Health-Related Quality of Life and Hearing Aids

SEARCHING FOR TRANSPARENT FACE COVERINGS
COVID-19 Challenges

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EDITORIAL MISSION
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.

Send article ideas, submissions, questions, and concerns to Erin C. Schafer, editor-in-chief, at dr.erinschafer@gmail.com.

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Gratitude Unlocks the Fullness of Life

There have recently been many articles, books, and posts reminding us of the importance of gratitude to combat stress and improve resilience. The events of this past year have, for many, led to increased anxiety, grief, depression, stress, and isolation. At such times, it can be difficult to feel grateful. However, in such times, gratitude is most needed.

Practicing gratitude can improve mental and physical health, as well as increase quality of life. In a recent Time 100 Talks interview, Deepak Chopra advocated for tapping into gratitude to find meaning in challenging events. Chopra noted that reasons for gratitude can range from the personal to broader concepts, such as global unity in addressing crises.

As I begin my term as president of the Academy, I am reflecting on the many opportunities I have found as an audiologist to be grateful over the last few months. These include, but are definitely not limited to:

- The lessons learned and personal and professional growth experienced through Catherine Palmer’s leadership. Her sense of humor and steadfast, clear-sighted, open-minded, compassionate, calm, and positive guidance during uncertain times were inspirational.

- Colleagues in the Academy and beyond who have openly shared strategies and innovative approaches for safely providing care to our patients during the pandemic.

- Generosity of audiologists in offering personal protective equipment (PPE) and resources/supplies to those in need, including other practices, health-care workers, schoolteachers, and their communities.

- Audiologists supporting each other and seeking opportunities to help, such as those who have welcomed externs into their practices on short notice to ensure students who were displaced during the pandemic can continue their path to graduation.

- Present and past Academy volunteers who have given, and continue to give, of their time and talents to support our profession.

These range from rapidly providing written guidance, organizing virtual town halls to discuss topics of interest, presenting virtual educational experiences, and engaging within the Academy’s Audiology Community online forum.
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Past presidents and board members of the Academy who prudently and thoughtfully established a solid foundation, capable of weathering difficult times.

The outstanding Academy Executive Director, Tanya Tolpegin, who tirelessly applied her expertise and innate skills to navigate the changing landscape.

The dedicated and talented Academy staff members, who seamlessly transitioned to COVID-19-compliant work situations without impacting Academy initiatives.

With gratitude for the many ways the audiology community has come together during this time, I look forward to continued collaboration as we strive together to meet challenges as they arise and to advance the profession of audiology.

“Gratitude unlocks the fullness of life. It turns what we have into enough, and more. It turns denial into acceptance, chaos to order, confusion to clarity. It can turn a meal into a feast, a house into a home, a stranger into a friend.”

—Melody Beattie

Sincerely,

Angela Shoup, PhD
President
American Academy of Audiology

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Education is primarily delivered through auditory input, whether in person or virtually, and even a mild hearing loss can impact a child’s success in school. 

*Published September 1*

The major problem is that typical masks (cloth or medical) present an obvious visual barrier to those who depend on nonverbal communication cues on the face (e.g., mouth, lips, teeth, tongue, and cheeks).

*Published August 20*

In a recent study (sample size 1,512) of survivors of childhood cancers at St. Jude Children’s Research Hospital, an increased risk for neurocognitive deficits was found in children who have hearing loss after treatment.

*Published August 28*

Isolation due to the pandemic and failure to get hearing aids checked have fueled anxiety, depression, and more hearing loss for many seniors.

*Published September 30*

November 6–7

**Virtual Conference**

Annual Conference of the South African Speech-Language-Hearing Association

https://confco.eventsair.com/

QuickEventWebsitePortal/saslia-2020/event-info-site

November 16

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November 18–20

**Virtual Conference**

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**Virtual Conference**

International Conference on Audiology


December 7–11

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January 1

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January 1

**Application Deadline**

Washington State STAR Program

www.audiologyfoundation.org/scholarships-grants/
The negative impact of hearing loss on communication abilities, quality of life (QoL), social participation, and overall well-being is well documented (National Academies of Sciences, Engineering, and Medicine, 2016). Audiological rehabilitation (AR) provides a holistic approach to lessening the impact of hearing loss and improving the health-related quality of life (HRQoL) through sensory management, instruction, perceptual training, and counseling (Boothroyd, 2007).

From a public policy standpoint, measuring the benefits of treatment intervention on improving HRQoL, along with the costs to provide needed audiology technology and services, is essential to the audiology profession and the patients we serve. Why? Because health economics provides outcomes research to
Health-Related Quality of Life and Hearing Aids

governments, payers, health ministries, clinicians, and patients, who then are able to adequately compare and select among the available intervention options.

There are two categories of economic evaluation: partial and full.

The decision to select a given intervention is guided by assessing the costs associated with the treatment intervention, the benefits of the treatment intervention, and the way these factors compare to all illnesses, diseases, and injuries within health care. In this article, the reader is provided with an overview of the costs and benefits associated with hearing aids and rehabilitation services in adults.

Defining Health, QoL, and HRQoL

There is no consensus among scholars on the definition of the terms discussed in this section. The World Health Organization, for example, defines health as “a state of complete physical, mental, and social well-being and not just in the absence of a disease or infirmity” (WHO, 1948). Key aspects of disagreement among scholars with respect to the WHO definition are the inclusion of “social well-being” (Torrance, 1987) and the emphasis on “the absence of disease” (Patrick et al, 1982).

The significance of QoL in health care became apparent in the 1960s when medical interventions extended the length of life for individuals. Consequently, traditional measures of morbidity, biological functioning, and death rates were insufficient to quantify changes in population health (Bergner, 1985).

Many approaches to defining QoL exist, based on the dimensions of human needs, subjective well-being, social interactions, psychological status, physical status, functional abilities, expectations, and economic status (Post, 2014). In general, QoL should be viewed as an individual’s subjective perception about the way they feel, behave, function, and interact in their daily life at a given point in time.

HRQoL can be defined broadly as a multi-dimensional tool that assesses the physical, psychological, functional, and social domains related to a person’s perception of QoL affected by health status (Wilson and Cleary, 1995). To quantify health status, HRQoL uses
the estimate of the quality-adjusted life year (QALY) as an outcome measurement for the economic evaluation of health technologies.

Health technology is an all-encompassing term for an intervention that includes diagnostic and treatment interventions such as pharmaceuticals, surgeries, therapies, diagnostic imaging, infection control, and hearing aids. The QALY is a measure of health outcome determined by combining the quality of life (subjective measure) and length of life (objective measure) provided by an intervention into a single index number ranging from 0.0 (death) to 1.0 (perfect health). The QALY can also be used to compare the cost-effectiveness of a given intervention, with the outcome reported as cost/QALY.

What Is Economic Evaluation?
Economics is the study of decision through the examination of incentive and consequences and the measure of service production, delivery, and consumption. Economic evaluation, therefore, is the understanding and use of economic evidence in decision-making in generating outcomes. These outcomes provide legislators and other professionals with the ability to identify, measure, and compare activities with the necessary impact, scalability, and sustainability to optimize individual and population health.

Categories of Economic Evaluation and Audiological Rehabilitation Outcomes
There are two categories of economic evaluation: partial and full.

PARTIAL ECONOMIC EVALUATIONS
Partial economic evaluations consider costs or consequences of a disease or intervention, but do not involve a comparison between an alternative intervention or relate costs to outcomes. There are two types of partial economic evaluations: cost of illness and cost analysis.

Cost-of-illness evaluations estimate the economic burden or total costs attributable to a disease. Huddle et al (2017), for example, found that hearing loss results in a loss of productivity in the United States ranging between $1.8 and $194 billion, while medical costs range between $3.3 and $12.8 billion. More recently, Ruberg (2019) estimated that disabling hearing loss (i.e., thresholds > 35 dB HL) equates to lost annual productivity of $9,100 per American and $9,260 per European.

A cost analysis is a systematic and itemized breakdown of the fixed and variable direct (e.g.,
labor, materials) and indirect (e.g., supplies, utilities, equipment) costs associated with a treatment intervention. To determine how to itemize direct and indirect clinic-operation costs systematically, the reader is referred to Sjoblad and Abel (2016). A thorough cost analysis is a requisite before proceeding with any of the economic evaluations listed in the next section.

FULL ECONOMIC EVALUATIONS

Full economic evaluations provide valid information on the efficiency of an intervention by comparing the costs and the benefits of two or more interventions. There are three types of full economic evaluations: cost-benefit analysis, cost-effectiveness analysis, and cost-utility analysis.

A cost-benefit analysis (CBA) is considered the gold standard of economic evaluation because all costs and benefits are quantified using a common metric, such as dollars, per QALY. Willink et al (2019) found that hearing-care services for older adults with hearing aids reduced annual Medicare spending by $2,513 per individual when compared to a similar group of aided listeners who did not use the same services.

Brent (2019) employed a CBA to estimate the direct and indirect utility benefits of hearing aids on reducing dementia symptoms. The findings revealed that hearing aids provided a benefit over costs by a ratio of 30:1. In addition, the reduction in symptomatology from hearing aid use alone was enough to cover the retail cost of hearing aids.

In Australia, Hogan and colleagues (2020) assessed the estimate of non-device usage and the costs associated with the existing service delivery model versus a proposed service model grounded in rehabilitation. The authors found that the provision of rehabilitation services—either in addition to or instead of
hearing aids—could save an estimated 62 to 81 percent of publicly funded dollars.

Willingness to pay is another approach consistent with CBA. Here, an individual or group determines how much they are willing to pay (WTP) for the benefits associated with a technology.

Chisolm and Abrams (2001), for instance, examined how much Veterans were WTP for their hearing aids as a function of the benefit they received from the Abbreviated Profile for Hearing Aid Benefit (APHAB) (Cox and Alexander, 1995). The results revealed that the average Veteran, who receives hearings aids for free, was WTP $203.30 with no measurable APHAB global benefit and an additional $22.06 for each point increase in APHAB global benefit.

A cost-effectiveness analysis (CEA) compares improvement by dollars spent between varying interventions (e.g., without/with hearing aids) for the same health outcome (e.g., the QALY).

Chao and Chen (2008) found hearing aids to be a cost-effective treatment for adults ages 50 to 80 in Taiwan, when compared to the non-adoptions of hearing aids, at an estimated $13,615/QALY for men and $9,702/QALY for women. Similarly, Joore and colleagues (2003) found that the cost-effectiveness of hearing aid fittings compared to the non-adoptions of this technology in the Netherlands yielded an estimate of €15,807/QALY. Regrettably, the individual findings from Chao and Chen (2008) and Joore et al (2003) failed to meet the minimum threshold of $20,000 and €16,000 for the consideration of insurance coverage and reimbursement in their respective countries.

A cost-utility analysis (CUA) is a subtype of CEA that compares the costs of different interventions with their outcomes, measured in utility-based units. Few studies have used this economic approach in the adult hearing aid literature.

Abrams and colleagues (2002) conducted a CUA comparing hearing aid use alone (HA) to hearing aid use with audiological rehabilitation (HA + AR) in the Veteran population. Pre- and post-treatment effects were measured using an HRQoL assessment tool. The results revealed a cost/QALY of $60.00 for HA and $31.91 for HA + AR, indicating that the latter was the more cost-effective intervention. (A review of HRQoL assessment tools can be found in Abrams et al (2005) and Dillon (2012).)

**Summary**

To date, the literature clearly conveys the economic burden of hearing loss. In addition, there is a small pool of evidence that demonstrates the reduced costs and increased benefits associated with improving HRQoL through technology and audiological rehabilitation services.

There is a marked need for increased scholarship in the area of health economics. This information could help the audiology profession to increase its footprint in the health-care arena, as well as lead to an increase in federally subsidized health-care dollars through public-health venues.

In time, the collective evidence from increased scholarly work will, presumably, provide the profession with a rational argument regarding the allocation of public monies toward audiological rehabilitation.

Amyn M. Amlani, PhD, is director of professional development and education at Audigy. He recently earned the University of Washington certificate in health economics and outcomes research.
Health-Related Quality of Life and Hearing Aids

References


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The purpose of this article is to help audiologists and others navigate the considerations for transparent face coverings. Specific commercial products are mentioned here, however the mentions do not represent endorsement by the authors.

BY SAMUEL R. ATCHERSON, EVAN T. FINLEY, B. RENEE MCDOWELL, AND CELESTE WATSON

Because of COVID-19 and broad mandates to wear face coverings, there are numerous local, state, and national conversations regarding communication access in school, hospital, and public settings for individuals who are d/Deaf or hard of hearing (HOH). Although there was an initial shortage of face masks and concerns about meeting global demands, we have witnessed, in a short period, rapid production of various types of masks and shields intended for use by either the public or health workers, including masks with clear (transparent) windows.

The major problem is that typical masks (cloth or medical) present an obvious visual barrier to those who depend on non-verbal communication cues on the face (e.g., mouth, lips, teeth, tongue, and cheeks) (Mendel et al 2008; Atcherson et al, 2017;
Atcherson and Finley, 2019; Eby et al, 2020; Baltimore and Atcherson, 2020).

Indeed, both linguistic and nonverbal information are important for understanding social communication and interaction (Rieffe and Terwogt, 2000; Most and Aviner, 2009). In a timely publication concerning medical masks, Goldin et al (2020) reported acoustic degradations where medical masks act as lowpass filters and high frequencies between 2000-7000 Hz are attenuated by about 3–4 dB for simple surgical masks and up to 9–12 dB for N95 masks.

They cautioned that these reductions would prove challenging when individuals who are d/Deaf or HOH listen to speech in background noise and in reverberant (echo-like) settings—especially with advancing age and greater likelihood of hearing loss.

Mendel et al (2008) recorded passages by a male speaker wearing a mask and presented those with and without pre-recorded dental-office noise to listeners with "normal" hearing and moderate hearing loss in an audio-only format. When the passages were presented in quiet, the simple surgical mask did not influence speech understanding. Not surprisingly, however, the dental-office noise did have a detrimental effect on speech understanding.

These authors considered the possibility that listeners with greater degrees of hearing loss might have more difficulty with masks as the reliance on visual cues increased.

Atcherson and colleagues (2017, 2019) conducted the

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<td>ClearMask</td>
<td>Face shield for mouth and nose</td>
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<td>Transparent respirator-style mask, not commercially available</td>
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<td>LEAF Mask</td>
<td>Transparent mask (FDA registered), not commercially available</td>
<td><a href="http://www.leaf.healthcare">www.leaf.healthcare</a></td>
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<td>Rapid Response PPE</td>
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<td>Safe ‘N’ Clear</td>
<td>Transparent surgical-style mask (FDA registered), available but backordered</td>
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<td>Various Cloth Masks</td>
<td>Commercial and do-it-yourself transparent cloth masks by Catharine McNally and Dr. Tina Childress</td>
<td><a href="http://connect-hear.com">http://connect-hear.com</a></td>
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first comparison of the standard surgical mask with a prototype transparent mask (prototype FaceView mask) and found that the transparent mask improved speech understanding in noise by making the lips and mouth visually accessible. In their studies, listeners in both the moderate and severe-to-profound hearing loss groups benefited, with the greatest magnitude of benefit observed for the severe-to-profound group. None of these studies, however, considered the impact of transparent masks and their use with or without face shields.

In terms of the availability of transparent medical masks, the demand has far exceeded the supply. There are likely to be further supply challenges for these items as many schools and universities reopen. One commercially available transparent medical mask that has been around for nearly two years is The Communicator by Safe ‘N’ Clear, which is a Food and Drug Administration (FDA) registered American Society for Testing and Materials (ASTM) Level 1 surgical mask.

Safe ‘N’ Clear has experienced a surge in orders and continues to carry a backlog while fulfilling orders as quickly as it can. They hope to meet the demand as quickly as possible. The only caveat about The Communicator is that it is not an N95-style mask that would be safe enough to use with COVID-19 patients.

Not too long after COVID-19 arrived, two other transparent options became available. They include the Humanity Shield by Rapid Response PPE (i.e., personal protection equipment) and the ClearMask, but only the latter is FDA-cleared as a class II surgical clear mask that meets ASTM Level 3 standards.

The Humanity Shield includes a full-face shield with draping fabric to cover the sides of the face and below the chin and can be used with a mask underneath. The ClearMask is a face shield that covers the nose and mouth, but not the eyes. The manufacturers of these two offerings are also taking orders and may be delayed in production as demand surges. Therefore, those awaiting viable transparent mask options are looking for acceptable alternatives and safe PPE combinations, such as cloth coverings (with and without transparent options) and face shields.

**TABLE 1** lists some of the transparent masks and face shields.
Preliminary Data on Masks and Masks Plus Shields

The avalanche of interest in transparent face coverings has us wondering about the possible effect of transparent masks and/or face shields on speech acoustics. Recently, we collected preliminary data on some masks available to us (e.g., standard surgical mask, KN95 mask, N95 mask (vented), prototype FaceView transparent mask, Safe ‘N’ Clear transparent surgical mask, and handmade transparent cloth mask). We presented white noise through a fabricated loudspeaker mannequin head and we recorded the output from six feet in a double-walled sound booth.

Table 2 shows the maximum sound-pressure level (SPL) reduction (in dB) of the different mask types, as well as each mask type in conjunction with a standard face shield, when compared to the no-mask condition. With minor exceptions, our preliminary data closely mirror the results by relevant to this topic. The reader will note that there are a variety of transparent cloth masks sold by various vendors, including patterns to use to make your own.

![Surgical Mask Comparison With and Without Shield](image1)

**FIGURE 1.** Standard surgical mask with (orange line) and without (blue line) a face shield. White line is the reference ‘no-mask’ condition. From upper to lower y-axis, decibels (dB) are arbitrarily reported from high intensity (-20 dB) to low intensity (-80 dB).

![Safe ‘N’ Clear Mask With and Without Shield](image2)

**FIGURE 2.** Safe ‘N’ Clear transparent mask with (orange line) and without (blue line) a face shield. White line is the reference ‘no-mask’ condition. From upper to lower y-axis, decibels (dB) are arbitrarily reported from high intensity (-20 dB) to low intensity (-80 dB).
Goldin et al (2020) and the presence of the face shield had the most dramatic effect.

On average, the presence of the face shield produced total reduction by as much as 29 dB! Also surprising is that each of the three transparent masks attenuated more than their non-transparent counterparts and they produced a resonant peak somewhere between 5000 and 7000 Hz. This resonant peak is believed to coincide with vibrational distortions produced by the film.

As examples, FIGURES 1 through 3 illustrate visually how some of the masks, with and without a face shield, perform. In these figures, the y-axis is reported arbitrarily in SPL from high intensity (-20 dB) to low intensity (-80 dB). The white line, representing the no-mask condition, has the highest SPLs. The blue line, representing the mask-only condition, has the next highest SPLs. Finally, the orange line, representing the mask-with-shield condition, has the lowest SPLs. These levels can now be compared to the data reported by Goldin et al (2020).

CONCLUSION
Although transparent masks were shown to reduce SPL and conceivably further degrade speech more than their non-transparent counterparts, they play an important role in preserving nonverbal communication cues on the face.

Without a doubt, transparent masks used with or without shields help maintain access to the mouth, which can help to aid some listeners with lipreading and other nonverbal cues, such as emotion (McIntosh and Howell, 2020; Atcherson, 2020; Most and Aviner, 2009). However, some individuals depend more heavily on the quality of speech whether or not there is a transparent window.

Additionally, new knowledge about further sound-pressure reductions by transparent masks, with or without shields, raises several considerations:

- Do we use more vocal effort with different types of mask materials?
- Are we exaggerating our speech through certain types of mask materials?
Search for Transparent Face Coverings During the COVID-19 Pandemic

- Does speaking with a mask cause our masks to shift, requiring repeated adjustments?
- Subsequently, do we enunciate less to reduce mask shifting?
- Do we speak less loudly when we wear shields (sound reflection back toward our ears)?
- What is the effect on listening with increased distance between two people talking while wearing masks and/or face shields?
- Are all people good at reading nonverbal cues?
- Does communication with non-transparent masks increase cognitive effort and fatigue?
- Do hearing aids and implantable devices compensate or adjust to mask-related decibel changes?
- Is there any value in considering supplemental acoustic access, such as using hearing assistive technology systems (HATS), including remote microphone technologies?
- Are there individuals other than those who are d/Deaf or HOH who could benefit from transparent masks?
- Will children with "normal" hearing benefit from teachers wearing transparent masks?
- Will it help to have interpreters wear transparent masks (e.g., foreign languages and American Sign Language)?
All of these questions are important to think about when considering communication in a holistic manner. In other words, what do we lose with non-transparent masks vs. what do we gain with transparent masks and face shields? These questions remain to be answered and we are forced to consider them in the middle of a COVID-19 pandemic that may be here to stay a while into the foreseeable future.

Samuel R. Atcherson, PhD, is a professor of audiology and otolaryngology—head and neck surgery at the University of Arkansas for Medical Sciences and director of the Auditory Electrophysiology and (Re)habilitation Laboratory. His clinical and research efforts focus on audiological rehabilitation needs, auditory and vestibular electrophysiology, and health literacy. He is a member of the Board of Trustees of the Arkansas School for the Deaf/Blind and Visually-Impaired, a former president of the Association of Medical Professionals with Hearing Losses, co-founder of the Association of Audiologists with Hearing Losses, and a bilateral cochlear implant user.

Evan T. Finley, BA, is a full-time AuD extern and PhD student at the University of Arkansas for Medical Sciences. He was instrumental in the most recent audiovisual speech perception in noise study using the prototype FaceView mask. Evan’s research interest primarily lies in audiological rehabilitation. Evan is a cochlear implant and hearing aid user.

B. Renee McDowell, BS, is a third-year AuD student at the University of Arkansas for Medical Sciences. Her ongoing capstone project was to develop the fabricated loudspeaker mannequin, and record and analyze the acoustics of the many masks and shields made available.

Celeste Watson, BS, is a second-year AuD student at the University of Arkansas for Medical Sciences. Her capstone project will focus on speech perception in noise in normal hearing listeners with more challenging signal-to-noise ratio (SNR) conditions and simulated hearing loss.

References


WORKING EFFECTIVELY
WITH AUDIOLOGY STUDENTS
WHO ARE d/DEAF OR HARD OF HEARING
TIPS FOR CLINICAL PRECEPTORS
The clinical experience is a key component of education for students enrolled in doctor of audiology (AuD) programs. Throughout a variety of clinical rotations, students learn how to diagnose, treat, counsel, support, and empower patients with hearing loss. To become effective clinicians, students must be able to participate in and experience these rotations to the fullest.

How do we support our students who are d/Deaf or hard of hearing (HOH) themselves in this setting? We educate our patients and encourage self-advocacy skills that they can use in their everyday lives. How can audiologists incorporate this same practice for our student clinicians who are d/Deaf or HOH?

Students and preceptors alike might wonder how to address these issues most effectively so that a positive clinical experience is shared by all. Finding answers requires a collaborative effort. Building a partnership and tackling these questions together is important for good communication between student and preceptor and will yield the best outcomes for the student.
Although self-advocacy and transparency about needs are the student’s responsibility, new students are not typically aware of all their options or the kinds of clinical situations they might encounter during their education. This is where the preceptor can step in, applying their role as a mentor to provide support, as well as audiology knowledge and skills to help students brainstorm effective solutions.

It may seem obvious that a partnership between preceptor and student is necessary for the student’s development of strategies and clinical independence; however knowing where to begin can be difficult (Allen and Culbertson, 2002). This article, authored by two audiologists who are Deaf and have cochlear implants and a final-year AuD extern with hearing loss who uses a hearing aid, will outline some potential challenges for our students who are d/Deaf or HOH and offer suggestions for ways to tackle these issues successfully.

**Potential Difficulties for Students Who Are d/Deaf or Hard of Hearing**

Similar to their performance in the classroom setting, students who are d/Deaf or HOH are fully capable of completing clinical tasks; however, they may need accommodations to do so. Every student is different, but some common difficulties may include: listening checks, word- and sentence-recognition scoring, the role of test assistant for conditioned play audiometry (CPA) and visual reinforcement audiometry (VRA), general relationships with clinicians and support staff, and environments where listening and speech reading are difficult. This list, while not comprehensive, provides the common scenarios where the majority of students who are d/Deaf or HOH may find themselves in need of accommodations.

As a clinical preceptor, being aware of these potential difficulties and assisting your student in learning about appropriate ways to meet their access needs is critical for their success. Students who are d/Deaf or HOH may have experience in advocating for themselves and finding their own accommodations, but taking this on within clinical environments can be daunting.

The decision to disclose a hearing loss lies with the student. When clinical preceptors offer support for determining the best accommodations, students who are d/Deaf or HOH often find this very impactful in their journey toward becoming an audiologist.

**Recommendations for Managing Potential Difficulties**

Clinical preceptors should encourage students to try a few accommodation options to determine what works best for them. As a graduate student clinician, the student may be allowed access to a student lab where they can practice clinical skills. Taking advantage of this time is important!

Students also have access to a university office for students with disabilities. Encourage them to provide their audiological records to this office, if they have not done so already, so that the appropriate setup for their success can be documented and available for all instructors and preceptors.

As the students progress in their program, experimenting with
Working Effectively with Audiology Students Who Are d/Deaf or Hard of Hearing

different accommodations might be necessary to ensure the best possible outcome. The next section reviews some recommendations to try for specific difficulties in the clinical environment.

Listening Checks
If the student uses a personal assistive listening device (ALD), many options exist for converting the device into a custom listening scope. For example, a student who uses a Phonak Roger Pen or Select may be able to use the device’s audio jack to connect with a lapel microphone, then connect listening cups to the microphone via size 13 hearing aid tubing (Atcherson and Spangler, 2014). The patient’s hearing aid receiver can then be coupled to this listening scope so that the student can perform a listening check on the hearing aid.

A similar step may also be possible for performing listening checks on cochlear implant processors. The audio jack from the ALD can be plugged into the listening sets for Advanced Bionics and MED-EL, allowing the student to perform a listening check.

Depending upon the student’s hearing devices, other listening-check options might be more appropriate. Examples include placing the earpieces of a traditional listening scope over the student’s device microphones, making a hole in a rubber thimble or similar object for coupling directional ALDs (e.g., ReSound Mini Mic, Oticon ConnectClip) to the patient’s hearing aid receiver or ordering personalized coupling devices for connecting a student’s cochlear implant processor microphones to a listening tube.

For more information, refer to the American Academy of Audiology/Student Academy of Audiology Students with Hearing Loss Task Force (SWHL) Unconditional Listening Check Guides in the Resources section at the end of this article. In addition, using objective measures such as electroacoustic analysis to check for distortion and other hearing aid problems is also helpful for many students who are d/Deaf or HOH.

Word- and Sentence-Recognition Scoring
Encourage the student to share if they have difficulty with hearing during word- and sentence-recognition testing. Students might be hesitant to disclose these challenges, due to a concern that their preceptor will question their competence as a student clinician. Let your student know from the beginning that they have your support in finding a reasonable accommodation that will result in accurate scoring for these tests.

Finding the method that works best might require some trial and error. Position the patient in front of the booth window at a slight angle for the student’s optimal speech-reading access, dim the lights on the examiner’s side to reduce glare from the window, and encourage the student to ask for repetition when needed. If the student is comfortable doing so, encourage them to share their hearing loss with the patient so that any miscommunication can be resolved quickly.

Depending on the individual student’s needs, other possible accommodations include: asking the patient to wear the student’s personal ALD during testing; asking the patient, patient’s parent, or an audiology assistant to write the patient’s responses; and working with accommodations provided by the student’s university such as American Sign Language (ASL) interpreters or communication access real-time translation (CART) writers.

In our experience, automated speech-to-text applications do not work well for the purpose
of word- and sentence-recognition scoring, as these apps do not always reproduce the patient’s responses accurately. You and the student (or the student and another person) could practice word-recognition scoring through a mock word-recognition exercise, or you could score alongside your student and compare words missed and scores at the end of the appointment.

FINDING THE METHOD THAT WORKS BEST MIGHT REQUIRE SOME TRIAL AND ERROR.

Keep in mind that your student might struggle more with patients who have facial hair or unfamiliar accents. Reviewing the research on critical differences in word-recognition scores (Carney and Schlauch, 2007; Thornton and Raffin, 1978) may also be helpful for preparing to work with a student who is d/Deaf or HOH.

Test Assisting

Serving as a test assistant for CPA and VRA may be challenging for students who are d/Deaf or HOH who rely heavily on speech reading for understanding spoken language. If test assisting is difficult for a student, the first step in addressing the challenge is to determine exactly what is difficult. The issue may be resolved by finding a solution that involves higher quality auditory access, improved visual access, or both.

Think about the norms at your clinic for CPA and VRA testing. Do the tester and test assistant usually communicate with each other during testing? If so, does that happen through the sound-field speakers, a set of headphones, an FM system, or by some other means? Allow the student to use their personal ALD to hear you on the other side of the booth if these options do not provide them with sufficient auditory access.

What is the booth setup? If possible, position the student so that they have convenient visual access to the tester at all times. This might require positioning a patient with their back toward the tester so that the right and left speakers/reinforcers would be reversed.

What are your expectations for the role of the test assistant? Clarify these with your student up front and ask if any of the expectations seem challenging. If the student finds frequent commentary from the tester difficult to process while assisting, find ways to reduce the number of words...
used when communicating with the student test assistant.

Examples include using words with low-frequency vowels, such as on and tone, to indicate that the tester is presenting, using the name of an animal reinforcer (e.g., sheep or bunny) if your student has trouble understanding left and right, and saying big and little instead of the exact numbers for intensity levels of presentations.

**Relationships with Preceptors and Other Professionals**

At times, misunderstandings and communication breakdowns may occur when working with students who are d/Deaf or HOH. From the student perspective, these experiences can be embarrassing and difficult to discuss afterward. Show your student compassion during these times and approach the misunderstanding directly, rather than avoiding it. If the student does not know that a misunderstanding occurred, the problem is likely to occur again. If your student does not follow your instructions, it is possible that the instructions were not heard or understood clearly.

Support your student by keeping your face fully visible and staying in close proximity during conversations. Any conversation about progress, goals, or personal strengths and areas for improvement should take place in a quiet environment where clear communication is possible for all involved parties.

A common challenge for students who are d/Deaf or HOH is obtaining sufficient visual cues while meeting preceptors’ expectations for efficiency. If you are providing feedback after an appointment with a student who needs visual cues while the student is in the process of recording test data or another related task, arrange to debrief at another time.

Your student might be worried that they are not being as efficient as you would like and their looking away from you could be their attempt to balance their need for visual cues with the expectation for recording all information efficiently. This is a matter of particular concern for students who need visual cues to take a case history and, therefore, cannot save time by asking questions while performing otoscopy or tympanometry.

Keep in mind that your student who is d/Deaf or HOH might not have heard that a person was saying “Hello” to them in the hallway or might not have realized that the person was talking to them. Although this kind of misunderstanding can create frustration from other professionals in the clinic who might perceive the student as aloof, it can be avoided by encouraging your student to share with others that “If you say hello to me and I don’t respond, it’s because I didn’t hear you.” You might also want to ask your student’s permission to share with your colleagues that a student who is d/Deaf or HOH will be learning in the clinic this rotation.

Encourage your student to find mentor audiologists who are d/Deaf or HOH. For additional support, refer them to the Association of Audiologists with Hearing Loss Facebook page, the meeting at the American Academy of Audiology annual conference for audiologists who are d/Deaf or Hard of Hearing, the SWHL Task Force page, and other listings in the Resources section at the end of this article.

**Environment**

Certain clinical environments may be challenging for your student who is d/Deaf or HOH in terms of auditory and/or visual access. These include dark spaces such as electro-physiologic and vestibular test labs, spaces
Working Effectively with Audiology Students Who Are d/Deaf or Hard of Hearing

Resources
American Academy of Audiology and Student Academy of Audiology

Students with Hearing Loss (SWHL) Resources
https://saa.audiology.org/educational-opportunities/students-hearing-loss

- Unconventional Listening-Check Guides
- Tips for Interviewing
- Legal Rights Resource
- Resource Packet
- Resource for Access
- Mock Word-Recognition Testing Resource (requires another person)
  Contact emily.camacho@wustl.edu for this resource.

Facebook Groups
American Academy of Audiology and Student Academy of Audiology

Students with Hearing Loss
www.facebook.com/groups/386981481726597

Association of Audiologists with Hearing Loss
www.facebook.com/groups/114874958541349

Association of Medical Professionals with Hearing Loss (The AMPHL Portal)
www.facebook.com/groups/amphl

Mentorship
Audiology Students and Professionals Who Are d/Deaf or HOH Meeting at the American Academy of Audiology Annual Conference

Association of Medical Professionals with Hearing Loss:
https://amphl.org/mentorship

Association of Audiologists with Hearing Loss
https://www.audiologistswithhearingloss.com

arranged so that the audiologist and student are not facing the patient at all times, and sterile spaces such as operating rooms where everyone is masked and background noise levels are high.

If your student relies heavily on visual cues, consider what can be modified in the environment to provide better access. During electrophysiologic and vestibular assessments that require lights dimmed or off, the patient can wear the student’s personal ALD or you can wear it yourself so that the student can hear you better. For setups where an auditory brainstem response (ABR) patient is on one side of a booth and the tester is on the other, if a monitor speaker is set up with the audiometer in the booth, the student can place their personal ALD beside the audiometer.

Arrange desks and chairs in consultation rooms so that the student will not need to face away from the patient while programming, verifying, or running electroacoustic analysis on hearing devices. For sterile and other environments that require masks, transparent masks can be obtained at a low cost. These would allow the student to have visual access while maintaining safety within the environment.

Conclusion
By using these tips for supporting audiology students within the clinical setting who are d/Deaf or HOH, preceptors can foster a supportive learning environment where these students can thrive. Discussions about challenges and accommodations are best approached through a partnership where you and the student work together to ensure that everyone’s needs are being met and all concerns are addressed. If you would like more resources for working
Working Effectively with Audiology Students Who Are d/Deaf or Hard of Hearing

Sarah Sparks, AuD, is a clinical audiologist based in Washington, D.C. She is in the process of opening a (re)habilitation-focused telepractice. Her interests include pediatric audiology, vestibular assessment and management, cochlear implants, (re)habilitation, tinnitus, and bilingual audiology services provided in American Sign Language and English.

Margaret Richter, BA, is a fourth-year AuD student at the University of North Carolina (UNC) at Chapel Hill. She is completing her externship year at the UNC Hospitals Hearing and Voice Center and works primarily with adults, providing diagnostic, hearing aid, and cochlear implant services.

Emily Camacho, AuD, is a pediatric audiologist at The Children’s Hospital of Philadelphia. Her primary interests include diagnostics (re)habilitation, amplification, and language acquisition through early intervention.

References
COMPUTERIZED DYNAMIC POSTUROGRAPHY: A Historical ‘Concussion Predictor’

But have we considered the athletic ability of the patient?
A snowboarding injury and a dizziness handicap score: Was the patient’s athletic ability affecting the outcome of the testing for balance issues?

BY CATHERINE SASSANO AND DENISE POUNCEY
History
A male patient in his early 30s, seen in the University of Mississippi Medical Center clinic in the summer of 2019, had sustained a head injury above his left eyebrow from a snowboarding accident in December 2017. He presented in our clinic with primary complaints of lightheadedness on a weekly basis, room-spinning vertigo every couple of days, presyncope and syncope every so often, floaters in his vision, and daily imbalance.

Formerly a monthly “migrainer,” he reported that his migraines had doubled since his snowboarding incident. He denied any hearing concerns, a fall within the past 12 months, or the use of a vitamin D supplement. The patient reported that competing speech signals that require “too much brain power” worsened his symptoms. He noted that something that provides him temporary relief is applying pressure to the base of his skull in the form of pressing his head into the back of a chair headrest.

Of note, it is important to mention that the patient’s medical history was also significant for a car accident in 2015. Based on symptomatology, the patient was diagnosed with concussion and referred for a balance assessment.

Results
Upon arrival to his balance assessment, the patient completed a case history packet including the Dizziness Handicap Inventory. He scored a total of 74 (Emotional = 20, Functional = 30, Physical = 24), which was consistent with a severe dizziness handicap. He then completed a balance evaluation including videonystagmography (VNG), video head impulse testing (vHIT), and computerized dynamic posturography (CDP).

Interestingly, the testing was largely within normal limits. There was no presence of spontaneous nystagmus, benign paroxysmal positional vertigo (BPPV), or gaze-evoked nystagmus. Some positional nystagmus was observed in vision-denied conditions, however, it was non-clinically significant in nature. Also interestingly, oculomotor testing (tracking, random saccades, optokinetics, etc.) was normal.

Caloric irrigation revealed a borderline left unilateral weakness, on the side of the head injury (TABLE 1).
1). Of note, right warm and left cool irrigations were repeated, but they yielded comparable results to the primary irrigations.

Video head impulse testing (vHIT) yielded no significant overt or covert catch-up saccades when stimulating the lateral; left anterior, right posterior (LARP); or right anterior, left posterior (RALP) planes.

**FIGURE 1. Sensory Organization Test (SOT) (Sway Referenced Gain: 1.0)**

**CDP Testing Performance**

Sensory organization testing (SOT) showed his performance as abnormal for Conditions 1–3, the most dynamically straightforward of the SOT conditions. However, for Conditions 4–6, his performance was well within normal limits for the more demanding tasks, launching him into an overall...
normal composite score regardless of his significant imbalance (FIGURE 1).

For his motor control test (MCT), the size and timing of his responses were within normal limits, but he shifted his body weight heavily to the right (his snowboarding stance) to athletically compensate for any disordered balance issues that would typically be recognized during this test (FIGURE 2).

**FIGURE 2. Motor Control Test (MCT)**

**CDP Testing Results**

**SENSORY ORGANIZATION TEST**

Sensory organization testing (SOT) is composed of six increasingly dynamic conditions (three trials each), yielding a composite score averaging the performance on all
conditions. The gray backdrop behind each condition (x-axis) in FIGURE 1 represents the range of normal for the degree of sway (y-axis). The blue bars represent normal sway, red bars represent abnormal sway, and striped bars represent trials that were repeated.

The sensory analysis portion of SOT testing assesses how a patient uses inputs from their somatosensory (SOM), visual (VIS), and vestibular (VEST) systems to maintain their balance. During the testing, the visual reference and base of support (BOS) the patient is standing on are disrupted in a systematic fashion, providing atypical

FIGURE 3. Adaptation Test (AT)

Data Range Note: NeuroCom Data Range: 20–59

- 5 degrees; 20lbs force;
  4-inch force center displacement

Sampling Rate: 100Hz

2.5 seconds
inputs the patient has to combat in order to maintain balance.

For strategy analysis, each of the shapes represent a condition. Depending on where they are plotted, they indicate if a patient uses a hip-dominant or ankle-dominant strategy to maintain balance.

In Conditions 1–3 for this particular patient, the surface that he was standing on did not move and he was relying on his own static balance. He demonstrated more sway than what is considered normal. In Conditions 3–6, however, there were varying combinations of moving visual surroundings and base of support, which are typically more difficult to perform, in comparison to Conditions 1–3.

As demonstrated in this patient’s strategy analysis and center of gravity (COG) alignment, he managed to “ride” the machine as if he were back on the slopes, which resulted in the avoidance of an ankle- or hip-dominant strategy reading. The snowboarding term “goofy” is indicative of a right-foot-forward, left-foot-back riding stance, which was apparent in his COG alignment: most of his weight distribution was toward the right.

**MOTOR-CONTROL TEST**

Motor-control testing assesses a patient’s ability to adapt to sudden and unpredictable forward and backward movements of the platform they are standing on. Three measurements are obtained: weight symmetry between sides (right and left), how long it takes the patient to react to the unexpected movement (latency in milliseconds), and how strong their reaction is (amplitude scaling).

For this test, the shaded areas in FIGURE 2 represent abnormal responses and the white areas represent normal limits. The S, M, and L signify small, medium, and large impulse movements of the platform. The three boxes represent the patient’s performance directly parallel to the S, M, and L movements.

This patient had a tendency to lean heavily to the right during those movements, which reflects his snowboarding stance. The timing (latency) of his response was normal for both medium and large forward and backward movements of the platform, and the size of his response was normal, further solidifying his athletic ability to compensate for any true disruptions to his balance strategies.

**IMPROVED PERFORMANCE WITH INCREASED DEMAND?**

Upon testing, what was observed was an athlete doing what he did best: snowboarding. He visibly dropped his hips and bent his knees for the more demanding Conditions 4–6, which allowed him to compensate for the increased dynamics in testing (FIGURE 1). Additionally, this patient adapted and anticipated appropriately when the task was more predictable in nature (FIGURE 3).

**ADAPTATION TEST**

The adaptation test presents “toes up” and “toes down” movements of the platform the patient is standing on. There are five trials of each movement (x-axis of the top boxes in FIGURE 3). The shaded region represents abnormal performance.

For each of the conditions, this patient performed within the range of normal (green boxes). The trend for normal balance adaptation is that the “tracings” (second and third figures) get smaller and smoother with each trial because the patient is able to predict and adapt accordingly. Our patient adapted and predicted with each trial that was presented,
which is apparent in the increasingly smooth tracings in sway.

**SOT RAW DATA**

The raw data for the patient’s sway and the shear force of the plate during SOT testing are shown in **FIGURE 4** for each of the three trials performed for all six conditions. In Conditions 1–3, the patient’s amount of sway was considered abnormal, although these conditions are not as dynamic as Conditions 4–6.

In the first condition, the patient is standing on a still platform with eyes open and the visual reference does not move. This patient had trouble maintaining his base of support (BOS) over his center of gravity (COG). This trend continued in Condition 2 (Condition 1, but with eyes closed) and Condition 3. He responded to dynamic movements by inadvertently bending his knees more, dropping his hips, and using other snowboarding tactics.

The first three conditions of SOT (described in **FIGURE 4**) are the least dynamic of the six SOT conditions, meaning that the patient is more readily relying on using their functional balance and proprioceptive inputs to maintain their stability. Typically, with patients exhibiting symptoms similar to the patient in this case, the trend seen in SOT performance is as follows: a decline in SOT performance with the progression to each condition. This patient’s performance improved during the most dynamic conditions (4–6) because they triggered his athleticism to initiate compensatory strategies for balance maintenance (see equilibrium score of **FIGURE 1**).

The CDP testing revealed that the athlete’s sport of choice must be considered in order to accurately determine the functional impact a head injury could have had on their vestibular system. Although a standardized baseline shift could not be applied, it raised speculation as to what additional testing must be performed to appropriately aid in the

**FIGURE 4. Sensory Organization Test (SOT) Raw Data**
8 Questions to Ask Your Technician

Your audiology equipment is essential to your business. Without it, you couldn’t treat your patients, and lost time with patients means lost money.

Because of this, you should only trust it in the hands of qualified professional technicians. So how can you make sure you’re entrusting your equipment to the best people?

Here are eight questions you can ask:

1. Are you NASED certified?
   Make sure your technician is certified by the National Association of Special Equipment Distributors (NASED). NASED-certified technicians will service your instruments with care and efficiency.

2. Have you been trained by the factory for repairs?
   A quality service technician has been trained by the manufacturers of the equipment they calibrate and repair. When speaking with a technician, be sure to ask them if they’ve received training from the manufacturer of your instrument.

3. Has your test equipment been calibrated in the last year?
   Regular calibration of your equipment ensures that the audiometer’s hearing level complies with values set by the American National Standards Institute (ANSI). Just as you should have your audiometric instruments calibrated yearly, a service technician should have their testing equipment calibrated yearly, too.

4. Do you have access to the latest software and firmware?
   Having the latest software and firmware updates installed on your equipment ensures it’s running at its best. Make sure the service technician you hire has access to these resources. Ideally, they’ll be in close contact with the manufacturer of your equipment so they can acquire and install updates in a timely manner.

5. Will you be providing a certificate for calibration covering the items discussed in the audiometer standards ANSI S3.6 appendix G?
   A technician should provide you with a certificate that states your audiology equipment has been calibrated to ANSI standards. This will ultimately protect you from any claims that your equipment is producing inaccurate results.

6. Are you carrying liability insurance?
   It’s crucial to ensure your service technician or the organization they represent is covered with liability insurance. If your equipment is damaged during your appointment, you want to ensure the technician will hold themselves accountable to replace it.

7. How fast can you get out for emergency repairs?
   Ideally, you want your technician to be a short drive away so they can be at your office the day you call or within 24 hours. That way you can have your issue resolved fast.

8. Do you have loaners available when needed?
   Sometimes a problem can’t be solved with one appointment and your equipment needs to be sent to the manufacturer. In this case, it’s best to ensure your service technician can provide you with a loaner. This will allow you to continue treating patients while your instrument is being fixed.

Asking these questions will help you better gauge if the service technician you’re looking to hire has the expertise and dependability you require. If you’re in need of calibration, repair, or maintenance services for your audiology equipment, local e3 service technicians are here to support you.

For more articles: http://blog.e3diagnostics.com
rehabilitation of a concussed athlete from an auditory perspective.

**DIAGNOSIS**

The vestibular test battery showed overall normal vestibular function, as did CDP, with the exception of the least dynamic SOT conditions. Based on history and complaints, the findings suggest concussion and sub-concussive events.

The auditory system is uniquely situated in the temporal lobe to be ultra-susceptible to external forces applied to the brain, even when mild in nature (Kraus and Krizman, 2018). Changes in sound processing and equilibrium can be monitored via auditory and vestibular testing in athletes before and after sustaining a head injury.

**Sports-Related Concussions**

Sports-related concussions have long been on the rise. Approximately 2.5 million high school students reported having had at least one sports-related concussion within the 12 months preceding their response to the 2017 National Youth Risk Behavior Survey, according to the Centers for Disease Control analysis of the survey (Centers for Disease Control and Prevention, 2017). Technology has been evolving to help detect these concussive and sub-concussive events (Kraus and Krizman, 2018).

Traditionally, concussion was only diagnosed when a total loss of consciousness was observed, but it is now known that approximately 95 percent of concussion patients maintain consciousness throughout the duration of the injury (Kraus and Krizman, 2018). According to the Centers for Disease Control (CDC, 2019) and the Defense and Veterans Brain Injury Center (2020), “concussion” and “mild traumatic brain injury” (mTBI) are synonymous, warranting the expansion of the injury scope of a concussion (Kraus and Krizman, 2018).

The accumulation of concussive or sub-concussive events over time leads to chronic traumatic encephalopathy (CTE), a “degenerative brain disease found in athletes, military veterans, and others with a history of repetitive brain trauma,” according to the Boston University CTE Center (2020).

Dr. Bennet Omalu published the first evidence of CTE in 2005, as found in Mike Webster, a center for the Pittsburgh Steelers (Omalu et al, 2005).

Since the discovery of CTE, several studies have uncovered its prevalence in professional and amateur athletes, including a study conducted by Mez et al in 2017. Researchers in this study inspected the postmortem brains of 202 former professional athletes, 111 of which were former National Football League (NFL) players. CTE was found in the brains of 110 of the former NFL players (Mez et al, 2017).

**Test Findings and Athletic Abilities**

Concussions, particularly mTBI or sub-concussive events, are “invisible injuries that affect function rather than macrostructure” (Kraus and Krizman, 2018). These events go unseen using conventional imaging, such as a computerized tomography scan (CT scan) or magnetic resonance imaging (MRI), and diagnosis relies heavily on symptom reporting (Kraus and Krizman, 2018).

What, then, potentially becomes the issue when relying on symptom-reporting from amateur or professional athletes? They might be inclined to brush off lightheadedness, double vision, or loss of concentration for the sake of
the game, a scholarship, or not disappointing their team.

CDP has been proposed as a concussion detector in studies, including research conducted by Karin et al in 2017. That research team quantified the impairment of a concussion on five male athletes in order to implement more targeted therapy techniques. In the study, post-therapy posturography showed an average of a 22 percent improvement in the overall CDP composite score (Karin et al, 2017).

Previous studies have demonstrated how CDP can be used as a tool to quantify the impact a head injury has on balance, post mTBI (Walker et al, 2018). Additional studies have looked into the test-retest reliability of the addition of a head shake (HS) during sensory organization testing (SOT) of post-concussed athletes to detract from the athleticism supplementing their performance (Cripps et al, 2016). Our facility currently does not have a post-concussion protocol that includes HS-SOT.

Overall, our findings in this case study of a snowboarder suggest that providers must be cognizant of the way athletic ability may alter test findings.

Catherine Sassano, AuD, is an assistant professor in the Department of Otolaryngology-Head and Neck Surgery at the University of Mississippi Medical Center.

Denise Pouncey, AuD, is an associate professor in the Department of Otolaryngology-Head and Neck Surgery at the University of Mississippi Medical Center.

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Using emotional intelligence to create positive patient financial conversations

Emotion drives human behavior. Especially during times of uncertainty or increased sensitivity, understanding the emotion beneath the words and behavior of patients can help you better address their needs. Here are four steps you can take, utilizing emotional intelligence, to build trust and help patients feel understood during the financial discussion.

Pattie Casebolt, Chief Quality Officer, shares some best business practices when it comes to having positive financial conversations.

Step 1. Connect and build rapport
Connecting with patients and building rapport is integral to creating trust. If a patient doesn’t trust the staff and providers, they aren’t as likely to be open about their financial situation or any other concern they may have. Building rapport involves several key factors including:

- Authenticity — be open and honest with patients
- Curiosity — have a curious and helpful attitude
- Questioning — ask questions to discover patient priorities
- Listening — listen to determine deeper, underlying needs
- Checking — elicit feedback to confirm understanding

Step 2. Look for emotional cues
The largest part of communication is body language and tone. If you pay attention to more than just what the patients say, you may be more effective in your communication. This is especially important in the current times we are in. Some people are more stressed for a variety of reasons. It is helpful to have a heightened awareness of this and be mindful of slowing down and tuning in to your patient, as well as yourself.

Step 3. Put cost into perspective
Patients may assume they can’t afford a product or treatment and make decisions based on that assumption. By educating patients about all of your payment options, you can show them how they may be able to fit hearing care into their budget. It is helpful to compare the monthly payment amount to other common costs the patient is familiar with.

Step 4. Add convenience
Patients may appreciate when a practice has anticipated their needs and is proactive in meeting them. Discussing all of your payment options up front helps patients relax and feel in control. Giving them the opportunity to apply for financing on their smartphone helps maintain privacy, and also expedites the approval process. For patients who are not ready to come into the office, having the ability to apply on your website is an added convenience.

For more hearing industry insights and resources visit [www.carecredit.com/soundstrategies](http://www.carecredit.com/soundstrategies).

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Alport Syndrome Awareness: Hearing Loss Caused by Kidney Disease

By Todd Landsberg

Remember the words Alport syndrome from your textbooks? Perhaps this seemed an attempt to stump you on an exam. As an audiologist and Alport patient with hearing loss, I hope to emphasize the role audiologists can play in helping provide critical early diagnosis for patients.

Alport syndrome is a rare, genetic renal disease, often accompanied by hearing loss. The mechanism of hearing loss remains understudied. Misdiagnosis is common. Recent research suggests Alport syndrome may be more common than initially thought.

Frequently, the onset of hearing loss leads to correct diagnosis. Still, many audiologists do not put hearing loss together with kidney disease, causing further delay in treatment.

We can have major impact on a patient’s life by getting them properly diagnosed. The following is a reminder list of signs and symptoms:

- Bilateral sensorineural hearing loss
- Cookie bite audiogram
- Initial loss of low and mid frequencies
- Onset of hearing loss in early childhood
- Females in their 40s–60s with kidney disease

In these cases, I encourage you to ask about history of hematuria or family kidney disease. Please encourage patients to get a simple urinalysis test and send a referral note to their primary-care physician.

Questions? hearing@alportsyndrome.org.
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- Pros and Cons of New Sources of Revenue for the Audiology Practice
- Radiology

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Deciphering Medicare Advantage Hearing Benefits

By Anna Marie Jilla and Mariah Cheyney

Introduction to the Medicare Advantage Program

The Medicare Part C Program was developed following passage of the Balanced Budget Act of 1997 and went into effect in January of 1999. With identified gaps in coverage for Medicare beneficiaries, the addition of an optional Medicare program permitted the Centers for Medicare and Medicaid Services (CMS) to contract with private or public agencies to provide additional Medicare options for beneficiaries who wished to seek coverage in addition to original Medicare’s Part A and B benefits.

In 2003, Part C of the Medicare program was renamed the Medicare Advantage Program (Centers for Medicare and Medicaid Services, 2020) and currently provides private coverage for one-third of Medicare beneficiaries (Sung and Noel-Miller, 2019).

Most Medicare Advantage (MA) plans are administered by private insurance companies. The two most common types of MA plans are health maintenance organization (HMO) plans and preferred provider organization (PPO) plans. HMOs typically provide access to benefits through a pre-defined network of providers, while PPOs allow a beneficiary to see an in- or out-of-network provider.

The MA enrollment periods occur throughout the year and provide opportunities for enrolling, renewing, or dis-enrolling from MA plans. Prospective and current beneficiaries can view and compare the plan benefits using the summary of benefits and/or evidence of coverage documents.

The summary of benefits provides a high-level overview of coverage. The evidence of coverage (EOC) document is a more detailed
document containing specific language on how the benefits will be accessed through the plan. By law, MA organizations are required to provide both evidence of coverage and summary of benefits documents on their website for prospective and current beneficiaries to download and review. (CMS, 2020; Ch3.70.1.2).

Benefits
Medicare Advantage plans include all services as defined under original Medicare Part A and B. In other words, MA organizations must provide coverage for Medicare-covered services as defined under Part A or B. For example, if an MA plan beneficiary receives a tinnitus evaluation, this procedure is covered under Part B as a diagnostic audiology service. Therefore, it must also be covered under the MA plan. For a list of covered audiology services under traditional Medicare Part B, see the CMS Audiology Code List (CMS, 2016).

The covered Part B services are typically reimbursed through the insurance plan, so it is important to understand whether there is a provider in-network restriction. For in-network services, the audiologist must be a contracted provider for the Medicare Advantage plan.

Premiums and Payments
Each MA plan will have different cost structures for beneficiaries. However, MA plan descriptions must use uniform terminology in describing expected costs. Each of these items should be explicitly outlined in the plan description documents (CMS, 2020; Ch4.10.2).

TABLE 1 provides a summary of terminology used in the plan description documents.

| **PREMIUM** | This is the price paid to enroll in the insurance plan. Plan premiums vary, are typically paid monthly, and are paid in addition to Part B premiums. |
| **COST-SHARING** | This is a broad term used to describe the agreed-upon cost responsibilities of the beneficiary and insurer. Generally, this term includes descriptions of deductibles, copayments, and coinsurance. |
| **DEDUCTIBLE** | This is a fixed amount that the beneficiary must pay each year before their insurance benefits begin to cover costs. |
| **COPAYMENT (COPAY)** | This is a fixed amount that the beneficiary pays for covered services. The remaining balance past the copayment is covered by the plan. |
| **COINSURANCE** | After meeting the deductible, beneficiaries pay coinsurance, a certain percentage of total costs for covered services under the plan. |
| **OUT-OF-POCKET MAXIMUM** | This is the maximum out-of-pocket amount that beneficiaries will pay in coinsurance after the deductible has been met. |

Supplemental Benefits
An MA supplemental benefit is defined by CMS as “an item or service not covered by original Medicare, that is primarily health related and for which the MA plan must incur a [...] direct medical cost” (CMS, 2020; Ch4.30.1).

Examples of supplemental...
CODING AND REIMBURSEMENT

benefits in an MA plan are vision care, hearing aids and routine hearing testing, home care, and/or transportation to medical appointments.

As many audiology services are not covered through traditional Medicare Part B, supplemental hearing benefits in MA plans can include provisions for items and services beyond that of Part B provisions. These items may include routine hearing tests, hearing aids, and other hearing aid accessories.

<table>
<thead>
<tr>
<th>XYZ INSURANCE</th>
<th>Evidence of Coverage Medical Benefits Chart</th>
</tr>
</thead>
<tbody>
<tr>
<td>SERVICES THAT ARE COVERED FOR YOU</td>
<td>WHAT YOU MUST PAY WHEN YOU GET THESE SERVICES IN-NETWORK</td>
</tr>
<tr>
<td>HEARING SERVICES</td>
<td>$0 copayment for each Medicare-covered exam.</td>
</tr>
<tr>
<td>Diagnostic hearing and balance evaluations performed by your provider to determine if you need medical treatment are covered as outpatient care when furnished by a physician, audiologist, or other qualified provider.</td>
<td>Your provider must follow prior authorization requirements.</td>
</tr>
<tr>
<td>ADDITIONAL ROUTINE HEARING EXAMS</td>
<td>$0 copayment</td>
</tr>
<tr>
<td>Limited to one exam every year</td>
<td></td>
</tr>
<tr>
<td>HEARING AIDS</td>
<td>Hearing aids are provided through a third party, XYZ Hearing Care. Additional fees apply for provider follow-up visits.</td>
</tr>
<tr>
<td>Through our agreement with XYZ Hearing Care, you can choose from a selection of hearing aids.</td>
<td>$600 copayment for each brand name ‘Entry’ level hearing aid.</td>
</tr>
<tr>
<td>Limited to 2 hearing aids every 3 years. Before receiving hearing services, contact XYZ Hearing Care to register. You can find a list of in-network providers on our website.</td>
<td>$1,500 copayment for each brand name ‘Standard’ level hearing aid.</td>
</tr>
<tr>
<td>HEARING AID ACCESSORIES</td>
<td>$2,000 copayment for each brand name ‘Premium’ level hearing aid.</td>
</tr>
<tr>
<td>Hearing aid accessories are not covered by the plan and are the responsibility of the member.</td>
<td>Covered services that do not count toward your maximum out-of-pocket amount.</td>
</tr>
</tbody>
</table>

NOTE: The benefits and prices outlined in this example are for illustrative purposes only and do not represent an actual Medicare Advantage plan.
When seeking information about the specific details of supplemental hearing benefits, health-care professionals should refer to the evidence of coverage document for a given MA plan and not rely on the summary of benefits document.

Part B-covered diagnostic audiology services are accessed by submitting directly to the MA payer. Many MA plans, which provide beneficiaries with access to supplemental hearing care, may do so through a contracted third-party vendor network. Thus, it is important not only to reference the MA coverage policies, but also the coverage policies of the third-party hearing-care contractor responsible for providing the supplemental benefits.

Examining the Evidence of Coverage Document
All Medicare Advantage evidence of coverage documents follow a specific format. You will be able to locate the information for hearing care in Chapter 4 of the EOC under “Hearing Services.”

In TABLE 2, we provide a hypothetical example of the hearing-services benefit for an MA plan. It is important to thoroughly review language in evidence of coverage documents and identify whether additional information on hearing-care coverage policies is referenced in other parts of the document (appendices, footnotes, etc.).

Medicare-Covered Services
MA organizations are required to provide all Medicare Part A and B benefits under MA plans. In the present example, the hearing services section outlines these coverage provisions for diagnostic hearing evaluations, as they would be provided through original Medicare Part B benefits. These Medicare-covered benefits
must be included in MA plans and will follow Medicare guidelines for payment. A full list of Part B-covered audiology services that should be included in all MA plans is detailed elsewhere by the CMS (2016).

Supplemental Benefits and Services

Routine hearing exams can be included in MA plan provisions that provide supplemental coverage beyond traditional Medicare Part B benefits. This example MA plan provides coverage for routine or annual hearing examinations once per year. Beneficiaries are simply responsible for the agreed-upon copayments for in- and out-of-network services.

Here, hearing aids are covered, but are provided exclusively through XYZ Insurance’s partner organization, XYZ Hearing Care. This third party serves as a contracted entity that provides MA supplemental hearing care benefits to beneficiaries through a defined network of contracted providers. The XYZ Hearing Care organization provides beneficiaries with options for different types and brands of hearing aids and allows for the provision of two hearing aids every three years.

In this hypothetical case, some stipulations on hearing benefits would apply, as follows:

1. For hearing aids to be covered, they must be obtained through the third party, XYZ Hearing Care.
2. The hearing aids available to beneficiaries under this plan are limited.

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3. Copayments for hearing aids do not count toward the out-of-pocket maximum.

4. Hearing aid accessories and follow-up visits are not covered and are the financial responsibility of the beneficiary.

To determine payment (revenue) for such services would require facility-specific review of third-party contracts or contracted fee schedules.

Summary
Practitioners are encouraged to first verify that original Medicare Part B benefits are adequately reflected in MA plan coverage documents, specifically those for diagnostic hearing, tinnitus, and balance evaluations. Additional benefits, such as routine hearing evaluations and hearing aids, may be covered by MA plans, but may also be subject to certain restrictions or different cost-sharing structures. Beneficiaries and providers should thoroughly review evidence of coverage documents as a first step in understanding the hearing-care coverage policies of MA plans.

Anna Marie Jilla, AuD, PhD, is a postdoctoral fellow in the Cochlear Center on Hearing and Public Health at Johns Hopkins University in Baltimore, Maryland.

Mariah Cheyney, AuD, is a clinical assistant professor at Northern Illinois University in DeKalb, Illinois.

Dr. Jilla and Dr. Cheyney are members of the Academy’s Coding and Reimbursement Committee.

**DISCLAIMER**

The purpose of the information provided above by the American Academy of Audiology Coding and Reimbursement Committee is strictly for educational guidance to audiologists. Action taken with respect to the information provided is an individual choice. The American Academy of Audiology hereby disclaims any responsibility for the consequences of any action(s) taken by any individual(s) as a result of using the information provided, and reader agrees not to take action against, or seek to hold, or hold liable, the American Academy of Audiology for the reader’s use of the information provided. As used herein, the "American Academy of Audiology" shall be defined to include its directors, officers, employees, volunteers, members, and agents.

**References**


The current pandemic has upended virtually all aspects of our lives: work, interaction with family and friends, schooling, travel, and finances. However, Congress and federal and state agencies have continued working under these extraordinary conditions to respond to the myriad of financial and health-care-related crises created by COVID-19.

The business of advocacy is typically a hands-on affair—characterized by in-person meetings with members of Congress and staff, fundraisers, coalition meetings, and travel to conferences and meetings. With the advent of COVID-19, these face-to-face activities came to a screeching halt. The disruption of these “typical” advocacy activities came at a time when it was more critical than ever before for the Academy, other associations, and industries to reach their elected officials and policy makers to express their concerns and share their ideas on how to address the health-care crisis. Our patients need access to non-COVID-19, yet critical, health-care services.

**Lobbying by Zoom**

Under usual circumstances, associations or other interest groups make donations from...
their political action committee (PAC) to various members of Congress or their campaigns and are able to meet with the members to gain actual “face time” to talk about issues of concern or to educate the members about their profession.

Believe it or not, even these fundraisers have shifted to Zoom events. The Academy has participated in several of them and staff have been able to express concerns directly to lawmakers, including Representative Frank Pallone (D-NJ), Chairman of the House Energy and Commerce Committee, and Senator Chuck Schumer (D-NY), Senate Minority Leader.

Chasing the Wave of Telehealth
The pandemic has changed the health-care delivery landscape by shifting many non-COVID-19-related health-care services to a virtual format. To keep pace with this shift, most private insurers, as well as the Centers for Medicare and Medicaid Services (CMS), began making rapid changes to their previously limited policies regarding the provision of services via telehealth.

The Academy engaged with CMS staff via written correspondence, telephone calls, and responses to CMS requests for provider feedback. As a result, audiologists were added to the list of providers able to temporarily provide services via telehealth with Medicare. While the services allowed to be provided, albeit temporarily, were limited, this was a critical “foot in the door,” setting the stage for the future.

Staying Focused
Before the pandemic hit, the Academy’s top legislative priority was the Medicare Audiologist Access and Services Act (H.R. 4056/S.2446), the “joint audiology bill” supported by the Academy, the American Speech-Language-Hearing Association (ASHA), and the Academy of Doctors of Audiology (ADA). This legislation, which would remove the physician-order requirement, grant audiologists “practitioner” status, and allow audiologists to bill for covered Medicare services has remained an area of critical focus even throughout the pandemic.

The Academy, along with ASHA and ADA, has been in regular contact with the principal sponsors of the joint audiology bill—Representatives Tom Rice (R-SC) and Matt Cartwright (D-PA) and Senators Elizabeth Warren (D-MA) and Rand Paul (R-KY)—to keep making the case to the House and Senate leadership that the provisions of the legislation—to remove barriers to beneficiary access to critical hearing and balance services. These services are essential to seniors, particularly at this time when many assisted-living centers and facilities are shut off from the outside world. This situation makes the ability of these seniors to communicate effectively even more important to stave off feelings of loneliness and isolation.

Managing the Deluge of Information
News stories about COVID-19 and its wide-ranging effects have dominated every news cycle since last spring. Early in the crisis, the Academy sensed the need to “curate” for its members the news stories and other information released by federal and state agencies that were most relevant to audiologists as health-care providers, small business owners, and as potential patients. Each Friday, the Academy has been sending out a COVID-19 Week in Review newsletter highlighting emerging resources and actionable news items.
Advocacy: Critical in a Crisis

Even as the typical avenues of advocacy have been interrupted, the need for effective advocacy during a crisis has remained. The Academy advocacy-related member committees (the Government Relations Committee (GRC), the State Relations Committee (SRC), the PAC Advisory Board, the Coding and Reimbursement Committee, and the Practice Policy Advisory Council (PPAC) are serving as invaluable resources to help guide the Academy through these uncharted waters to further the legislative priorities of the Academy and of the profession.

Each individual member can advance the advocacy goals of the Academy. Donations to the Academy PAC facilitate work with members of Congress. In addition, members can access the Academy Legislative Action Center to contact their elected representatives on issues of importance to the profession. In addition, engagement at the state and local government level or with state audiology academies dovetails with federal advocacy efforts and raises public awareness of the importance of audiology.

<table>
<thead>
<tr>
<th>CATEGORIES</th>
<th>AMOUNT</th>
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<tbody>
<tr>
<td>New Investigator Grant</td>
<td>Up to $10,000</td>
</tr>
<tr>
<td>Student Investigator Grants</td>
<td>Up to $5,000</td>
</tr>
<tr>
<td>• General Audiology/Hearing Science</td>
<td></td>
</tr>
<tr>
<td>• Vestibular and Balance Science</td>
<td></td>
</tr>
<tr>
<td>Student Summer Fellowship</td>
<td>Up to $2,500</td>
</tr>
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DUE DATE: January 25, 2021

www.audiology.org

KEYWORDS: RESEARCH GRANTS
Congratulations to the Recipients of the 2020 Jerry Northern Scholarships in Pediatric Audiology

The American Academy of Audiology Foundation is pleased to announce the recipients of the 2020 Jerry Northern Scholarships in Pediatric Audiology, awarded to students who show exceptional promise as clinical audiologists with a focus on the specialty of pediatric audiology.

The recipients each received a $10,000 scholarship and a $500 stipend to participate in the Academy's and the Student Academy of Audiology’s annual conferences.

**Congratulations** to the following recipients:

**Kendall Carroll**  
Vanderbilt University

**Arielle Darvin**  
Vanderbilt University

**Lauren O’Neil**  
University of Wisconsin–Madison

**Sarah Pupa**  
University of Pittsburgh

**Caitlin Sapp**  
University of Iowa

**Kyli Schultz**  
The University of Texas at Austin

**Delphanie Wu**  
Vanderbilt University

The AAA Foundation will accept applications for the 2021 Jerry Northern Scholarships in Pediatric Audiology between January 15, 2021, and May 31, 2021. The scholarships will be awarded to full-time graduate students enrolled in audiology (AuD, PhD, AuD/PhD) programs and in good standing at U.S. universities during the 2021–2022 academic year.

VISIT the Foundation website (www.AudiologyFoundation.org) for more information.
Academy Awards Two Music Research Grants

By Ryan McCreery

In spring 2020, the Academy’s Research Initiatives Committee launched the new Music and Hearing Research Grant Program. Funded by the American Academy of Audiology Foundation (AAAF) through the generous sponsorship support of Dr. Michael Santucci, this program supports research that will expand the body of knowledge to shape best practices in this area of audiology practice.

In addition to $10,000 in funding, each grant award in the inaugural cycle includes the opportunity for each grantee to receive mentoring from Dr. Santucci. While he has dedicated his career to protecting the hearing of musicians through his own research and development work, Dr. Santucci has also continued to promote best practices in audiology. He recently led the Academy task force that prepared the newly released clinical consensus document, *Audiological Services for Musicians and Music Industry Personnel*.

AAAF chair Dr. Helena Solodar has confirmed a commitment to a next cycle of the grant program.

The AAAF is very enthusiastic with the program inauguration and plans for a second cycle in 2021. We look forward to working with Dr. Santucci to garner long-term support for this needed research.

—Helena Solodar, PhD | AAAF Chair

A second request for applications will be released in spring 2021, with a July submission deadline. Peer review of the grant applications includes members of the committee, as well as guest reviewers with relevant research experience.

**Grantees**

The first two recipients of the Music and Hearing Research Grant are Erika Skoe, PhD, of the University of Connecticut and Alex Meibos, AuD, PhD, of the University of Akron. Through a competitive process modeled after the Academy’s other research grant program (also funded by the AAAF), the proposed studies by these investigators received the highest scoring for their potential to be impactful to the field of audiology and to musicians.
FUNDED STUDY:
The Auditory Benefits and Hazards of Being a Musician

PRIMARY INVESTIGATOR:
Erika Skoe, PhD
Associate Professor | University of Connecticut

College musicians are routinely exposed to sound levels that place them at risk for noise-induced hearing loss. Although the risks of noise exposure from music are well-known, studies of musicians rarely consider how hearing risks are increased due to unsafe levels from activities outside of music. The investigator’s recent work using body-worn dosimeters showed that unsafe levels of noise exposure are not limited to musical environments.

This work also showed that, even before hearing thresholds are compromised, increased exposure to noise can undermine some of the auditory benefits of musicianship (better hearing in noise and stronger efferent regulation of cochlear gain). The primary objectives of the current study are to characterize noise exposure doses from both music and non-music sources across different musician subgroups (grouped based on instrument class, major, ensemble type, and number) and examine the degree to which noise exposure undermines benefits of musical training on speech perception in noise in these groups.

FUNDED STUDY:
Facilitating and Measuring the Output and Isolation of In-Ear Monitors in Audiology

PRIMARY INVESTIGATOR:
Alex Meibos, AuD, PhD
Assistant Professor | The University of Akron

The purpose of this project is to investigate current knowledge and perceptions of audiologists regarding their role in facilitating in-ear monitor (IEM) systems to music industry workers and to measure the output and on-ear isolation of industry-leading custom-fit in-ear monitor devices, using conventional strategies available to clinical audiologists in most settings.

For many music industry workers, the use of IEM systems has become a popular means to help reduce cartage and storage of loudspeaker systems, while also reducing the high levels of sound produced on performance stages.

Effective and proper use of these systems can additionally lead to optimal music listening experiences for performers, audio engineers, and audience members alike, whereas the improper use may increase a music worker’s risk of music-induced hearing injury.

Audiologists are in an ideal position to address the risks with IEM use in the music industry since they are often consulted by music workers for custom IEMs. The proposed research is designed to help explore evidence-based strategies to prevent hearing injuries in music industry workers who use custom-fit IEMs.

Ryan McCreery, PhD, is chair of the Academy’s Research Initiatives Committee.
The Academy’s Loyalty Media Programs offer organizations the opportunity to connect with Academy members and the audiology community. You can find participants featured here in *Audiology Today* magazine, on our Web site (www.audiology.org), and at Academy events. Consider supporting the companies that support your association.

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- Oticon, Inc.
- Prestige Brands, Inc.
- Signia
- Ultratec CapTel
- Captioned Telephone

For more information about the program, contact Eric Gershowitz at eric.gershowitz@mci-group.com.
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We remain focused on delivering industry-leading technology and support designed to maximize each patient appointment, foster patient engagement, and drive long-term success, in the current COVID environment and beyond.