts, even those that are predominantly female (DOL, 2015). Likewise, women continue to lack equal representation in leadership roles, and do not have equal opportunities for professional advancement (Center for American Progress, 2014a).

Despite increased awareness and targeted efforts towards workplace equality, issues related to stereotypes, bias, and assigned or perceived gender roles persist. To eliminate the inequalities, we must reform the prevalent culture that quietly (and not so quietly) subverts efforts toward meaningful change. Beyond the pay gap, additional long overlooked issues surrounding gender equity and equality only recently have gained widespread attention in American society.

Equity Versus Equality

How do equity and equality differ, and how does this impact women in the workplace? Equity is providing everyone with the resources they need to be successful, while equality is treating everyone the same. It might seem as though treating everyone equally is a simple and effective solution. However, this approach does not take into account individual differences, needs, or the context in which the disparities exist.

FIGURE 1 (The Inclusion Solution, 2017) illustrates equality on the left: everyone trying to see over the fence gets the same box; clearly this doesn't work well for two of the spectators. The image on the right illustrates equity by considering the specific needs of the individual spectators and address those needs with different resources. Achieving equity is dependent on the willingness to address differing needs to realize the best possible outcomes for each worker.

Gender equality then, isn't about making women into men or vice versa, it's about recognizing that equal access to opportunities and resources for success must be provided. Effective solutions toward equality is predicated on recognizing what resources

FIGURE 1. Equality on the left; equity on the right (The Inclusion Solution website, 2017).

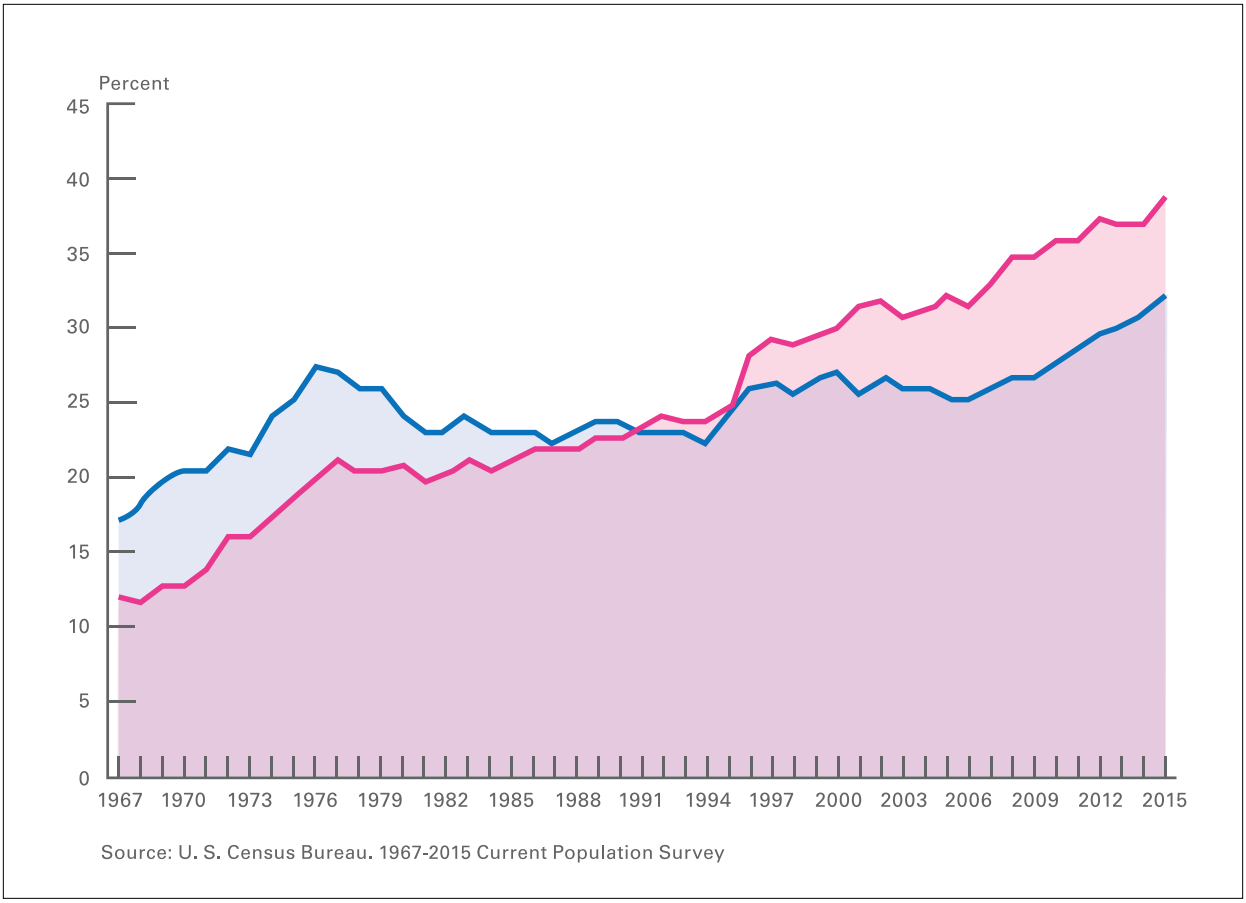

FIGURE 2. Percentage of the population aged 25 to 29 with a bachelor's or higher degree, by sex (1967 to 2015).

are needed to achieve equity. This article will explore challenges and opportunities in audiology in the area of leadership and professional advancement. The goal of this article is to start a much-needed dialogue on challenges and opportunities in developing women into leaders in our profession and in society as a whole.

The Leadership Gap: Some Statistics

Women make up nearly 51 percent of the general population in the United States and have outpaced men in terms of degree attainment for nearly two decades (FIGURE 2, DOL, 2016). Attainment of leadership roles, however, has not followed the same trend. For example, despite accounting for 78 percent of the health-care sector's workforce, women represent only 15 percent of executive officers and only 12 percent hold board seats in the health-care arena. (FIGURE 3, Center for American Progress, 2014b).

Health care, however, is just one aspect of the professional disparity that exists in our country. This disparity also is seen in governance. In 1916, Jeannette Rankin of Montana was the first woman elected to the House of Representatives. Elected at a time when women did not have the right to vote, her achievement particularly was groundbreaking. More than 100 years later, however, the U.S. political system continues to be dominated by male representation.

Women hold only 20 percent of the membership in the U.S. Congress and only 20 percent to 25 percent elected office nationwide (Center for American Women and Politics, 2018). At this rate, the Institute of Women's Policy Research suggests that it will take another 100 years for women to reach parity in politics (Institute for Women's Policy Research, 2015).

As key stakeholders, our political leaders are the ones who hold the greatest power to effect change. This lack of progress of equal female representation where public policy is developed, and laws and regulations are

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Top 5 challenges facing audiologists

Despite new obstacles, audiologists have the opportunity to evolve their practices with more patient-focused care

Executive Opinion from
Steve Mahon, CEO, Sivantos, Inc.

A large and aging population, younger people developing hearing loss, and greater interest in maintaining quality of life (and willingness to pay more for it) should translate to increased business for your audiology practice. Yet, rapid change and new competitive pressures make things difficult.

As with most challenges, opportunity can be derived from evolution. Understanding how to react to these five obstacles will help you to stand out and grow your practice:

OTC/PSAP devices
The FDA has yet to provide guidance on over-the-counter (OTC) hearing aids and personal sound amplification products (PSAPs), but many practices worry about their effect on business. If hearing aids become readily available without having to see an audiologist, how can you compete? By educating patients about what OTC devices and PSAPs don't provide—expertise, personalized service, and ongoing consultations and tunings—and the dangers of using such devices without professional medical advice, you provide valuable insight to guide their decisions.

Big Box retailers
Since "Big Box" retailers offer hearing aids at lower prices, they remain major competitors. But these retailers won't deliver some of the latest innovations like telehealth apps or provide the care most patients desire. However, Big Box outlets bring new patients into the hearing aid market, and if you integrate a value product line into your practice, you can attract first-time buyers with competitive prices and value-added services.

Internet sales
As more websites sell hearing aids, many practices fear growing competition from internet retailers. While patients may be attracted by lower costs, sellers neglect to mention what isn't included—the high-quality service only an audiologist provides. When patients need servicing of their hearing aids, which online sellers don't offer, you can welcome them to your practice with a helpful service plan.

Third-party payers
You'd think it would be easier to grow your practice as more insurance companies help patients bear the associated costs of hearing aids. The difficulty arises because third-party payers typically only cover the costs of the hearing exam and not the hearing aids themselves, while audiologists traditionally combine the devices and services into one fee. The key is to unbundle—separate the costs of the hearing aids from the services—to make it easier to work with payers.

Patient education
As the hearing healthcare industry continues to become more complex and dynamic, opportunity will be seized by those who continuously evolve. Now more than ever, it's important to evaluate new marketing strategies and the patient experience. Understanding the digital landscape will ensure you reach prospective physician partners and patients with your message. Implementing the latest audiological equipment, offering real-world product demonstrations, and providing telehealth services will differentiate you from Big Box and online competition.

The road ahead may be bumpy, but Signia is ready to guide you through each of these obstacles. We want to continue to achieve shared success with our customers by providing the products and resources needed to stand out. If we evolve together, we can help more people get the best hearing care possible.

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enacted undoubtedly has cultivated the widespread inequities that persist across all sectors of society today.

The Leadership Gap: What About Audiology?

Let's take a deeper look at the profession of audiology. How do we measure up in terms of leadership distribution? In FIGURE 4, we see that the current 2017–2018 Academy Board of Directors is 58 percent female. The most recently elected classes of 2019 and 2020 are only 33 percent female. While men represent less than 20 percent of audiologists, they account for 40 percent of the upcoming 2018–2019 nominations for the Board of Directors.

With women accounting for about 81 percent of the profession (DataUSA, 2014), it seems implausible that women would not hold the majority of leadership roles. It is important to explore the contributing factors that lead to these inequities. Is it that women are not voting for women? Is it that women are not getting nominated or are less likely to self-nominate? Is it that women are less inclined to take on leadership roles? How do we ensure equal gender representation? To vote for women, they must be on the ballot. So, what prevents the engagement, the ability to step-up?

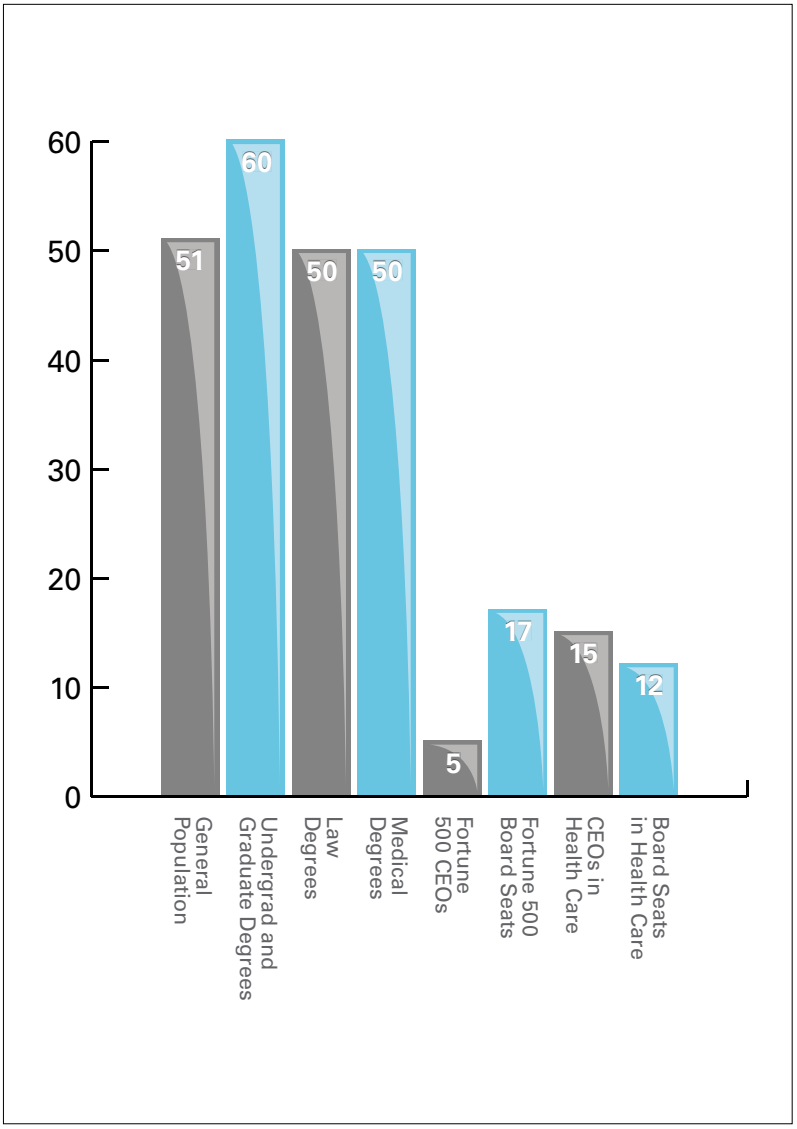

FIGURE 3. Percentages of women in each role.

Leadership Obstacles, Challenges, and Opportunities

Tara Sophia Mohr, an expert on women's leadership, found that women are less likely to apply for leadership roles due to the fear of failure. Women are less likely to rely on self-advocacy skills, relationships, or experience beyond the stated qualifications to make up for the lack of skills required (Harvard Business Review, 2014). While misperceptions about the hiring process as opposed to the actual job can be a factor, gender bias plays a much larger role. For example, women do likely need to be more qualified since they are more likely to be hired or promoted based on their records.

On the contrary, men are more likely to advance due to their "potential." In addition, young girls are socialized to "follow the rules" and subsequently are more successful in school relative to boys, but that rule-following skill becomes so ingrained, it's hard to break the habit in the workplace. Credentials were

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essential and required of women early in the 20th century when starting to break into male-dominated positions. Without an "old boys" network to rely on, they had to play by the rules and over-credential themselves to be competitive. That mindset resulted in women overestimating formal training at the cost of using self-advocacy skills to promote themselves and continues today.

Heilman and Chen (2005) reported on two experimental studies where they postulated that men performing altruistic citizenship activities in the workplace would enhance their favorability rating, and women who chose not to do such activities would harm their favorability. An example of an altruistic citizenship activity in the study was staying late at work to help a colleague.

Participants in the study were asked to rate the performance of a male or female employee who stayed late or chose to not stay late. If a man stayed late, he was deemed more favorable by a small amount as compared to the woman. However, if the man and the woman both chose not to stay late, the woman paid a much higher cost in terms of reduced favorability ratings. Isn't it possible that the woman would not be in the position to make such a choice even if she wanted to stay late to help a colleague? Their analysis of 183 studies from 15 different countries indicated women's increased chances of burnout due to emotional exhaustion when trying to maintain a healthy work/life balance.

Women routinely take on the undervalued activities such as child pick-up and drop-off, child sick days, home cleaning/maintenance, planning parties, etc., causing them to miss important career opportunities or to not be taken seriously. In addition, although the majority (69 percent) of children in the United States live in a two-parent household, single mothers make up the second-most common family unit. Since 1960, the percentage of children living with only a mother nearly tripled from 8 percent to 23 percent, while those living with only a father increased from 1 percent to 4 percent (U.S. Census Bureau, 2016).

> **Don't be intimidated by what you don't know. That can be your greatest strength and ensure that you do things differently from everyone else.**
>
> *– Sara Blakely, Founder/CEO Spanx*

A survey of female and male surgeons in academic medicine (Dyrbye et al, 2011) found that more than 90 percent of male surgeons were married and 50 percent were married to someone who did not work outside the home. Conversely, women surgeons were more likely to be single. Also compelling was that only 60 percent of women in academic medicine have children while more than 90 percent of men have children. What contributes to this disparity? Is it that women who do not seek to have children are more likely to pursue demanding careers or is it that women are choosing not to have families due to challenges balancing family and strong academic careers? The inequity in spousal support for critical maintenance of family (children who are sick, pick-ups and

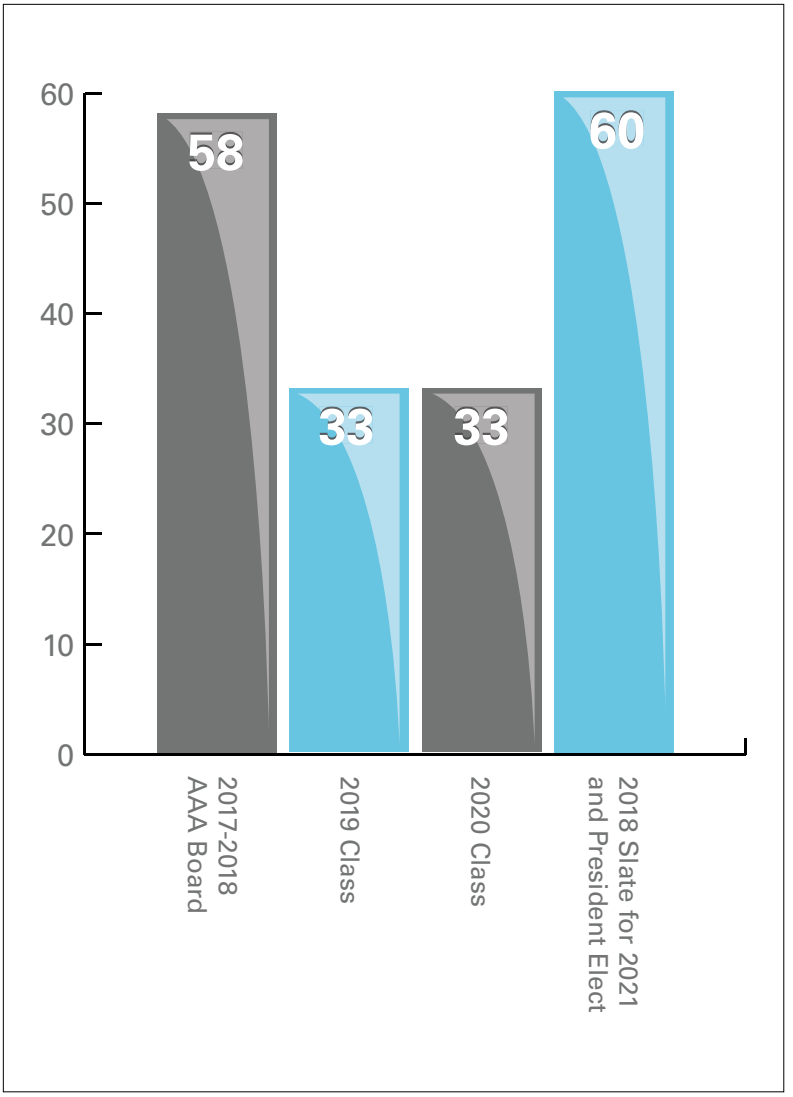

FIGURE 4. Percentage of women in leadership roles in the Academy.

drop-offs, etc.,) undoubtedly contributes to burnout.

How does the imbalanced distribution of home responsibilities affect professional advancement? In the same survey (Dyrbye et al, 2011), the majority of women faculty were at the assistant professor rank (48 percent) while the majority of male faculty were at the full professor rank (42 percent). Yet, there were no differences in median hours worked per week between males and females. This clearly challenges the misconception that having a family contributes to working less. It suggests that women physicians work just as many hours, yet they do not achieve academic advancement at the same rate as their male colleagues.

If the work weeks are similar, then it must be the extracurricular activities where discrepancies occur (i.e., needing to skip the after-hours meeting or get-together in order to care for the children). In addition, family care issues might take precedence over writing a case report for publication that leads to improving one's curriculum vitae. Maybe women must choose a less rigorous committee on which to serve so that night-time conference calls are limited, providing more time for family matters. Recognizing the highly imbalanced distribution of home responsibilities among women and men is a step in the right direction to a more equitable work environment.

Change Is Possible: Small Successes Daily

Indeed, a fundamental barrier to achieving gender equality is the limited voice women have in decision making across all sectors of society—politics, economics, education, employment, etc. We need increased female leadership to influence these changes. Improved mentoring to elevate women into leadership roles would serve to grow awareness and allow for a platform to discuss and address issues that are specific to women, by women. With more balanced gender representation, this would help us to move toward more equitable solutions.

Each of us is capable of affecting change in our own environment. Making the choice to take an active role in empowering the women around us is a small but important step in raising the female voice and encouraging women on the path to leadership. We cannot sit back and wait for others to create change for us. Make the decision today to recognize your own

value. If you do not fully believe in the value that you bring to your organization, you cannot successfully advocate for yourself or your colleagues. For this to be effective, we must also support others in self-advocacy—seeking out opportunities to lift those around us.

Working to raise the value of the group provides the necessary foundation to raise ourselves individually. There is a great truth to the concept of strength in numbers. Changing the culture only happens if each of us is actively engaging. The following section highlights just a few practical solutions you can implement in the short term to accelerate long-term change.

MEETINGS

Take a seat at the table. Unless there is a specific reason not to do so, always take a seat at the table. Ensure your ideas are heard and acknowledged by being an active participant in meetings. Never apologize when sharing your ideas, as it automatically undervalues your contribution. Make it a personal goal that at every meeting you either use your voice to champion yourself or a colleague.

MENTORSHIP

Identify those who can mentor you and reach out to them. Asking for help and locating resources is critical for advancing. Don't be afraid to send an email or pull them aside at a conference. Reaching out to other women who have attained a level of leadership that is your goal is imperative. Individuals at every level enjoy being sought out for advice and counsel. Developing a peer support group is also effective as it provides opportunities to amplify each other's ideas and solutions. Engage these individuals to provide you with honest feedback. This is hard but critical for growth.

NEGOTIATIONS

One of the most important solutions for short- and long-term advancement is to start your career positioned for equality and success. Babcock and Laschever (2007) report that women are reticent to negotiate their salaries leaving as much as $2 million over their lifetime. Men are more than four times as likely as women to negotiate a first salary and women who consistently negotiate their salary increase their earnings at least $1 million more during their careers than women who do not.

> We cannot change what we are not aware of, and once we are aware, we cannot help but change.
>
> *– Sheryl Sandberg, COO, Facebook*

Prepare to talk about your value and how it benefits the workplace. Be specific about past accomplishments and how they contribute to the overall success of the team. Don't undersell even though it might seem boastful and uncomfortable.

We Are Just Getting Started

As the emerging professional works to further her or his career, biases surrounding leadership attributes and promotion are hurdles that must be faced not only in audiology but all professions and occupations. Even seasoned professionals must remain aware of how bias (including

outdated gender roles) affects their advancement and the advancement of others and how that influences the workplace.

For equality (parity, equivalence) to happen in the workplace in our lifetime, we will need to promote women by elevating and amplifying their accomplishments. We must nominate women for the tough jobs, get women's names on the ballot, and be vigilant in calling out gender bias when we see it. This requires the commitment of women and men. There is no question that having the courage and resources to do this is easier the more advanced we are in our career.

The truth is that the ability to mentor, guide, promote, and elevate qualified women exists at all career stages. As a profession, we can work to identify ways to reduce inequities, acknowledge our biases, and work toward change by creating more opportunities for women early in their careers.

We have just scratched the surface. We need to discuss issues such as how to find a mentor or become a mentor, how to advocate for pay equity, how to negotiate effectively for compensation and leadership opportunities, and much more. Leadership is a learned behavior and it is earned through many small experiences that build on each other. The critical missing pieces to date, have been (1) limited access to opportunities and (2) true equity. For real, sustainable change we need both. Let's keep the discussion going.

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Hillary Snapp, AuD, PhD, is an associate professor and chief of audiology in the Department of Otolaryngology at the University of Miami. She is the 2014 recipient of the Glass Ceiling Award by the Business and Professional Women of Florida, and has been recognized by the American Academy of Audiology as a Jerger Future Leader of Audiology.

Kari Morgenstein, AuD, PASC, is an assistant professor and director of the Children's Hearing Program in the Department of Otolaryngology at the University of Miami. She is the president-elect for the Florida Academy of Audiology and is a past president of the Student Academy of Audiology.

Laurel Gregory holds the role of director in training and development for Entheos Audiology Cooperative, where she provides leadership coaching and team development to the members of Entheos. She is also the current president of the Hillsboro/Forest Grove branch of the American Association of University Women and is on the board for Pacific University's Center for Gender Equity.

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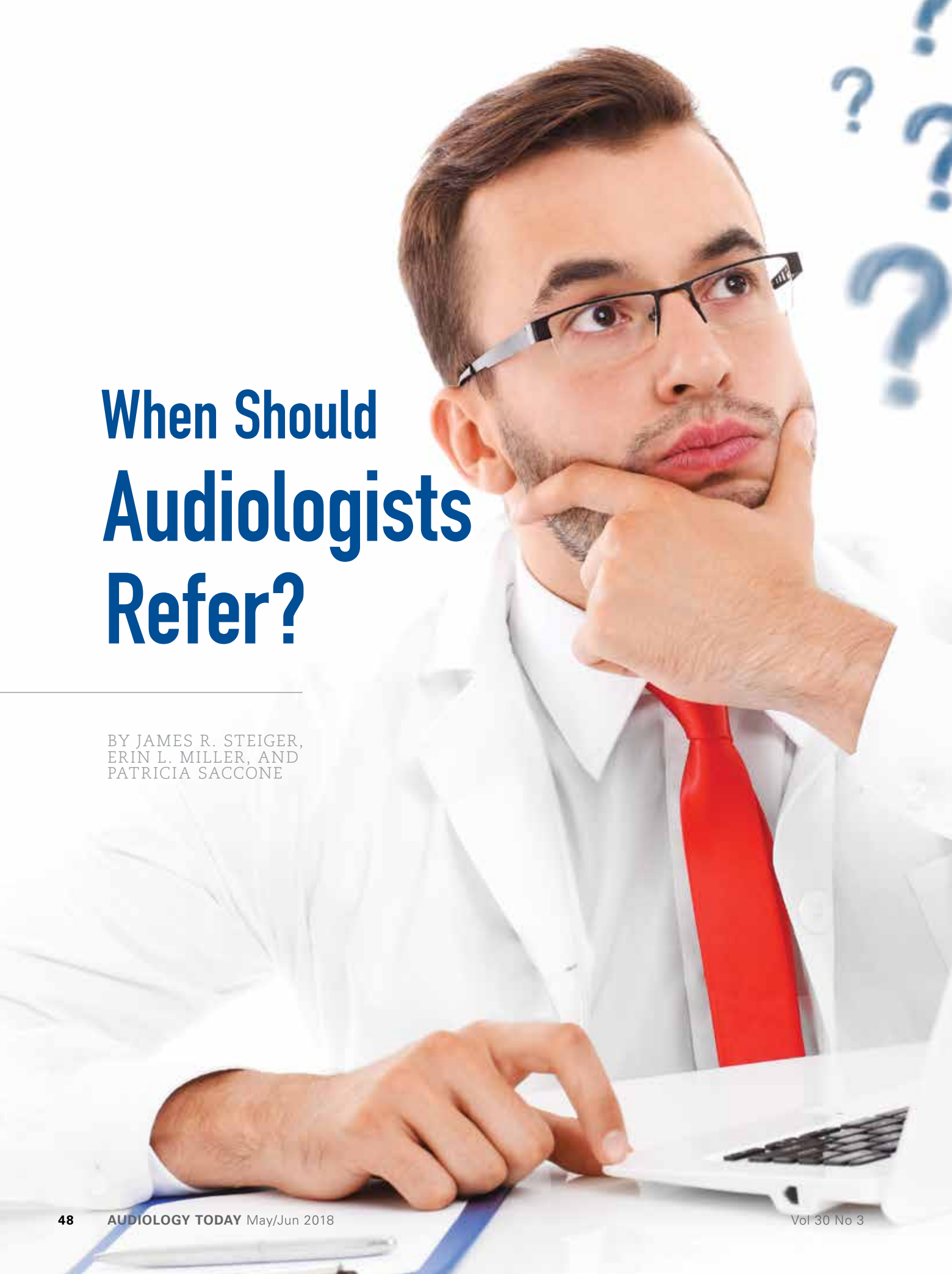
When Should Audiologists Refer?

BY JAMES R. STEIGER, ERIN L. MILLER, AND PATRICIA SACCONE



The purpose of this article is to provide audiologists with an overview of published criteria on when to refer patients for medical evaluation. We included criteria specific to hearing aid fitting, vestibular schwannoma, sudden sensorineural hearing loss, middle ear disorder, tinnitus, and dizziness. It is a synopsis of referral options and considerations to augment, but not to replace, clinical judgment.

In 2005, James R. Steiger, PhD, published *Audiologic Referral Criteria: Sample Clinic Guidelines*. Those guidelines included sample referral guidelines for hearing aid use, for the identification of vestibular schwannomas, and for the identification of middle-ear disorder with wide-width and narrow-width tympanograms. Considering the passage of time since that paper was published, and the absence of a discussion of tinnitus, vestibular disorders, and sudden sensorineural hearing loss in that paper, it seemed prudent to revisit the topic. This is a synopsis of referral options and considerations that may augment clinical judgment, with a basic decision-making progression shown in FIGURE 1. A more thorough discussion of this and other matters can be found in an audiology pocket guide format by Steiger and Miller (2017).

The U.S. Food and Drug Administration (FDA, 1977) promulgated federal regulations that serve as a guideline for determining the need for medical clearance for hearing aid use. We recommend consideration of the guidance provided in that document, though it will no longer be enforced at the federal level (FDA press release, 2016). States, however, may require that audiologists continue to adhere to this guideline. Clarifications and more comprehensive and rigorous recommendations were offered by the American Academy of Otolaryngology–Head and Neck Surgery (AAO-HNS, 1993, 1994, 2015). In our opinion, some of those recommendations would lead to a high over-referral rate. FDA guidelines for determining the need for medical clearance for hearing aid use, and AAO-HNS recommendations, are given below.

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Should a patient open the battery door to turn off the hearing aids when not in use?

If a patient removes their hearing aids during the day, the hearing aids should be put back on the charger. Rule of thumb — if the hearing aids are not on the ears they should be in the charger. The batteries will not overcharge, and this will not decrease the overall life of the battery. If the charger is not available, it's ok to open the battery door for a few hours until they are worn or can be put on the charger. If the hearing aids are not going to be worn for an extended period, the batteries should be removed.

Have more questions? Please visit www.ZPowerhearing.com/ask-the-expert to enter your question.

- Child younger than 18 years of age (FDA, 1977).
- Otalgia or discomfort in the ear (FDA, 1977).
- Visible congenital or traumatic deformity of the ear (FDA, 1977).
- Visible evidence of significant cerumen accumulation or a foreign body in the ear canal (FDA, 1977). Visualization of blood, pus, cerumen plug, foreign body, or other material in the ear canal (AAO-HNS, 2015). Note: Audiologists should determine if cerumen management is within the scope of practice in their state and manage or refer when warranted.
- History of active drainage from the ear within the previous 90 days (FDA, 1977) or within the previous six months (AAO-HNS, 1993, 1994).
- History of sudden or rapidly progressing hearing loss within the previous 90 days (FDA, 1977) or within the previous six months (AAO-HNS, 1993, 1994).
- Acute or chronic dizziness (FDA, 1977) or recurrent episodes of dizziness (AAO-HNS, 2015).
- Unilateral hearing loss of sudden or recent onset within the previous 90 days (FDA, 1977). The AAO-HNS (1993, 1994) clarification of unilateral hearing loss: air-conduction pure-tone PTA (500, 1000, 2000, and 3000 Hz) difference of 15 dB or greater. AAO-HNS (2015) concurred but did not identify test frequencies. They did, however, add unilateral or asymmetrically poor word recognition scores defined as a difference between the ears of greater than 15 percent.
- Audiometric air-bone gap of 15 dB or more at 500 Hz, 1000 Hz, and 2000 Hz (FDA, 1977). AAO-HNS (2015) criteria included unexplained conductive hearing loss or abnormal tympanogram but did not elaborate.
- Bilateral hearing loss greater than 90 dB (AAO-HNS, 1993, 1994; frequencies not specified). The AAO-HNS (2015) suggested greater than 30 dB (frequencies not specified) or word recognition score poorer than 80 percent; we believe this would lead to over-referral.

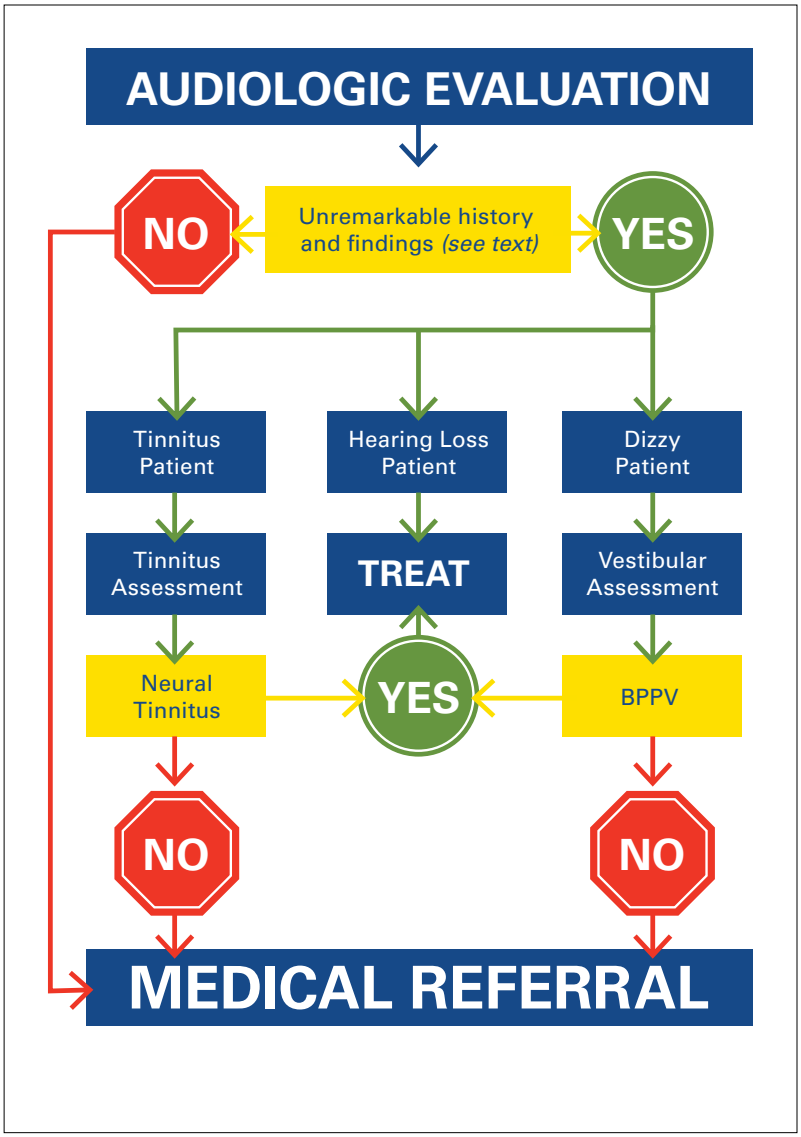

FIGURE1. When to refer for medical consultation.

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- Hearing loss with history of tuberculosis, syphilis, human immunodeficiency virus (HIV), Meniere's disease, autoimmune disorder, otosclerosis, Von Recklinghausen's neurofibromatosis, or Paget's disease of the bone (AAO-HNS, 1993, 1994) or history of ear infections or noise exposure, familial hearing loss, ototoxic medication use, otosclerosis, or head trauma related to onset (AAO-HNS, 2015).

Patients at Risk for Vestibular Schwannomas

Audiologists may wish to consider more specific options for vestibular schwannomas. Vestibular schwannomas most often occur unilaterally and cause unilateral or asymmetric symptoms and findings (rarer cases of bilateral vestibular schwannomas are not considered here). Patients at risk for vestibular schwannomas should be evaluated by an otologist and considered for magnetic resonance imaging (MRI). Audiologists may consider the following test findings, symptoms, and patient history:

- Symptoms and history: The significance of positive test findings may be tempered by whether they are explained by known acoustic or physical trauma, disease, or otologic treatment. Welling, Glasscock, Woods, and Jackson (1990), for example, reported a relatively high probability of vestibular schwannoma for patients exhibiting unexplained asymmetry of audiometric thresholds, word recognition score (WRS), and tinnitus. In contrast, they reported a lower probability of vestibular schwannoma for patients with isolated vertigo and historically explained unilateral hearing loss and tinnitus. This article's authors suggested suspicious case histories may include the following:
  - Unexplained unilateral or asymmetric hearing loss.
  - Persistent unexplained unilateral or asymmetric tinnitus or vertigo/dizziness.
  - Aural fullness.
  - Facial paralysis, paresis or weakness.
- Welling, Glasscock et al (1990), of course, discussed asymmetric hearing as a symptom and finding.

Below are criteria to identify pure-tone air-conduction thresholds as described by subsequent authors. Options include but are not limited to the following:

- AAO-HNS (1993, 1994) criteria as described above; the average difference in air-conduction thresholds between ears of 15 dB or greater at 500 Hz, 1000 Hz, 2000 Hz, and 3000 Hz.
- Obholzer, Rea et al (2004) recommendations: 15 dB threshold difference between ears at two adjacent frequencies for patients with unilateral hearing loss and 20 dB threshold difference between ears at two adjacent frequencies for patients with bilateral hearing loss. This option offered higher sensitivity but lower specificity than the AAO-HNS criteria. We prefer these criteria because they are simple to use and offer sensitivity that should mitigate the possibility of missing significant pathology.

Sensorineural hearing loss with sudden onset warrants immediate referral.

- Zapala et al's formula: Zapala et al (2012) offered a formula, based on a retrospective chart review of patients with unilateral acoustic neuromas, to calculate the risk of vestibular schwannoma for various audiograms. Considered in the formula were age, gender, and noise exposure history. The precise calculation is beyond the scope of this article and it may at first appear daunting. It can, however, be incorporated into a spreadsheet for easier use.
- Subsequent authors also have addressed the use of asymmetric word-recognition scores to suggest concerning asymmetries. We have noted ubiquitous use of Thornton and Raffin's (1978) statistical approach to the identification of significant WRS asymmetry when measured with NU-6 word lists, and also the 15 percent criteria recommended by the AAO-HNS (2015). The former sometimes allows asymmetry greater than 15 percent and thus will result in lower sensitivity and higher specificity.
- Other tests: The results of other tests may be considered at the discretion of audiologists, including but not limited to rollover, acoustic reflex thresholds, acoustic reflex decay, and auditory brainstem response (ABR).

From the above, audiologists may form test batteries. The sensitivity and specificity of test batteries can be manipulated by selection of strict or lax interpretation criteria (Turner, Frazer et al, 1984; Turner, 2013). A full discussion of this topic is beyond the scope of this article, but typically a strict test battery interpretation criterion will result in lower sensitivity and a higher miss rate, but fewer false alarms and a higher specificity. In contrast, a more lax criterion test battery interpretation criteria will result in higher sensitivity and a lower miss rate, but more false alarms and lower specificity. Intermediate criteria may be adopted. This is a complex clinical judgment that each audiologist must make on a case-by-case basis, based

on his or her level of comfort with risk. Moreover, the degree by which a test result exceeds criteria should be considered. This article's authors generally tend toward a relatively strict test battery interpretation, while monitoring borderline patients aggressively.

Sudden Sensorineural Hearing Loss

Sensorineural hearing loss with sudden onset warrants immediate referral. Based on the definition of sudden sensorineural hearing loss by the AAO-HNS (2012), we offer the following considerations:

- Pure-tone thresholds: A sudden decrease or asymmetry in hearing of at least 30 decibels (dB).
- Involved frequencies: At least three consecutive test frequencies.
- Duration: Onset over no more than 72 hours.

The guideline authors, however, recognized that clinicians might wish to err on the side of caution by adopting more liberal referral criteria and using clinical judgment. We concur. Moreover, the above authors reported that corticosteroid treatment appears to be most effective when prescribed within two weeks of onset, with diminishing benefit up to six weeks. This also should be considered when making referral decisions.

Interpretation of Wide-Width Tympanograms and Otoscopy

In general, an abnormal tympanometric pattern can be caused by more than one disorder. This is true of wide-width tympanograms, which can be caused by many disorders including but not limited to otitis media, cholesteatoma, glomus tumor, patent PE tubes, occluded PE tubes, and tympanic membrane perforation. We cannot cover all possibilities in this article, so we begin this section urging vigilance when wide-width tympanograms are measured. Symptomatic patients should be considered for referral for medical evaluation; symptoms include but are not limited to otoscopic evidence of otorrhea or blood, reported otalgia, significant conductive hearing loss. That said, the more common causes of wide-width tympanograms are discussed below.

OTITIS MEDIA

- Wide-width tympanograms with normal ear-canal volumes might indicate otitis media. Otoscopically, otitis media with effusion may manifest as a cloudy tympanic membrane and/or air bubbles or an air-fluid line (American Academy of Pediatrics, AAP, 2013). Wide-width tympanograms with positive otoscopy should be considered for referral, especially when air-bone audiometric threshold gaps meet criteria given in the FDA hearing aid fitting guidelines or other guidelines above. When otoscopy and audiometrics are negative, it seems reasonable to audiologically monitor patients with wide-width tympanograms. We offer the American Speech-Language-Hearing Association (ASHA) recommendations for tympanometric screening (ASHA, 1997). At a minimum, the tympanogram should be repeated in six to eight weeks and referral is indicated if findings or symptoms persist or worsen. Acute otitis media may manifest as a budging erythematic tympanic membrane (AAP, 2013).

PRESSURE EQUALIZATION TUBES

- Wide-width (flat) tympanograms with large ear-canal volumes are findings consistent with patent pressure equalization tubes that can often be visualized during otoscopy. Asymptomatic patients with patent pressure equalization tubes should be encouraged to follow the managing physician's advice on care and follow-up including dry-ear precautions.
- Symptomatic patients with patent pressure equalization tubes should be referred to the managing physician. Symptoms include otoscopic evidence of otorrhea or blood, reported otalgia, significant conductive hearing loss.
- Wide-width tympanograms with normal ear-canal volumes might indicate obstructed pressure equalization tubes, possibly with otitis media. Whether or not symptomatic, we recommend otoscopic confirmation of the obstruction and audiometrics followed by referral to the treating physician.

TYMPANIC MEMBRANE PERFORATIONS

- Wide-width (flat) tympanograms with large ear-canal volumes might indicate a tympanic membrane perforation that can often be visualized during otoscopy.

- Asymptomatic and previously undiagnosed patients should be advised to follow dry-ear precautions and be referred to an otolaryngologist.
- Asymptomatic patients with previously diagnosed tympanic membrane perforations should follow the managing physician's advice.
- Symptomatic patients with tympanic membrane perforations, whether or not previously diagnosed, should be referred to the managing physician. Symptoms include otoscopic evidence of otorrhea or blood, reported otalgia, significant conductive hearing loss.

Audiologists' goal should be to identify patients with neural tinnitus who are therefore candidates for audiologic treatment.

Interpretation of Narrow-Width Tympanograms and Otoscopy

As stated earlier, an abnormal tympanometric pattern can be caused by more than one disorder. This is true of narrow-width tympanograms, which can be caused by many disorders including but not limited to monomeric or dimeric tympanic membranes, ossicular discontinuity, or otosclerosis. As a general rule, symptomatic patients should be referred for medical evaluation; symptoms include otoscopic evidence of otorrhea or blood, reported otalgia, significant conductive hearing loss. More specific considerations are given below.

MONOMERIC OR DIMERIC TYMPANIC MEMBRANES

- Monomers and dimers result from disease or trauma causing the loss of at least the fibrous layer of the tympanic membrane. This causes tympanic membrane hyperflaccidity, which manifests on a tympanogram as high static compliance and narrow width. Typically, monomers and dimers cause no worse than a small high frequency conductive loss (Gopen, 2013). In addition to otoscopic confirmation, we recommend pure-tone audiometrics. Asymptomatic patients should be followed routinely.

OSSICULAR DISCONTINUITY

- Ossicular discontinuity typically results from trauma. This causes tympanic membrane hyperflaccidity, which manifests on a tympanogram as high static compliance and narrow width. In contrast to monomers and dimers, ossicular continuity typically manifests audiometrically as a more significant conductive hearing loss across the entire audiogram. Whether or not symptomatic, we recommend otoscopic inspection and audiometrics followed by referral for medical evaluation consistent with the FDA pure tone air-bone gap criteria discussed earlier in this paper.

OTOSCLEROSIS

- Otosclerosis involves an alteration and reformation of bone that fixes the stapes in place. This limits the motion of the middle ear structures resulting in a narrow width but often normal static compliance and unremarkable otoscopy. We recommend audiometrics as otosclerosis often manifests as a conductive hearing loss with a bone conduction notch at 2000 Hz reflecting a change in middle ear resonance. We recommend counseling regarding potential audiologic and medical treatments and referral for medical evaluation consistent with the FDA pure tone air-bone gap criteria discussed earlier in this paper.

Tinnitus Patients

Many disorders, medications, chemicals, and trauma can cause or exacerbate tinnitus. These exacerbating factors and all of the above referral criteria should be considered when deciding on the need for referral. Audiologists' goal should be to identify patients with neural tinnitus who are therefore candidates for audiologic treatment. Other tinnitus patients are candidates for medical evaluation (ASHA, 2014; Henry, Zaugg et al, 2010; Tunkel, et al, 2014; Simmons, et al, 2008). Tinnitus-specific triage referral criteria offered by Henry et al, included:

- Tinnitus of somatic origin including pulsatile tinnitus, especially pulsations consistent with heartbeat.
- Trauma, facial palsy, or sudden hearing loss.
- Mood disorder suicidal ideation or obvious mental health problems require referral to a mental health provider.
- Symptoms associated with movement of head or neck including tinnitus modulation.

ASHA includes the above and also recommends referral for the following:

- Symptoms associated with movement of head or neck: Presumably, this is in reference to modulation of tinnitus by head, neck, or eye movement, which though common deserves medical evaluation.

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- Otalgia, otorrhea, malodor, dizziness, and vertigo.

Dizzy Patients

Many disorders, medications, chemicals, and even trauma can cause or exacerbate dizziness, imbalance, and/or vertigo; these exacerbating factors and all of the above referral criteria should be considered; however, benign paroxysmal positional vertigo (BPPV) is the most common cause of peripheral vertigo (Froehling, Bowen, et al 2000), especially in patients 80 and older (Hain and Ramaswamy, 1999). Bhattacharyya, Baugh, et al (2008) recommended that clinicians differentiate BPPV from other causes of imbalance, dizziness, and vertigo for which the severity of serious medical sequelae may be greater. Patients with BPPV are candidates for audiologic treatment; other dizzy patients are candidates for medical evaluation (ASHA, 1990). Therefore, medical referral should be considered for:

- Patients with findings atypical to BPPV, including symptoms that are not provoked by head position including negative findings with the Dix-Hallpike.
- Patients with BPPV symptoms showing no improvement after two to three canalith repositioning treatments. Treatment failure can occur with misdiagnosis of the canal(s) affected by BPPV or misdiagnosis of another or even a concomitant disorder (Smouha and Roussos, 1995)

Conclusion

We offered here a synopsis of referral options and considerations for audiologists as a resource to augment, but not to replace, clinical judgment.

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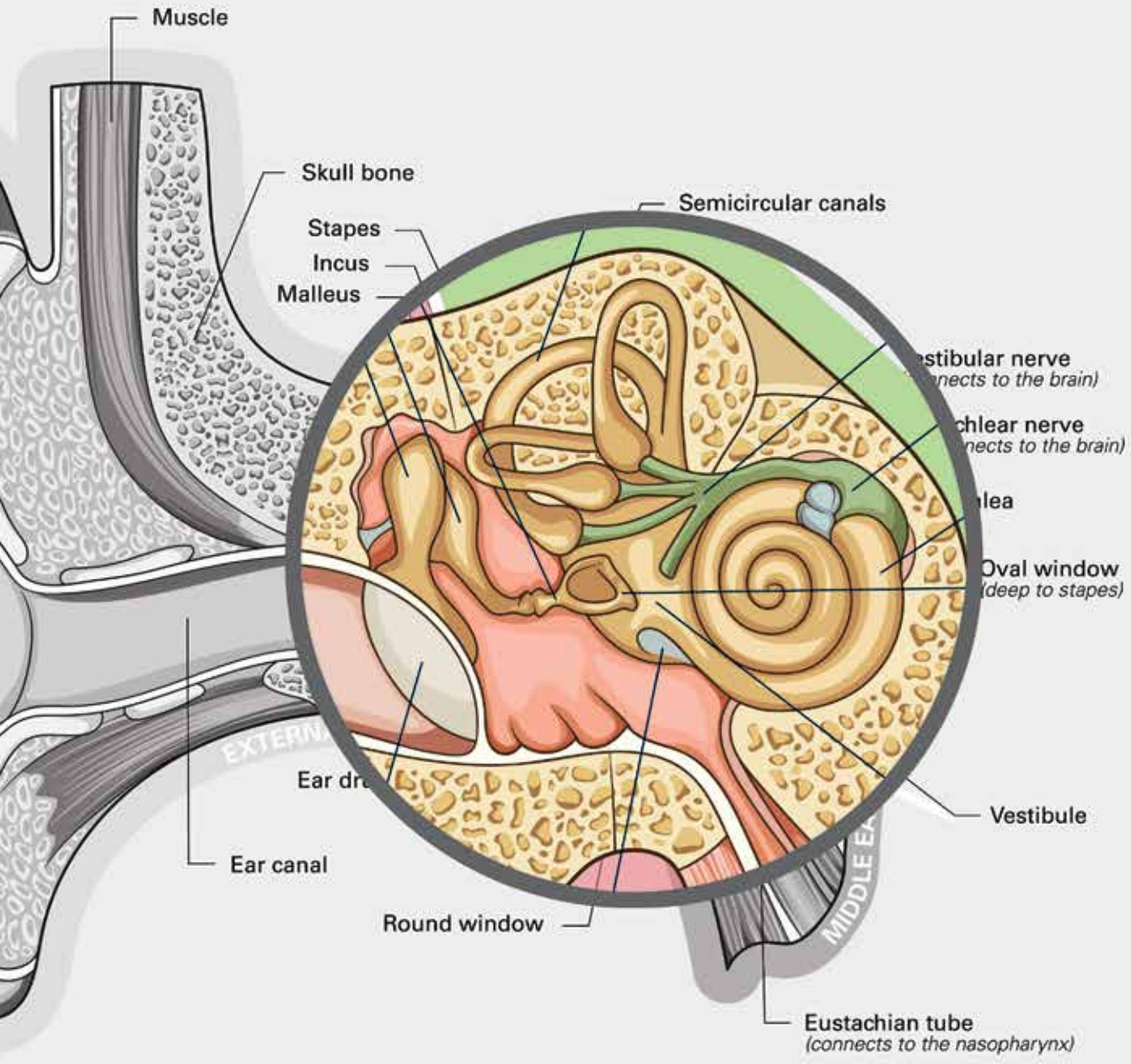
VEMP Stimuli

A GUIDE TO ENSURING PATIENT SAFETY



BY SAMANTHA KLEINDIENST ROBLER, CORY PORTNUFF, AND JAMIE BOGLE

This article is a clinically based summary of the recently published "Safe Use of Acoustic Vestibular-Evoked Myogenic Potential Stimuli: Protocol and Patient-Specific Considerations" by C. Portnuff, S. Kleindienst, and J. Bogle in the *Journal of the American Academy of Audiology*, 28:708–717 (2017).

Vestibular-evoked myogenic potentials (VEMPs) are electrophysiological measures of saccular and utricular reflex pathways. These potentials are currently the only method available to gain information on these important balance organs in the clinic. VEMPs are recorded easily and have been accepted widely due to the novel information they provide to the vestibular diagnostic evaluation. In most clinics in the United States, VEMPs are recorded using air-conducted short-duration tone bursts or clicks (Rosengren et al, 2009). To record these responses, however, high-intensity stimuli between 120 and 140 dB pSPL are required, reaching the upper limit of what is considered safe exposure.

During VEMP testing, the cochlea is exposed to high sound pressure levels (Krause et al, 2013; Mattingly et al, 2015; Stromberg et al, 2015), but unfortunately, there is limited reported information about the possible effects of VEMP stimuli on the cochlea. Several studies have evaluated the effects of this stimulus on cochlear function with results showing decreased distortion product otoacoustic emissions (DPOAEs) after VEMP testing, but with no significant changes in hearing thresholds (Krause et al, 2013; Stromberg et al, 2015).

One report identified a case study of sudden permanent bilateral sensorineural hearing loss after VEMP testing with stimulation intensities ranging between 128-135 dB pSPL (Mattingly et al, 2015). Despite the limited information, these reports demonstrate a concern for those completing VEMP testing, indicating that we must take care to safely measure VEMP responses without possible damage to the cochlea.

How Is Sound Exposure Measured?

Noise exposure standards have been put in place to protect workers from hearing loss due to occupational noise encountered over a work day. We use these standards to describe the possible noise dose obtained from our test stimuli and the associated level of risk. These standards include a recommended exposure level (e.g., U.S. National Institute for Occupational Safety and Health [NIOSH],1998 and European Union [EU], 2003) for a damage-risk criterion (DRC). If a person's exposure exceeds these recommended levels, then he or she is at increased risk for hearing loss.

While several DRCs exist for industrial noise exposure across the world, there is no specific recommendation for patient noise exposure in a health care setting. Considering this, we will use existing occupational standards. When evaluating sound exposure from VEMPs, we must consider both instantaneous sound levels and the actual exposure measured over time. For instantaneous sound levels, both the NIOSH and EU recommendations set upper limits of 140 dBC for impulsive noises (i.e., sounds lasting less than one second).

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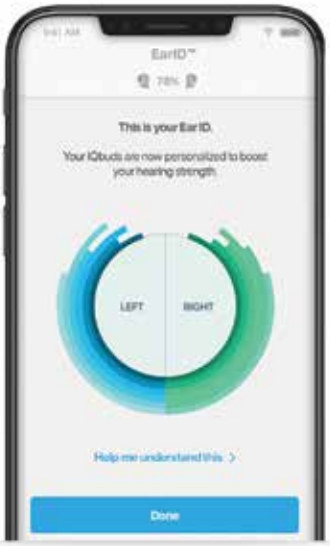

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While the published DRC limits for impulsive noises were developed to prevent hearing loss in the majority of workers (Ward, 1961; Price, 1981; Committee on Hearing and Bio-Acoustics, 1992), they still leave the 25th percentile susceptible to hearing loss (i.e., 75 percent of ears would not be at risk for sudden damage at 140 dB pSPL) and the fifth percentile susceptible to hearing loss with stimuli as low as 132 dB pSPL. Because a small percentage of ears might incur sudden acoustic trauma at stimulation levels as low as 132 dB pSPL, the regulatory standards are not protective of all individuals.

We also must consider the "noise dose" of the total test stimulation. For example, NIOSH establishes the maximum (or 100 percent) noise dose for an eight-hour exposure at 85 dBA. Noise dose is a cumulative measure and sums exposures from various activities throughout the day to calculate the total noise dose. Noise doses exceeding 100 percent put the individual at a higher than normal risk for hearing loss.

How Are VEMP Intensity Levels Measured?

Air-conducted VEMPs require high sound pressure levels, making it important to understand the patient's overall sound exposure from the test. First, we need to know the actual output level of the evoked potential equipment. Measurements in dB SPL are not adequate for reporting VEMP output, as dB SPL reflects some degree of averaging, either averages of multiple stimuli over time or root-mean-square averages of a specific stimulus token—these measurements do not reflect instantaneous peaks.

Because VEMP recordings are saccular and utricular responses to the peak intensity of the stimulus, understanding peak sound pressure levels is needed to determine the risk for possible acoustic trauma. Evoked potential equipment can be calibrated by measuring either peak (pSPL) or peak-equivalent sound pressure level (peSPL) in accordance with IEC 60645-3:2007. Some sound level meters can measure transient stimuli using a "peak hold" type of response to obtain a pSPL measurement. Otherwise, pSPL can be measured using a microphone, preamplifier, and conditioning amplifier, then viewing the absolute greatest amplitude of the signal on an oscilloscope. A sound level meter set to a "fast response" will average sound levels measured over a given time (e.g., 125 ms), and will result in measured levels approximately 6 dB below the actual peak of the signal for 500 or 1000 Hz tone bursts (Beattie and Rochverger, 2001).

Clinicians should evaluate their **current VEMP protocols to ensure VEMP stimuli** are **within accepted limits** for **safer** exposure to **sound.**

Another method for calculating sound pressure level is peak-equivalent SPL (peSPL), which is derived from adjusting the level of the output until it is equivalent to the peak-to-peak, baseline-to-peak amplitude, or voltage of the transient. Of note, pSPL is typically 3 dB greater than peSPL depending on which peSPL value is used (Laukli and Burkard, 2015). It

is important to note that pSPL and peSPL are two separate references for describing the stimulus output. Knowing how our evoked potential systems are calibrated allows us to understand the actual output of the device.

What Is Your VEMP Stimulus Intensity?

The first step in creating a safe and effective VEMP protocol is to know the output levels produced by the evoked potential system. If equipment output is provided in either dB nHL or dB HL, clinicians should know their equipment-specific conversion factor between those values and dB pSPL or peSPL. This often can be obtained from the manufacturer or during equipment calibration. Each evoked potential system may have equipment specific calibration methods for deriving peak output. Keep in mind that conversion factors can vary between sites and between equipment. For example, a 95 dB nHL 500 Hz stimulus may be equivalent to 126 dB peSPL in one lab, but 122 dB peSPL in another, potentially leading to different outcomes.

Clinicians should evaluate their current VEMP protocols to ensure VEMP stimuli are within accepted limits for safer exposure to sound. For conservative protocols, total exposure should not exceed 100 percent of the NIOSH noise dose, instantaneous sounds should not exceed 132 dB pSPL, and total energy should remain below 132 dB SPL over one second. Exceeding these limits increases the risk of incurring noise-induced hearing loss (NIHL) in highly susceptible individuals (Price, 1981).

TABLE 1. Summary of strategies to reduce VEMP noise exposure.

STRATEGIES TO REDUCE VEMP NOISE EXPOSURE
Minimize number of sweeps.
Minimize number of repetitions.
Minimize stimulus duration.
Limit search for threshold to necessary cases (e.g., superior semicircular canal dehiscence).
Consider starting at a lower intensity level.
Consider the patient's total daily noise exposure in addition to VEMP exposure.

How Can I Modify My Protocol for Safer VEMP Testing?

Air-conducted VEMP stimuli are loud and can be uncomfortable to some patients. While we take care to minimize this as much as possible, we should consider any possible medical-legal concerns associated with VEMP test paradigms. To better protect yourself and your clinic, your first step is to establish a safer protocol that reduces the noise dose your patient receives. Your clinic should consistently use your established protocols and should document that each patient's test exposure fell within these safer criteria so that you have information regarding the test protocol if a patient has concerns about hearing loss after testing.

The output of the evoked potential system is key to providing a safer sound exposure, but variations in test protocol variables also can contribute to the overall output. TABLE 1 provides several strategies to help the clinician maintain exposure below the recommended total energy levels. Reducing stimulus duration and/or the total number of stimuli presented will diminish the patient's total sound exposure to levels that are well within safe limits for exposure. In addition, a small reduction in maximum intensity will reduce a patient's exposure. For example, with the same number of stimuli, a reduction of 3 dB will reduce a patient's overall dose by half. Often this small reduction in intensity does not significantly affect the diagnostic utility of the VEMP data, but does impact the noise dose for that patient.

Clinical protocols for safer VEMP testing should evaluate several


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STIMULUS PARAMETER	VALUE
Intensity	< 126 dB pSPL*
Stimulus duration	4 ms (e.g., 2 ms rise/fall, 0 ms plateau)
Gating	Blackman
Number of sweeps	
cVEMP	<100
oVEMP	<150
Number of repetitions	Two trials at high intensity Two trials at low intensity level Consider threshold search in 10 dB steps if asymmetry or concern for third window disorder

*Include corrections for ear canal volume if necessary

TABLE 2. Example of stimulus parameters for 500 Hz tone burst air-conducted stimuli that generally do not exceed recommended noise exposure levels.

stimulus parameters that you can control. The most important considerations are the stimulus intensity, stimulus duration, and number of sweeps. TABLE 2 provides a protocol that generally does not exceed NIOSH recommended noise exposure values. Keep in mind that variation in these parameters will affect the overall exposure level. For example, if the number of sweeps or intensity is changed, the total noise exposure will vary accordingly. The clinician should not only be mindful of output level for each variation in protocol but also the projected dose for all testing to be completed (e.g., if both cVEMP and oVEMP testing are to be completed). Once you have settled on your protocol, note that your responses may vary from the reported literature. For example, since VEMP testing requires high-intensity stimulation, if you chose to test at a lower-intensity level, the response amplitude will decrease (Colebatch et al, 1994).

Further, altering the stimulus duration also will influence the response amplitude and latency (Welgampola and Colebatch 2001), but does not impact clinical interpretation of the VEMP. Similarly, increasing or decreasing the number of sweeps minimally alters the response amplitude, however, it significantly influences the daily noise dose. See FIGURE 1 for an example of change in number of sweeps on VEMP response, output, and noise dose. Overall, these modifications are likely to provide minimal changes to your responses and ultimately your clinical findings, while more importantly, providing a safer VEMP stimulus to your patients.

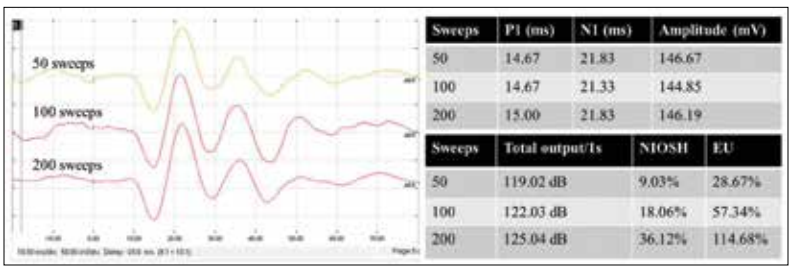

FIGURE 1. VEMP response and output to change in number of sweeps. Static VEMP parameters included 500 Hz tone burst, 4 ms stimulus duration, 126 dB peSPL output for two repetitions each. Tracings represent grand averages for two independent tracings for each number of sweeps. There is minimal effect on VEMP amplitude with a significant increase in recommended daily noise exposure with an increase in number of sweeps.

A TOOL FOR CALCULATING NOISE EXPOSURE FROM VEMP STIMULI

Portnuff et al (2017) includes a supplemental Microsoft Excel (2013) worksheet that can be downloaded to calculate the noise exposure level that takes into account stimulus intensity, duration, number of sweeps per trial, and number of trials. The worksheet provides three metrics that can weigh the potential risk to an individual patient from their VEMP exposure: the NIOSH and EU DRCs, and a total energy over one second exposure as described by Colebatch and Rosengren (2014). A clinician can use these metrics to judge whether the patient may be at increased risk for NIHL due to a certain VEMP stimulus exposure. It is important to note that this tool allows clinicians to calculate VEMP exposure from tone burst stimuli only and cannot be used for click stimuli.

Should VEMP Testing Be Modified for Certain Populations?

While you have taken care to use an appropriate protocol that meets safer sound exposure limits, there

are several populations that may be at higher risk and require additional consideration. These populations include children, those with tinnitus or hyperacusis, those with third-window phenomena, and those with high daily noise exposures outside of the clinic (TABLE 3). For these patients, the clinician should weigh the diagnostic needs of the individual and if sufficient benefit is gained from obtaining VEMP information.

CHILDREN

Infants and young children are often evaluated with VEMPs due to ease of administration. For pediatric protocols, modifications can be made to reduce the sound exposure to these smaller ears without compromising diagnostic information. Maes et al (2010) found that for typical children between ages 4 and 12, VEMP responses can be obtained at approximately 120 dB SPL (note, the reference value was not provided). In these younger populations, using a lower intensity level will lead to safer noise exposure without sacrificing clinical diagnostic utility.

Ear canal volume in these young patients can be used to help determine which lower intensity to use. As a rule, for every halving of volume in the ear canal, there is a doubling of sound pressure based on 2cc coupler measurements (Beck et al, 2009). This estimate is conservative but measuring ear canal volume before VEMP testing will allow for adjusting maximum output levels to accommodate for this change (e.g., -6 dB for 1.0 cc, -12 dB for 0.5 cc). This should be obtained easily, as evaluation for middle ear function before VEMP testing is necessary because of the effects of conductive hearing loss on the response (e.g., Zhou et al, 2012). Knowledge of ear canal volume will allow you to quickly modify your stimulus intensity to provide a safer protocol for the individual child.

For example, in a pediatric clinic, if the clinician followed the recommended parameters provided in TABLE 2, the noise dose may be higher than anticipated due to the expected increase in intensity in smaller ear canals. A child with an ear canal volume of 0.5 cc would have 12 dB higher output than the average adult, resulting in a noise dose that would be unsafe for that child. If in doubt, consider work recently published by Rodriguez and colleagues (2018) which recommends not exceeding 120 dB peSPL.

PATIENTS WITH TINNITUS OR HYPERACUSIS

Tinnitus and hyperacusis are commonly reported symptoms in the vestibular laboratory and specific care should be taken in these patients. At this point, there is minimal literature

TABLE 3. Special populations that may require reduced VEMP exposure levels.

CONDITION	RATIONALE FOR MODIFYING PROTOCOL
Tinnitus/Hyperacusis	Patients with tinnitus/hyperacusis may be bothered by high-level sounds.
Known susceptibility to noise exposure (e.g., existing NIHL)	Greater risk for NIHL than typical population.
Third window phenomenon (e.g., SSCD, large vestibular aqueduct)	Sound levels within cochlea may be higher than expected.
Pediatrics	Possibility of increased susceptibility to NIHL, reduced ear canal volume.
Current/recent use of ototoxic agents (e.g., platinum chemotherapy, antibiotics)	Synergistic effect of noise and ototoxin causes greater risk.
Patients with additional daily noise exposure (e.g., factory workers)	Addition of VEMP may cause total noise dose to exceed recommended limits.

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evaluating VEMPs in patients specifically with tinnitus; however, the authors' clinical experience has shown that some patients with tinnitus may experience an increase in their tinnitus perception during VEMP testing. Also, patients who report hyperacusis or sound sensitivity may not be comfortable with VEMP stimuli for the duration of the test.

When a patient with tinnitus or hyperacusis presents for a vestibular evaluation, VEMP testing may be deferred or perhaps modified to use a lower stimulus intensity level. Modifications to the sound level provide a more comfortable experience for the patient but may limit the diagnostic interpretation. If higher intensity information is needed for appropriate management of the patient, the patient should be counseled about the risk of discomfort. Patients with phonophobia or misophonia (psychological conditions involving fear or hatred of sound) may be wholly unwilling to participate in VEMP testing.

PATIENTS WITH THIRD-WINDOW PHENOMENA

Third-window disorders, such as superior semicircular canal dehiscence (SSCD), are disorders with an abnormal opening into the inner ear labyrinth. For SSCD, the opening is in the osseous roof of the superior semicircular canal, which creates a window into the middle cranial fossa. These third-windows create a pathway for sound stimulation through the dehiscent bone and increase intralabyrinthine pressure. Evidence suggests that ears with SSCD have VEMP thresholds that are approximately 20 dB lower and interpeak amplitudes considerably larger than ears unaffected by SSCD (Welgampola et al, 2003).

For this reason, the stimulus intensity level for VEMP testing in patients suspected to have SSCD may be started at a lower level to determine threshold. A lower intensity level may avoid unnecessary patient discomfort and reduce the potential for overdriving the acoustic signal to the inner ear through the dehiscence.

As clinicians, we should **consider the overall noise dose provided to our patients from VEMP stimuli**, taking into account **each patient's unique risk** insomuch as this is possible.

PATIENTS WITH HIGH SUSCEPTIBILITY TO NIHL

Many of our patients have their own risk factors for NIHL. While we have no direct diagnostic test to evaluate susceptibility to NIHL, we may be able to infer increased susceptibility. We can assume that patients with suspected pre-existing NIHL are likely susceptible to worsening hearing due to overexposure to noise especially if they also receive occupational or recreational exposures. Beyond this, patients who are or were recently undergoing significant medical treatments, including potentially ototoxic medications, may be at higher risk for NIHL (Boettcher et al, 1987). These medications include platinum-based chemotherapy (e.g., cisplatinum,

carboplatinum), aminoglycoside antibiotics, and loop diuretics.

A comprehensive case history is advised to determine if patients are on potentially ototoxic medications, have a history of NIHL or who have a significant family history of NIHL. For those patients who may be at increased risk, the clinician can determine the diagnostic usefulness of VEMP information, opting to defer or modify protocols in these cases to ensure safer noise exposures.

PATIENTS WITH ADDITIONAL NOISE EXPOSURE

While you can control the noise dose acquired during VEMP testing, the overall daily noise exposure of a patient also should be considered. As noise dose is cumulative across all activities in a patient's day, it may be important to avoid additional sound exposure for some patients. For example, consider a patient who works in a noisy environment or the patient who has just completed a series of MRIs. These patients may have received all or part of their noise dose before arriving at the vestibular laboratory. The diagnostic need for VEMP testing should be considered, weighing the possible risks and benefits before testing. You may recommend that patients remain isolated from noise before the testing. Depending on the dose accrued from the VEMP testing, you may need to advise patients to remain isolated from noise following the testing.

Conclusion

VEMP testing can be a safe and effective tool in the vestibular test battery and provides information on important reflex pathways. As clinicians, we should consider the overall noise dose provided to our patients from VEMP stimuli, taking into account each patient's unique risk insomuch as this is possible. This is especially important for the pediatric population, patients with a history or increased risk of NIHL, and patients with certain disorders, including tinnitus, hyperacusis, and third-window phenomena. By following the suggestions reviewed in this article, you can provide safer VEMP testing to the patients in your vestibular laboratory.

The sample protocol provided reduces sound exposure to levels acceptable to NIOSH recommendations while providing adequate diagnostic information. This protocol may not be ideal for every clinic, but it provides a framework for establishing a VEMP test battery that limits noise exposure to the inner ear. Using this or a similar protocol can help to provide consistent results that can be reported and compared across clinics resulting in improved clinical and research outcomes for VEMP testing.

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AMERICAN ACADEMY OF AUDIOLOGY

BY SARAH SYDLOWSKI

TOGETHER WE CAN DO SO MUCH

A CHALLENGE TO ALL ACADEMY MEMBERS

The founders created a structure upon which to formulate a mission. Our call to action today is the opportunity to fully bring the intention of the American Academy of Audiology to fruition. **YOU are audiology. WE are audiology.** As Helen Keller said, "alone we can do so little; together we can do so much."

Thirty years ago, Rick Talbott facilitated a miniseminar session on the future of audiology. Reflections from American Academy of Audiology (AAA) founders involved in that meeting were published recently in *Audiology Today* (Fabry, 2018). The article reviewed how and why that miniseminar came to be and described the subsequent inception and development of the American Academy of Audiology. For anyone not there at that session, having the opportunity to read about the motivation, foresight, and raw determination of audiologists at the time to break with tradition and forge a new path is inspiring.

Audiologists banded together for a common purpose. Dr. Talbott recalled "the enthusiasm, dedication, and personal sacrifice of time and energy that so many folks gave to the cause, including many volunteers for the exponentially expanding needs of the new organization." Because of the commitment, dedication, and

grassroots efforts of many, the future of audiology changed.

Audiologists created a professional home and built an infrastructure to support advocacy, education, leadership, public awareness, and research of, by, and for audiologists.

In the 30 years that have passed, the profession of audiology has strengthened and continues to develop. The AuD degree became a reality. Partner organizations focused on accreditation, certification, and student development. Advocacy efforts and visibility in Washington continue to increase. The American Academy of Audiology is now nearly 12,000 members strong, and has scraped and clawed its way into the position of a respected representative for the issues of audiologists. Yet audiology again finds itself at a crossroads, and conversations frequently turn to the future of the profession in the face of disruption of hearing technology, continued challenges with low reimbursement, and ongoing questions surrounding the quality of audiology education.

As Lucille Beck observed, "audiology has not completely transformed into a mature profession and remains vulnerable to many threats." Concerns about these challenges emerge from audiologists on social media, in community posts, in editorials, and in casual conversations with colleagues in the expo hall. Frequently, those concerns couple with the question of what is AAA doing about the challenges facing audiology?

When reflecting on the seminar where the call to develop AAA came 30 years ago, James Hall recalled "…a tingling combination of nervousness, anticipation, and wordless audiology comradery. Just before the session officially began, I remember standing… near the podium in the very large ballroom. Turning around, I witnessed a seemingly endless line of audiologists streaming through the open doors. There was an unmistakable buzz and

energy in the room that reflected my excitement. By the opening remarks, the crowd was crammed into every corner of the room and standing along every inch of wall space."

Despite the ongoing work of Academy staff and volunteers, sometimes it may appear that efforts are at a standstill. The reason, perhaps, is the very existence of the Academy. Thirty years ago, there wasn't an organization that solely represented the interests of audiologists and the early founders realized the necessity of personally pounding the pavement to make it happen. They flocked to that early session and demonstrated their support, not only philosophically, but by committing to do their part to bring a vision to fruition.

Today, many Academy members may lack appreciation of the continued importance of their role in advancing the profession. The annual membership meeting each year is held in a relatively empty, echoing meeting room, typically with a few dozen former board members and committee chairs scattered throughout. The turnout to influence Academy leadership is a far cry from the endless stream of audiologists that packed the meeting room and drove the development of AAA. Dues are paid and members expect that their monetary contributions are enough for the organization to take up arms and defeat any challenges that come along.

But this expectation assumes that the organization is less than what it is. What the Academy founders built was not a building, or a staff, or even the leadership. The true strength and composition of the Academy is the membership. An "academy," by definition, is "a society of learned persons organized to advance art, science, or literature." A society, in turn, is "an organized group working together… because of common interests, beliefs, or profession." It follows then, that by definition, the American Academy of Audiology *IS* the membership. The tagline in current Academy publications is very literally correct: YOU are audiology. WE are audiology.

AAA comprises a 34-person staff and more than 200 volunteers who work together to move the profession in a continued forward trajectory. While the efforts of these individuals are valuable beyond measure, it is important to realize that these volunteers make up just 1.95 percent of the membership. Imagine the impact if all of the membership worked together toward the same common purpose. Vince Lombardi observed, "individual commitment to a group effort—that is what makes a team work, a company work, a society work, a civilization work." And individual commitment to action is what will make the American Academy of Audiology and the profession of audiology work.

While the passion for issues facing audiology today has presumably not diminished, the enthusiasm has not coalesced into the productive energy that catapulted AAA into being.

The Academy leadership and staff work diligently to create materials, cultivate relationships, and encourage volunteerism. In the absence of everyone contributing the same level of enthusiasm, dedication, and personal sacrifice of time and energy so many gave to create this Academy, efforts to increase public awareness and sustain the profession of audiology will fall short.

Considering the challenges that audiologists face, perhaps 30 years is long enough, and audiology is again in

need of a venue, a forum, a call to action, to evaluate our current status, to imagine the future, and to cultivate change. Our opportunity is now…this year is a call to action and a request for a commitment from the membership to stand with AAA, not only philosophically, not only by paying membership dues, but by dedicating time, talent, and yes, monetary resources, to a collective cause.

The Academy's current strategic priorities are to deliver purposeful education; provide member value and engagement; advocate for the audiologist; and promote recognition of the Audiology Enterprise.

Over the past two years, Academy staff and leadership have introduced a new organizational structure including an Outreach Council comprising committees focused on public awareness, public relations, communications, and outreach to other health care providers and industry. A public relations consultant, Vicki Bendure, has been retained to identify opportunities for media involvement. Over the next few months, you will see AAA's influence in several key national resources. In all venues, the Academy is promoting the message "Get Your Hearing Checked" and encouraging all members to work in their local communities to do the same. The Academy has launched and will continue to develop numerous resources that can be utilized by members for this purpose. No effort by membership, however small, will be without impact if everyone is contributing.

ONLINE RESOURCES

- Members-Only Public Relations Tool Kit and Hotline
- Press Release Templates
- Customizable Fact Sheets on More than 23 Topics
- Audiologist's Guide to Hearing Aids, PSAPs, and OTC Devices
- Guide to Adult Hearing Health
- May Is Better Hearing Month
- hearScreen USA App—consumer-friendly hearing screening and referral app.
- *Voices of Hearing Wellness*: Stories of Patient Success

The Academy is here for you. The Public Awareness Committee, Public Relations Committee, and the Outreach Council are valuable resources staffed by your colleagues who can help facilitate your grassroots efforts. Contact us and let us know your challenges and accomplishments so we can help you navigate those efforts for the best results and share in your victories.

Audiology is in the press and we can do more. Don't miss the recaps we e-mail to you and publish on the Academy website. We want to hear about your efforts, so please share them with us.

The staff, the board, and even the many volunteers of the American Academy of Audiology cannot alone reach the millions of Americans who need to hear our message. We all must engage to make it happen. Thirty years ago, this Academy, this society, agreed to band together to work for the common benefit of audiologists. The founders created a structure upon which to formulate a mission. Our call to action today is the opportunity to fully bring the intention of the American Academy of Audiology to fruition. YOU are audiology. WE are audiology. As Helen Keller said, "alone we can do so little; together we can do so much."

Sarah Sydlowski, AuD, PhD, CISC, is the audiology director of the Hearing Implant Program at the Cleveland Clinic in Cleveland, Ohio. She is also a member of the 2018 Academy Board of Directors and the immediate past president of the Ohio Academy of Audiology.

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Central Auditory Processing Testing and Concussion Management

By Renée Lefrançois

When hearing is evaluated, the peripheral system often gets the most attention. An area not often considered is the central auditory nervous system (CANS). CANS processing abilities allow individuals to hear better in noise, generate an acoustic reflex, detect minute changes in volume and tone, localize sound, etc. Recent research has established that for individuals experiencing concussion, some of these advanced hearing abilities become compromised. Resultantly, select central auditory tests have the ability to substantiate the presence of a concussion.

New advancements in portable, automated audiometers are getting close to offering this capability in an easy-to-use screening format. This has the potential to empower neurology, and other specialized clinics to add abridged central auditory processing tests to their concussion test battery.

In advocating for the ability to enable more hearing testing by more health-care professionals, we can enable better identification of cognitive issues as well as higher quality referrals to specialists. It is well-known that patients and health-care professionals alike experience frustration with the lack of tests to confirm concussion, as well as its severity. Adding central auditory processing into the mix expands the number of clinical tools available to this important subset of patients. Learn more about tablet audiometers at SHOEBOX Audiometry (www.shoebox.md).

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Renée Lefrançois, MSc(A) Reg. CASLPO, is the director of audiology with SHOEBOX Audiometry, Ottawa, ON Canada.

The Unexpected Hearing Loss in a Dizzy Kid

By Patricia Gaffney

WELCOME BACK to an ongoing series that challenges the audiologist to identify a diagnosis for a case study based on a listing and explanation of the nonaudiology and audiology test battery. It is important to recognize that a hearing loss or a vestibular issue may be a manifestation of a systemic illness. Being part of the diagnostic and treatment "team" is a crucial role of the audiologist. Securing the definitive diagnosis is rewarding for the audiologist and enhances patient hearing and balance health care and, often, quality of life.

History

Five-year-old female (DK) was referred for vestibular testing and an audiogram by the pediatric ENT to investigate vestibular neuritis as a cause of dizziness. DK's mother relayed the history information—she thinks the dizzy episodes were related to vaccinations.

The initial episode happened at two years old, DK was seen by her pediatrician for her wellness check and she received a varicella vaccine. The episode began 11 days after her vaccine, the symptoms lasted five to 40 minutes over a period of seven days. She described the dizziness at the time as "the room is moving." Her mother also noted that DK was having a difficult time walking. She was taken to the emergency room and diagnosed with ataxia. Blood and urine testing, MRI, and EEG were all negative. After seven days the symptoms resolved. The second episode happened four months later, lasting five days, approximately 30 days after receiving a hepatitis B vaccine. DK's mother noted that the patient was very tired, and her eyes were moving back and forth. DK was taken to the ER for this episode as well, and all testing was negative. The most recent episode was four months before testing. DK's mother noted that she had been sick for about a week before the episode.

In addition to the symptoms stated earlier, DK also has an infrequent history of a beeping tone in her ears and fullness, and denied a history of hearing loss and visual impairment. There is a family history of dizziness (paternal grandmother) and migraines (mother and aunt). DK's mother partly filled out the Dizziness Handicap Inventory-Patient Caregiver (DHI-PC), but she did not want it to be part of the medical report since the symptoms were not consistent. The patient is currently in school and participates in horseback riding, swimming, ice skating, and tennis. When asked, DK's mother stated that her coaches

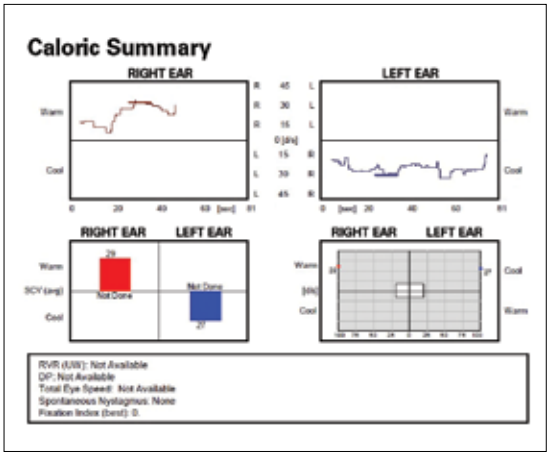


FIGURE 1. For right warm, we obtained 29 deg/sec and left cool 27 deg/sec. We cannot calculate a true unilateral weakness, but we can say that each ear on its own is working normally.

FIGURE 2. To correlate these results, we did sinusoidal harmonic acceleration (SHA) testing on rotary chair at 0.04Hz, which was normal.

noted she has good balance. When asked, DK reported that she enjoys school and her activities.

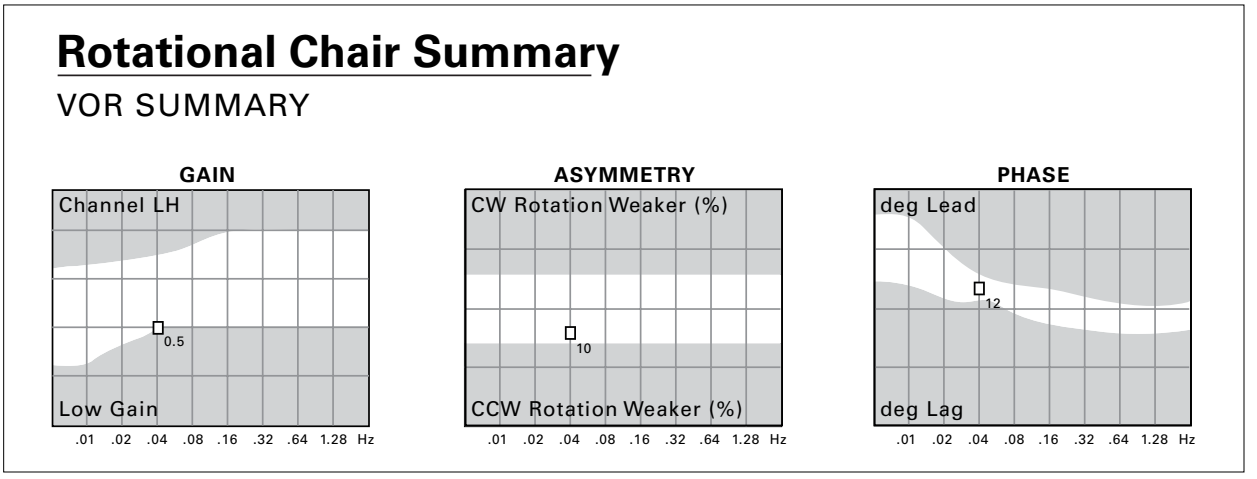
Initial Differential Diagnosis

When we examine the symptoms related to the history we note vertigo, nystagmus, ataxia, and fatigue with the episodes. Other significant history is occasional tinnitus, fullness, family history of migraines, great balance (noted by the mother), intermixed history of vaccinations, and all previous testing was normal.

If we pick a few initial theories, the first would be the ENT thought of vestibular neuritis. The timing for the vaccinations and vertigo attacks vary, so the causal relationship is a little strained. Vestibular neuritis can have several causes, but has been related to viral infections. If vestibular neuritis is the cause of the dizziness, the results will present typically as a unilateral peripheral vestibular pattern. Since vestibular neuritis can attack the superior vestibular nerve, inferior vestibular nerve or both, it is important to assess both branches when testing. Labyrinthitis is another vestibular pathology related to viral infections, but labyrinthitis has a sudden unilateral onset of sensorineural hearing loss with the dizziness. There were no complaints of sudden onset of hearing loss.

Migraine would be another suspected pathology in this case given a strong family history of migraine. When queried further, DK's mother reports that her sister (DK's aunt) has very bad migraines. She also noted that two other physicians also suggested migraine as the culprit for DK's vertigo episodes.

Looking at all other potential pathologies, there are reasons to rule most of them out. For example, large vestibular aqueduct syndrome (LVAS) is right for the age, but no significant changes in hearing was noticed, and she seems to be a child with good balance, where many LVAS children



tend to be clumsy. If it were LVAS we would see unilateral or bilateral vestibular and hearing loss on testing. Because of her age other pathologies like Meniere's can be put further down the list because it is very rare in childhood.

Vestibular Testing

Otoscopy was normal bilaterally. Postural screening showed normal postural with Romberg with eyes open and closed on a firm surface, and Romberg eyes open on foam. DK had sway and fall on Romberg eyes closed on foam. Saccades, pursuit, optokinetics, headshake, vertebral artery screening, Hallpike and positionals were all normal.

For calorics, our clinical protocol is warm monothermal water unless abnormal then add cool. We started with right warm, which yielded a great response, but made her cry because she felt it was too hot. (This was a lesson for myself and my AuD students, although I've had children tested with warm before and tolerate it, maybe starting with cool would be better). After she was calm, she was brave enough to try again on the other ear with cooler water. This clearly is not the ideal, as it is best to compare the same temperature for each ear, but like testing children in a booth: try to get whatever you can.

For right warm we obtained 29 deg/sec and left cool 27 deg/sec, we cannot calculate a true unilateral weakness, but we can say that each ear on its own is working normally (see FIGURE 1). To correlate these results, we did sinusoidal harmonic acceleration (SHA) testing on rotary chair at 0.04Hz, which was normal (see FIGURE 2).

Cervical vestibular-evoked myogenic potentials (cVEMP) were completed, which showed normal latencies and amplitudes, and an amplitude asymmetry ratio of 4 percent left ear larger, which falls within the normal limits (see FIGURE 3).

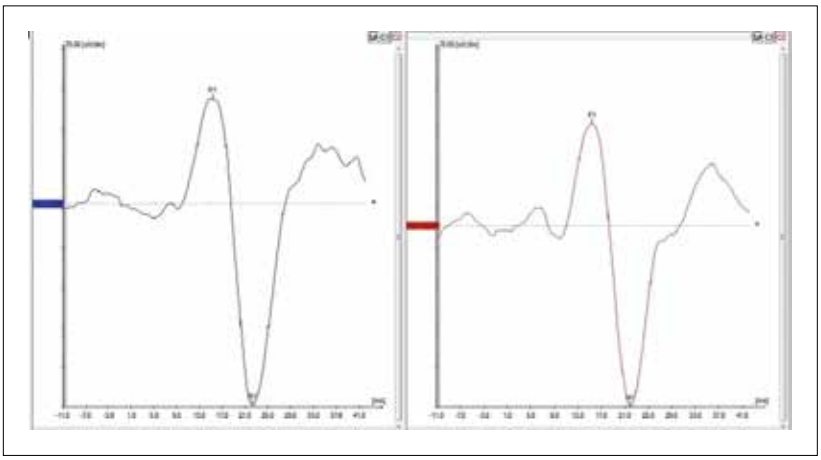


FIGURE 3. Cervical vestibular-evoked myogenic potentials (cVEMP) were completed, which showed normal latencies and amplitudes, and an amplitude asymmetry ratio of 4 percent left ear larger, which falls within the normal limits.

Audiometric Testing

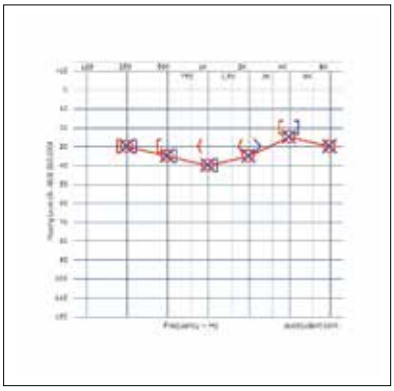
Pure-tone testing revealed an essentially mild flat/cookie bite sensorineural hearing loss (see FIGURE 4). Tympanometry and acoustic reflexes were normal. Otoacoustic emission (OAE) screening was completed, which showed robust emissions in the higher frequencies (3-6kHz) (see FIGURE 5).

Differential Diagnosis

Going back to our initial list of diagnoses, it does not appear that neuritis or labyrinthitis is the cause. There is no vestibular loss on either side and although surprisingly there was hearing loss, it is not unilateral. Given the completely normal vestibular testing in combination with the history, it appears that migraine is our most likely diagnosis.

The hearing loss was a complete surprise given no history of hearing complaints. Her speech and language are completely appropriate if not advanced for her age. When DK's mother was questioned further about the hearing loss, she reported that DK failed newborn OAE hearing

FIGURE 4. Pure-tone testing revealed an essentially mild flat/cookie bite sensorineural hearing loss.



screening in the hospital and was retested again the following day and failed; this was attributed to DK being born by cesarean section.

DK had a follow-up auditory brain stem response (ABR) testing with normal results at the local children's hospital, passed OAE, passed school language tests, and failed the hearing screening at school. OAEs performed by a pediatrician in an office setting were normal. DK's mother was told that since OAEs were normal in the office that it was a more reliable test than the school screening since OAEs are an objective test. Therefore, DK's mother believed her daughter's hearing was normal.

Counseling

Regarding the vestibular complaints, counseling focused around migraine including an official diagnosis by a neurologist, symptoms, and potential progression. According to the International Headache Society's *The International Classification of Headache Disorders*, 3rd edition (ICHD-III) classification (2018), benign paroxysmal vertigo (BPV-C) is a migraine variant that affects children, which must meet these diagnostic criteria of five episodes of vertigo plus at least one of the following: nystagmus, ataxia, vomiting, pallor, or fearfulness with normal neurological, audiological and vestibular results between episodes.

As of now, it appears she has three significant episodes that meet these criteria, and there may have been others that did not rise to the same level of concern as the three major episodes. Also, the symptoms appear to have started in a typical age range for BPV-C (Spiri et al, 2014). Long term, it is possible that she will be an adult migraineur (Krams et al, 2010). It was recommended that she follow up with a neurologist to pursue diagnosis and treatment.

Counseling on the hearing loss was more in depth as this was a more unexpected finding with a confusing history. The fact that there were contradictory findings in the mother's eyes made things more difficult. In this case, the hearing loss is most likely congenital given the configuration and not related to the dizziness. We explained why the OAEs would pass with a mild hearing loss; although the pediatrician was correct about present OAEs and it being an objective test, OAEs are not perfect and there is a range that OAEs can miss a mild hearing loss. We discussed the mild hearing loss in relation to academic success and talked to DK's mother about amplification options for school.

Since I'm not a "pediatric" audiologist, we had DK's mother and father return for more counseling, particularly focusing on the hearing loss with our resident pediatric expert. Although amplification was recommended with medical clearance by ENT, DK and family have not returned yet to pursue amplification. Also, DK's mother also had her hearing tested to see if she had the same hearing loss, her hearing was normal. Finally, they were going to make an appointment with a neurologist to evaluate DK for migraines.

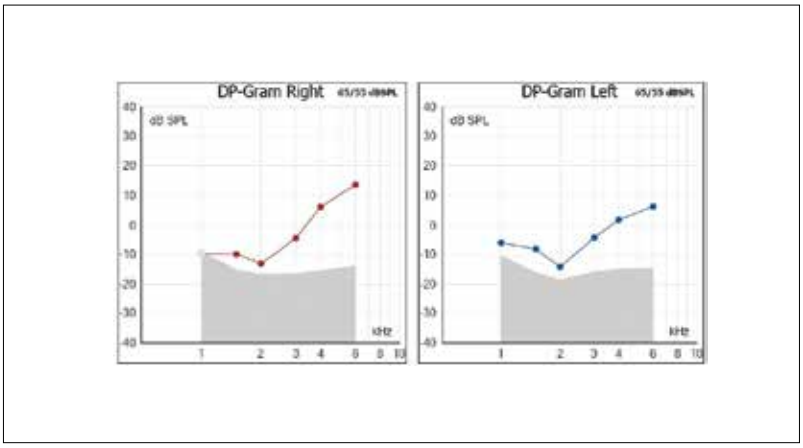


FIGURE 5. Otoacoustic emission (OAE) screening was completed, which showed robust emissions in the higher frequencies (3-6kHz).

Final Thoughts

Pediatric vestibular testing is becoming more prevalent and requires modifications to test this population compared to normal adults. This can be a challenge because attention spans are shorter, tracings can be messier, and normative data is not as prevalent as adult data (although it is growing).

Being a vestibular audiologist, the vestibular diagnosis and recommendations comes easier. But diagnosing a child with hearing loss is not as common for me, and I had to draw on information that I do not use regularly. For me, it was a reminder that although I'm a vestibular audiologist who sees pediatric dizziness on occasion, I need to remember that with pediatrics to expect the unexpected.

Patricia Gaffney, AuD, is an associate professor of audiology at Nova Southeastern University, Fort Lauderdale, Florida.

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Medicare Revalidation Reviewed

By Goldie Pappan and Alyssa Needleman

You may have received a notification to revalidate your Medicare enrollment, or heard others discussing Medicare revalidation, and were unsure what this process was, or if you were required to do anything. The Academy has put together some quick answers to your questions and links to resources to help you through the revalidation process.

What Is Medicare Revalidation?

Medicare revalidation is a required process completed at certain intervals to ensure provider enrollment records remain current. As part of the Affordable Care Act, audiologists are required to revalidate their Medicare enrollment every five years, or as requested by the Centers for Medicare and Medicaid Services (CMS). This process allows providers to verify the information contained in his or her Medicare enrollment record to ensure it is still accurate and compliant with Medicare regulations.

Basically, revalidation is re-enrollment.

How Do I Know When to Revalidate?

CMS advises providers to submit the needed documentation six months before the due date. This allows for processing time and prevents interruption in Medicare reimbursement. If you are enrolled as a provider under the Medicare program, you can check the Medicare Revalidation Lookup Tool (https://data.cms.gov/revalidation) to find your revalidation due date. Providers should receive notice from their Medicare Administrative Contractor (MAC) when he or she needs to revalidate.

Off-cycle revalidation may be requested by CMS when a complaint is filed, concerns about local health-care fraud arise, or if a provider's compliance with CMS regulations is in question.

What Is a Medicare Administrative Contractor and What Is the Process to Revalidate?

Your MAC is a private health-care insurer that has been awarded a specific geographic jurisdiction to

process Medicare Part A and Part B claims for Fee-For-Service (FFS) procedures and Durable Medical Equipment (DME) beneficiaries. Your local MAC will provide links to help walk you through the process.

The easiest way to revalidate is to go to the Internet-based Provider Enrollment, Chain, and Ownership System (PECOS) website at https://PECOS.cms.hhs.gov. You also can submit your revalidation on paper to your MAC, using the CMS-855 form. Revalidation can occur on an individual or organizational basis. CMS has prepared a revalidation checklist to support providers in this process. This checklist details what individual providers and organizations must submit in order to complete the revalidation process.

Providers working in a hospital setting, under a managed-care organization or multiclinic practice, should ask their administrator if they should file for revalidation on an individual or organizational basis.

Can I Revalidate Early, Before My Due Date?

No. If you have not received a notification from your MAC but suspect you need to revalidate, or if you see a TBD (to be determined) when you check your status on the Lookup Tool, it is considered an unsolicited application, and will be returned to you by your MAC.

What Happens If I Don't Revalidate?

Failure to complete the revalidation process will result in deactivation of your Medicare enrollment, and you will lose the ability to bill Medicare for services rendered. If your Medicare enrollment is deactivated, you will be required to resubmit a full application in order to reestablish your Medicare billing privileges.

Helpful Websites

The Academy also encourages audiologists to review Medicare Enrollment guidance document (see website below) developed by CMS for additional information. This document reviews initial Medicare enrollment, including how to obtain a National Provider Identifier (NPI) number and use the PECOS website, as well as the process for Medicare revalidation.

- Check your revalidation status: https://data.cms.gov/revalidation
- Revalidate/update your Medicare information: https://PECOS.cms.hhs.gov
- Download the CMS-855 application form: www.cms.gov/Medicare/CMS-Forms/CMS-Forms/Downloads/cms855i.pdf
- Review the Revalidation Checklist: www.cms.gov/Medicare/Provider-Enrollment-and-Certification/MedicareProviderSupEnroll/Downloads/RevalidationChecklist.pdf
- Get Medicare enrollment guidance: www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/downloads/MedEnroll_PhysOther_FactSheet_ICN903768.pdf

Goldie Pappan is a clinical intern at the Kansas City VA Medical Center in Kansas City, Missouri, and 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.

Highlights from AAA 2018 in Nashville

The Foundation was proud to be part of the AAA Annual Conference as the Academy celebrated its 30th anniversary in Nashville. There were many memorable moments in Music City; three AAA 2018 highlights in particular include the Foundation's annual Auction 4 Audiology, the Marion Downs Lecture in Pediatric Audiology, and the launch of the exciting new public awareness project, the publication of patient stories in a memorable book, *Voices of Hearing Wellness*.

Auction 4 Audiology

The Foundation's annual Auction 4 Audiology was a huge success! We are truly grateful to all auction donors and auction bidders who helped us raise over $14,000 to help advance our mission to promote philanthropy in support of research, education, and public awareness in audiology and hearing science. Among some of the hot items were a guitar signed by Rascal Flatts, vacation travel getaways, and unique custom jewelry. Congratulations to all auction winners! We hope you enjoy your purchases, which benefit a good cause.

Marion Downs Lecture in Pediatric Audiology

The AAAF's Marion Downs Lecture Series is presented annually at the AAA Annual Conference. The speaker is chosen in recognition of research and clinical work in the area of pediatric audiology. This lecture series was created in honor of Marion Downs, known as the Mother of Audiology. Downs not only pioneered the first national infant hearing screening program in 1963 in Denver, Colorado, but also provided the clinical practice and research basis for which all pediatric audiologists rely on today. She worked tirelessly throughout her career to make the identification and management of hearing loss in infants and children an important medical and educational consideration and public health issue. Her efforts eventually resulted in the hearing screening of newborns in all 50 states in the United States and many other countries.

The 2018 Marion Downs Lecture in Pediatric Audiology was presented by Dana Suskind, MD, professor of surgery at the University of Chicago, director of the Pediatric Cochlear Implant Program at University of Chicago Medical Comer Children's Hospital, and founder and director of Thirty Million Words© (TMW). Dr. Suskind discussed TMW, which aims to empower parents and caregivers with the knowledge and skills to develop their children's intellectual and educational potential. Deployed through a web-based platform, TMW's evidence-based interventions translate emerging brain science into strategies parents and caregivers can use in everyday settings. Dr. Suskind presented preliminary findings from the interventions across different SES levels and the feedback cycles and behavioral nudges used to support adult behavior change.

For a limited time, the 2018 Marion Downs lecture is available for free on-demand on www.eAudiology.org.

Voices of Hearing Wellness

"I can understand the voices of my grandchildren!"

"I attended the theater and for the first time in years I knew why everyone was laughing."

"I feel like I can finally manage my tinnitus."

We have all been moved by patients recognizing the improvement in their quality of life based on interventions provided through audiologic care. These stories are compelling…they touch us…they stay with us months or even years after the encounter. They not only remind us why we entered the profession, but they provide a natural bridge to share audiology and the benefits of care to the general public.

The American Academy of Audiology Foundation is excited to announce a new public awareness initiative with the publication of *Voices of Hearing Wellness*. This collection of stories from the American Academy of Audiology Foundation shares the narratives of adults and children living with hearing loss and how YOU, as an audiologist, have made an impact. Hearing loss doesn't discriminate. It isn't visible. Millions of Americans are living with hearing loss and tinnitus, and

this impacts not only the individual, but also the friends and families of those experiencing the loss. Hearing loss can feel very isolating.

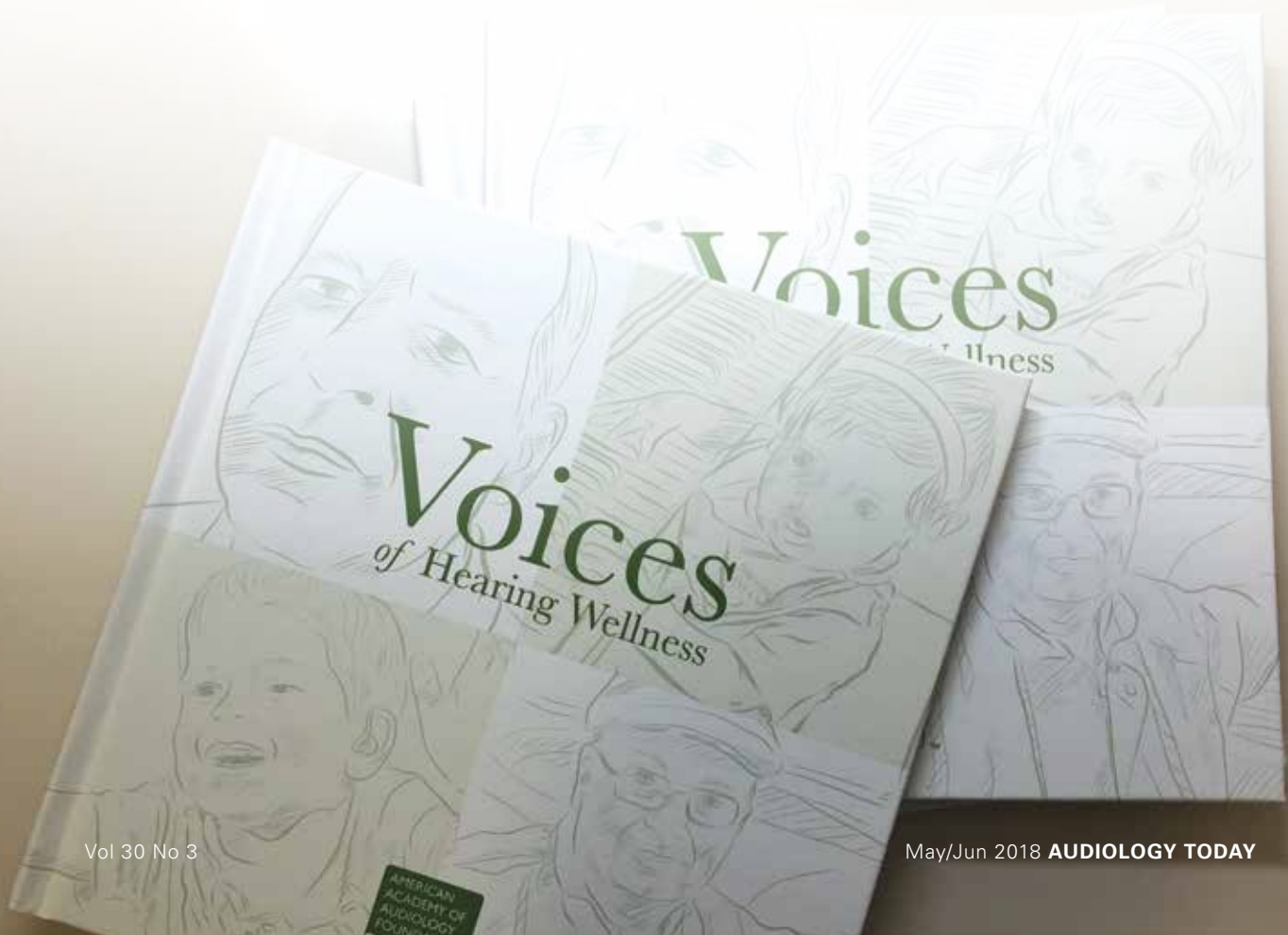
The stories in this collection range from people living with adult onset hearing loss, adults diagnosed with hearing loss as children who may have at one time been reluctant to pursue assistance and young children identified with pediatric hearing loss. All of these stories and individuals are unique; however, they contain one common theme: hearing is vital to communication and taking steps to address hearing loss directly is empowering.

This book was created in part to promote public awareness of audiology and launched at the annual conference in Nashville. The stories were submitted by Academy members. The Foundation extends a warm thank you to those who shared stories. This piece makes ideal waiting-room reading material and may also serve as a tool to share with media sources about the impact of audiological care.

For those who were unable to attend the American Academy of Audiology's annual conference this year, copies of the book may be requested from Foundation Manager Rissa Duque-Yangson at ryangson@audiology.org or 703-226-1049. Proceeds will support the Foundation's mission.

The Foundation encourages you to share your ideas to continue to promote public awareness, by contacting Duque-Yangson at the listed e-mail or phone number.

We hope you are inspired by these stories of individuals sharing their experiences with hearing loss and the successes that occur from treating hearing loss. The work we do makes an impact, and the Foundation is pleased to share this impact with the public.



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Presented by Tacy M. Byham, PhD

Dr. Tacy M. Byham is chief executive officer at Development Dimensions International (DDI). Lead Like a Girl will empower all leaders to declare their true worth and ignite impact in the workplace, from the start of their careers all the way to the C-Suite.

She is the co-author of the acclaimed book, *Your First Leadership Job: How Catalyst Leaders Bring Out the Best in Others*, and will be on hand for a book signing during AAA 2018.

Marion Downs Lecture in Pediatric Audiology

THIRTY MILLION WORDS: A PUBLIC HEALTH APPROACH TO EARLY CHILDHOOD EDUCATION

Presented by Dana L. Suskind, MD

Dr. Dana L. Suskind is a professor of surgery and pediatrics at the University of Chicago. In her presentation, she will discuss the Thirty Million Words Initiative, which develops and disseminates evidence-based, parent-directed programs that encourage parents to harness the power of their words to build their children's brains and shape their future.

PHILANTHROPIC SUPPORT PROVIDED IN PART BY THE OTICON FOUNDATION.

Get On Our Level!

By Jennifer Whittaker and Liz Marler

As members of the Student Academy of Audiology (SAA) Board, we often hear that one of the greatest challenges local SAA chapters and our student members face is incorporating advocacy into their daily and chapter activities. When students think about advocacy, it tends to be on a large scale. We envision pictures of students standing in front of the Capitol in Washington, DC. with their folders, clipboards, and leave-behinds. We think about our classmates and friends who participated in National Day at Your State Capital Day (NDAYSCD) and traveled to the state capital to speak to representatives. Yes, this is the epitome of the advocacy dream; however, advocacy occurs on many different levels and in a variety of capacities.

Macroadvocacy works to understand issues and develop solutions that persist in larger networks within the state or across the nation. Professional organizations advocate on behalf of audiologists; however, that is not where macroadvocacy stops. SAA chapters initiate advocacy for legislative efforts at the state (such as NDAYSCD) and national levels.

Mesoadvocacy focuses on local communities, schools, and organizations through education and public awareness. From a student perspective, this level of advocacy is extremely accessible. Local SAA chapters can organize initiatives, such as school-based educational campaigns, or participate in national initiatives, for example the "Ask Me About Audiology" campaign. Mesoadvocacy allows for an individual or group to make a large difference without the pressure of large-scale advocacy.

Microadvocacy impacts individual change, working with patients and families to support them through their hearing loss journey. This is as simple as encouraging and equipping patients to advocate on behalf of their hearing loss in a setting like a restaurant or movie theater, or

in a personal conversation. Being a microadvocate may also include someone seeing you wear earplugs at a concert or sharing a cool ear fact at the family dinner table. Microadvocacy happens every day, and it only takes one person—you! How are you contributing to microadvocacy efforts in your daily environment?

Don't Wait for Advocacy to Come to You, Get On a Level!

As you can see, advocacy is much more accessible than originally thought! With planning, resources and confidence, you can advocate on a daily basis. The SAA Public Outreach Committee has gathered resources to make advocacy easily attainable to students. Following are steps to plan your advocacy effort. Also, for more information, visit the SAA website, saa.audiology.org.

1. **Define your target audience.** Will it be a friend, a local school, or your senator?
2. **Plan your message.** What is the most appropriate and relevant message for the target audience? A pressing bill in the state may define your target topic. If you are presenting to a group of elementary students, promoting good auditory health habits may be appropriate.
3. **Consider your delivery.** What makes the most sense for your target audience? Can you plan a face-to-face visit? Is a phone call or e-mail more realistic? Is a Facebook post the most effective way? Whatever makes sense and makes you feel comfortable, do it!
4. **Execute with confidence!** You are the expert in audiology here. Don't be afraid to share your knowledge with your target audience.
5. **Provide additional information.** Bring a leave-behind handout about audiologists, follow up with an e-mail full of additional websites/links or hand out ear coloring sheets. Pro tip: Check the advocacy pages on the SAA or Academy website for printable resources and leave-behinds.
6. **Follow up!** Unfortunately, contacting someone one time doesn't tend to ignite much change. Be sure to contact whomever you talked with and ask if he or she has questions or needs more information. This can happen a day, week, or month after your initial contact. It can happen every week! Consistency and perseverance pay off in the work of advocacy.
7. **Share what you've done!** Students get empowered and inspired when they see their cohort and fellow classmates doing advocacy work. Share your efforts with the national SAA or post on social media.
8. **Plan another advocacy effort.** Now that your foot is in the advocacy door, grab the handle and open it up! Try another target audience, involve your classmates, and challenge yourself. Don't stop advocating!

Student Voices Matter!

Wherever you are in your academic career, advocacy can be incorporated into any level of your life. Are you an undergraduate preparing to leave for graduate school? Be a microadvocate and engage your friends and family in conversations about what you plan to study and why it's so important. Are you a new officer on your SAA Board? Take your advocacy efforts to the mesolevel by organizing an outreach event on campus or in your local community. Eager to change the system but not sure how to get started? Join us by applying to volunteer with national SAA or check the resources on our website, saa.audiology.org. Get on the macrolevel by collaborating with students across the country to improve audiology.

As a student, you are in a unique role in the advocacy world. The efforts achieved now will impact YOU as a professional. Don't wait for advocacy to come to you. This is your profession. Own it and get involved. Start on the microlevel and advance to a macroactivity, or live in one level for your entire career. Whatever you do, engage your community, empower your patients and fellow students, and lead your profession!

Engage your communities. Empower your patients. Lead your profession.

Jennifer Whittaker is the SAA president. She is a fourth-year student at Washington University and an extern at Nemours AI duPont Hospital for Children. Her audiology interests include pediatric audiology and central auditory processing disorders.

Liz Marler is the SAA president-elect. She is a third-year audiology student at Purdue University. Her audiology interests include electrophysiology, vestibular, and cochlear implants.

New Members of the Student Academy of Audiology

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Olivia Batten
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UPCOMING LIVE WEB SEMINARS

MAY 8, 2018, 12:00 PM ET

Hyperacusis: Underlying Pathologies and the Current State of Our Knowledge

PRESENTER:
Ali A. Danesh, PhD

0.1 CEUs

JUNE 6, 2018, 12:00 PM ET

Assessment of the Pediatric Vestibular System: Making the Most of Your Little One's Time

PRESENTER:
Violette Lavender, AuD

0.1 CEUs

Why Choose ABA Board Certification?

Recent AuD Graduates Discuss Reasons Why They Chose ABA Board Certification

Joshua Huppert, AuD

Assistant Professor and Pediatric Audiologist

University of Miami Ear Institute, Miami, Florida

Unlike state licensure, the only necessary and sufficient credential needed to practice audiology in the United States, certification is voluntary. That is, should a practicing professional choose to pursue certification, he or she is going above and beyond those requirements determined by a state or federal agency that grants an individual a legal right to practice within his or her respective state(s).

When I was looking into certification, I knew I was limited to two possible options—the Certificate of Clinical Competency in Audiology (CCC-A) through the American Speech-Language and Hearing Association (ASHA) or Board Certification in Audiology through the ABA.

As a steward to the profession of audiology, I wanted to ensure that the organization through which I sought certification would adequately represent and embody the ideals and ambitions I had to elevate, and enhance the profession moving forward. Quite simply, I was unsure how ASHA could fulfill these aims when only 10 percent of its membership are audiologists. The ABA, however, being an organization whose representation is of, by, and for audiologists, does more closely align with my aims, and so, for me, the choice was a no-brainer.

Furthermore, the ABA's Board Certification in Audiology designation requires a more rigorous continuing education structure that demonstrates an individual's dedication to advancing his or her skills and knowledge as a practicing professional across notably more diverse topic areas (including professional ethics). I believe that structure exalts my credibility and sets me uniquely apart from my fellow colleagues and other professionals.

I'm proud to be board certified because I believe it is a step in the right direction to help raise the bar on standards of excellence across the profession, which will only ensure a brighter, more prosperous future for our profession and the patients we serve daily.

Hannah McLeod, AuD

Clinical Audiologist

The American Institute of Balance, Largo, Florida

Around this time last year, I took the first leap into my career—graduation. Although we spend years looking forward to that day, it feels more like a formality, as I already mastered how to mask for bone conduction and word recognition, how to coax an anxious patient into spinning 100 degrees per second in a rotary chair, and recognize that carrots are part of the parsley family. My days of homework assignments and carefully logging patient contact hours were behind me, and I had a new adventure ahead of me—a world of licensure, certifications, and continuing education.

My initial exposure to ABA and board certification was through my attendance at AAA conferences during graduate school. As

a student, it was always a fun, yet hectic few days, with an overwhelming amount of information regarding my future choices affecting my career. At that time, I was not sure of the steps or qualifications for board certification, or how it could contribute to my career. Several of my colleagues are board certified, and it was their recommendation that I explore ABA further following graduation.

ABA's mission is to "create, administer, and promote rigorous credentialing programs that elevate professional practice and advance patient care." I chose to become board-certified to demonstrate my commitment to maintaining high standards of practice and continuing education to both my patients and colleagues. As part of a very interdisciplinary private practice, board certification is a recognizable standard that translates well with other health care providers. Board certification is also recognizable to patients and shows a commitment to exceeding minimum requirements for practicing as an audiologist.

So, to all my fellow young professionals, I encourage you to explore the American Board of Audiology's board certification, the benefits it can provide both you and your practice, and to discuss it with your colleagues. We are the future of our profession, and we owe it to our colleagues and our patients to be involved in our profession, continue our education, and hold ourselves to a high standard of practice.

How to Become Board Certified:

To earn the Board Certified in Audiology credential, first submit to the ABA staff a written application (www.boardofaudiology.org) that meets the requirements in each of four eligibility categories. Then, agree to uphold the ABA ethical standards and pay all appropriate fees.

- **Category 1:** Education
- **Category 2:** Licensure
- **Category 3:** Professional Experience
- **Category 4:** Employment History

The Importance of the Accreditation Site Visit to the Accreditation Agency and the Program

By Catherine V. Palmer

ACAE prides itself on having the most sophisticated, interactive, and up-to-date electronic system for accreditation not only for audiology, but the electronic platform rivals any other discipline for seamless data entry, retrieval, interaction between reviewers and programs, and ability to update with minimal effort.

So why hasn't all this wonderful technology done away with the (historically dreaded) site visit? The site visit remains critical to the accreditation agency and the program, and if done correctly, does not need to be dreaded by either party.

The purpose of accreditation is to protect the patients we serve. Accreditation accomplishes this by setting standards that, if met, produce graduates who are ready to practice the full scope of hearing and balance care. The practice standards are driven by practice reviews completed by professional organizations at reasonable time intervals that inform the accreditation agency as to how practice in the profession is evolving. The purpose of the site visit is to verify that everything the program has described that supports its ability to educate students, and to assess that students have achieved competency is in place.

Accreditation acknowledges that a program has met a minimum set of criteria related to the accreditation standards. ACAE has a rigorous "minimum" criteria requiring programs to demonstrate didactic and clinical education across the entire scope of practice, with specific mechanisms in place to assess outcomes indicating that students have mastered the skills and knowledge set out in the standards.

ACAE has a unique interactive component to the accreditation process that starts during the electronic data entry portion of the review. This allows the site visitors to read through all of the materials the program has submitted in support of the program's compliance with the standards, and ask questions related to these materials before the site visit. This is a unique feature of ACAE and allows the eventual on-site visit to be efficient. The site visitors arrive with a specific list of items that must be verified or further explored to assess compliance with various standards.

If the purpose of the site visit is to verify what has been submitted by the program in the accreditation report, what should we expect of the site visitors? The site visit team will have expertise in education and clinical practice in audiology. Site visitors go through rigorous training to make sure they stay focused on their overarching goal—to verify what has been reported in the accreditation document and to assess whether this constitutes compliance with each standard.

The site visit involves tours of space, equipment access, discussions with faculty, students, preceptors, and other stakeholders of the program. Site visitors leave behind their biases and favorite things about their own programs or clinics. Although it is tempting to engage site visitors in discussions about common areas of interest/expertise because we are a small field and tend to know each other, you'll find that site visitors are focused on the program, not any one individual. The site visit ends with a preliminary report to the program indicating compliance, strengths, and, if applicable, areas that need attention. The site visitors are the eyes and ears of accreditation and their job is to report their findings to the full accrediting body. The full accrediting board then votes on the status of the program.

From its inception, ACAE has approached accreditation as a collaborative process between the accreditation agency (site visitors) and the academic program. This is a unique approach to accreditation and puts everyone on the same team—the team that is dedicated to improving audiology education by reviewing and supporting programs in their efforts to produce graduates who can independently practice across the entire scope of practice.

The site visit should not feel threatening, as if people are coming to try to catch you doing something wrong. Instead, the site visit should feel like a time when a program can show what they do and self-reflect on what is going well and what could be improved relative to the demands and opportunities in our field for which students will need to be prepared. Most programs feel good about what they do and put a tremendous amount of energy into continually improving their programs. But without the requirement of accreditation, including the site visit, we often do not stop and reflect about how our program maps onto current standards and how we measure that our students demonstrate knowledge and competencies. If done correctly, accreditation, including the site visit, is an ideal time to self-reflect and plan.

Catherine V. Palmer, PhD, is as associate professor and director of the AuD program at the University of Pittsburgh (Pennsylvania). Dr. Palmer serves as the director of audiology for the Integrated UPMC Health System.

The ACAE site visit team consisted of two audiologists, one from another AuD program and one clinical person who worked with AuD students. In addition to being thorough, it was very collegial, with the team providing feedback about all standards, whether in compliance, partial compliance (and steps suggested for full compliance) or program strengths. It truly felt like a partnership—with the team and the program faculty sharing the goal of excellence in AuD education.

Martha Mundy, AuD | *University of North Carolina School of Medicine*

AUDIOLOGY ADVOCATE

Academy PAC Goes Local in 2018

By Adam Finkel

The Academy's Political Action Committee (PAC) plays a key role in supporting federal advocacy initiatives.

In 2017, the Academy was able to make contributions to congressional champions such as Sen. Dean Heller (R-NV), Rep. Dave Loebsack (D-IA), Rep. David McKinley (R-WV), and Rep. Mike Thompson (D-CA), among others, at fundraising events in Washington, D.C.

The Academy also has made significant PAC contributions to the Democratic Congressional Campaign Committee (DCCC) and the National Republican Congressional Committee (NRCC), providing the Academy with access to political briefings and other events featuring key members of Congress. In turn, Academy government relations staff has been able to attend such events with audiologists visiting Washington. For example, members of the Academy's Board of Directors attended an NRCC briefing in the fall, and a group, including a student from the University of Texas at Dallas, attended a DCCC briefing this spring.

As members of Congress have ramped up their fundraising in advance of the 2018 congressional elections, the Academy has been able to capitalize on pre-existing relationships to send audiologists to local fundraising events for members of Congress.

In January, the Academy made a contribution to Rep. John Garamendi (D-CA), a long-time champion for hearing health care and a previous co-sponsor of the Access to Frontline Health Care Act, an Academy legislative priority. This contribution allowed two local audiologists and board members from the California Academy of Audiology to attend a fundraising reception with Rep. Garamendi in Vacaville, California.

Several weeks later, the Academy's PAC Chair, Emily Nairn, AuD, attended an event

in Ann Arbor, Michigan, for Rep. Tim Walberg (R-MI) that featured Michigan Gov. Rick Snyder (R). Rep. Walberg was integral when the Academy worked to rescind the U.S. Department of Labor's hearing aid dispenser apprenticeship program. He also sits on the prestigious Energy and Commerce Committee, which has House jurisdiction over health-care issues.

After the event, Dr. Nairn noted, "I was fortunate to have had the opportunity to attend a small fund-raising reception for Rep. Walberg featuring Gov. Snyder. I was able to thank him for his previous support, and also to discuss with both he and Gov. Snyder other important issues and legislation facing the profession, including OTC hearing aids, tax reform and tuition waivers, and early hearing detection and intervention programs. These types of events are crucial in terms of keeping our profession in the forefront of our legislators' minds and educating them on what we do and why we do it."

Local PAC events also support the Academy's advocacy initiatives by connecting audiologists who live and work in members of Congress' home districts with advocacy staff in the Washington, DC, area. One of the most valuable aspects of congressional advocacy is when Academy members are able to talk directly to lawmakers and congressional staff about how specific policies debated in Congress affect constituents, including patients and health-care providers. By sharing these experiences, audiologists are able to connect policy proposals to real-world impact on audiology and hearing health care.

When student groups or audiologists come to the Capitol to meet their elected officials, we often urge them to share why they chose to be an audiologist and to stress the impact that certain policies will have on them or their patients. These personal connections correlate to building stronger congressional relationships and translate to more meaningful conversations with members and their staffers.

It is for this reason that the Academy has placed a renewed focus on member engagement through the Grassroots Advocacy Network. The Network serves as a ready resource of volunteers to

assist the Government Relations Committee (GRC) and the Political Action Committee (PAC) Advisory Board to promote the organization's policy agenda on behalf of audiology. The Academy has been active in working to grow this network so that we can successfully lobby members of Congress at the local level when Congress is considering important legislation. To join the Network and to learn about engagement opportunities such as attending local PAC events, visit www.audiology.org/advocacy/grassroots-advocacy-network.

The Academy's PAC is supported entirely by contributions from Academy members. Please visit www.audiology.org/advocacy/political-action-committee-pac to make your annual contribution to the Academy's PAC. If you are interested in attending a local PAC event for your member of Congress on behalf of the Academy, or getting more involved in the Academy's Grassroots Advocacy Network, please contact me directly at afinkel@audiology.org for more information.

PLEASE NOTE: Corporate contributions (payment by company credit card or company check) and contributions from non-U.S. citizens without a Green Card are prohibited by law. Donations must be personal and voluntary. Contributions are not tax deductible for federal income tax purposes.

Adam Finkel is the associate director of government relations for the American Academy of Audiology.

Academy Launches New CEU Opportunity

Peer-to-Peer Mentoring

By Kelly King

The American Academy of Audiology is excited to launch a new initiative aimed at providing audiologists with a unique way to access continuing education through individualized, experiential learning. Members seeking specific training or experience can earn continuing education units (CEUs) from a peer with access or expertise willing to guide them through an educational experience. In many professions, peer-to-peer mentoring is an acceptable and encouraged practice. Not all skills are learned best in didactic lecture format; some are obtained through hands-on, personalized engagement. And yet, for postgraduate professionals in our field, opportunities of this kind are limited.

The Academy's Peer-to-Peer Mentoring Program (P2P) will allow audiologists to develop the educational experience that is most meaningful to them by calling on their peers to help them learn. Perhaps you're interested in purchasing a new piece of equipment but are hesitant without trying it out in a real-world setting. Or you're expanding into tinnitus management and want to learn more about integrating evaluations into your current patient flow from an experienced practice. Maybe you'd like to observe visual reinforcement audiometry at the local children's hospital to re-engage skills learned long ago or get hands-on practice in a clinic regularly doing VEMPs or vHIT. Each of these are examples of how the P2P program can be used; the opportunities for individualized learning are vast.

This CEU opportunity is for professionals at all stages in their careers. Interested members should submit an online application including a description of the planned mentoring event, and both the applicant and the mentor are required to sign-off on the experience. Want to participate but don't have a specific mentor in mind? The Academy is creating a registry of potential peer mentors willing to consider requests to host a peer-to-peer experience. In other words, applicants can preselect a peer mentor, or they can review the registry to identify potential continuing education experiences. Think your site has something to offer? Sign up for the registry today!

As lifelong learners in an ever-changing field, it is necessary to seek out opportunities to learn from those around us, and that should not be limited to lecture halls and meeting rooms. For many audiologists, the activities that P2P will support are taking place already in clinics and practices all across the country. By making them

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eligible for CEUs, the Academy legitimizes these valuable experiences and opens up educational opportunities to audiologists across the country, regardless of practice setting, location, or budget.

The Peer-to-Peer Mentoring Program will launch May 1, 2018! Go to www.audiology.org/continuing-education/peer-peer-mentoring to learn more or to sign up for the registry today.

Kelly King, AuD, PhD, works for the National Institute on Deafness and Other Communication Disorders (NIDCD) in Rockville, Maryland. She is also the chair of the Academy's Continuing Education Committee.

Erratum

In the March/April 2018 issue of *Audiology Today*, "Eyes and Ears," page 47, Table 1, Audiology column, 6th line, we would like to clarify the Baylor institution. This should have specified that this was The Baylor College of Medicine in Houston, Texas.

We apologize for this oversight.

New Members *of the* American Academy *of* Audiology

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Megan Blankenberger, AuD

Sze Wan Bok, AuD

Rachel Burns

Amanda Fadden, AuD

Rachel Haines, AuD

Cassandra Hall, AuD

Benjamin Hendricks, AuD

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For more information about the program, contact Samantha Leland at sleland@networkmediapartners.com.

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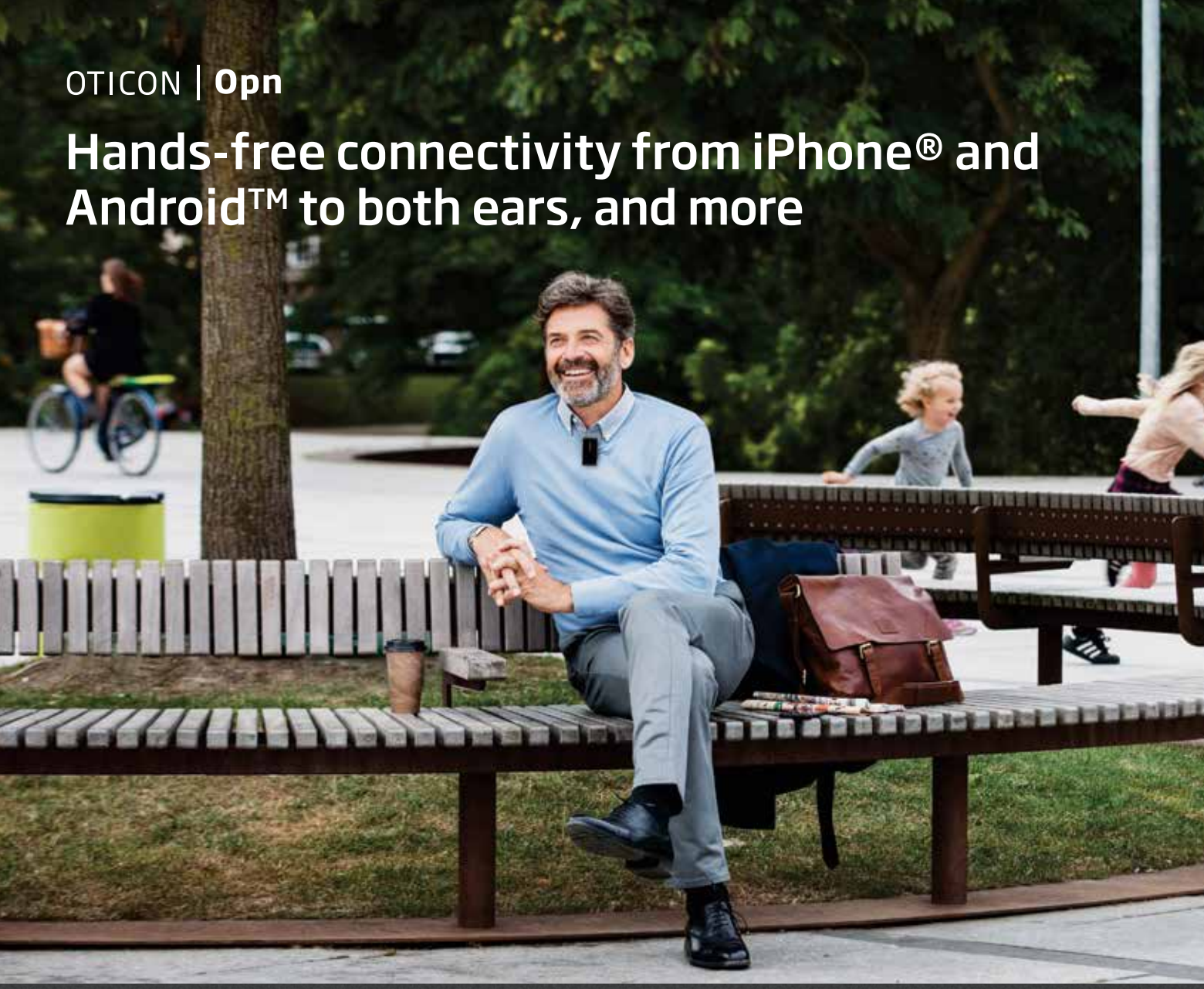

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