

## **Q&A Summary**

### *The Impact of Aging, Hearing Loss and Cognitive Burden on Health Literacy on Older Adults*

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**Presenter:** Lisa Rickard, AuD, CCC-A, Assistant Clinical Professor, Department of Hearing and Speech Sciences, University of Maryland, College Park, MD

### **Available On Demand:**

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#### **1. Are there any preventative measures that could be taken earlier in life (i.e., lifestyle changes, dietary changes) to delay or ward off hearing loss? Any pharmacologic interventions?**

I think it's important for us to think in terms of a "life-course" approach for many of the chronic disabling conditions that older adults face. That is, what can we do throughout the lifespan to prevent or mitigate age-related conditions rather than waiting until they become disabling in late life? Hypertension, diabetes and some cancers come to mind. The same can be said for hearing loss. I encourage you to take a look at the article that I cite at the end of this question for further information about thinking about hearing loss from a life-course perspective. The thoughts below are from that article.

Every individual, worldwide, is on a "hearing health trajectory," beginning at conception/birth and continuing throughout life. As individuals progress through childhood and adolescence, environmental conditions and experiences can become "embedded" into emerging biological systems, altering health trajectories. Further exposures throughout adulthood (e.g., to noise, smoking, alcohol, medications and weight gain) continue to affect hearing health such that two individuals at age 50 years might seem to have the same hearing health because they both have identical and apparently normal audiometric thresholds, yet they could be on very different underlying hearing health trajectories. The eventual trajectories in their hearing health depend on everyone's ongoing exposures to risk, protective factors and their genetic risk or resilience.

The most studied environmental risk factor for hearing loss in adulthood is exposure to industrial, recreational, military and social or community noise. The global burden of disabling noise-induced hearing loss is estimated to be as high as 16%. Even though hearing loss caused by exposure to loud sound is preventable, compliance with recommendations regarding use of ear protection for those at risk of occupational exposure or for leisure-related exposures is generally low. To a certain extent, the hazards of industrial noise have been reduced over the last four decades with the introduction of hearing-conservation regulations and the increasing automation of work.

For more information, please see Davis A, McMahon CM, Pichora-Fuller AM, et al. Aging and hearing health: The life-course approach. *Gerontologist*, 2016;56(S2):S256–S267. doi:10.1093/geront/gnw033.

## **2. At what age do you recommend hearing tests?**

Universal newborn hearing screening is in place in most of the US. That is, all babies are screened for hearing loss prior to leaving the hospital after their birth. We suggest that the “medical home” keep close watch on an infant and toddler’s hearing, speech and language development. Children are regularly screened throughout their school years. For adults, I would recommend a hearing test any time the individual perceives a change in hearing. Some family physicians screen for hearing loss as part of regular physicals. Otherwise, I think it’s reasonable for an individual to request a hearing test at about the age of 50—just to have a baseline in case there are any hearing changes in the future. We screen for many health conditions at about the age of 50, and hearing loss has a significant negative impact on healthy aging as well as other conditions.

## **3. Are there guidelines to follow for individuals who are experiencing hearing loss but are reluctant to wearing an aid and for those who are increasingly forgetful/confused and can become aggressive when you suggest that they get tested?**

Unfortunately, many people with hearing loss are in denial or reluctant to consider wearing hearing aids. There are many reasons for this—some of which we discussed in the webinar—such as lack of affordability and access, low self-efficacy and negative stigma about wearing hearing aids. In my day-to-day work, I teach students about the Stages of Change model. This is not a new model, and it can be applied to many areas of behavioral healthcare change—from smoking cessation to weight loss or starting an exercise program. The Stages of Change model suggests that everyone goes through five very distinct stages of change. The first, precontemplation, is where most people who are in denial and refuse to consider hearing aids are. I’ve included the link to the original paper that described this model as well as ways to help individuals progress through the stages. It’s important to recognize where a person is in their journey to change and deal with them where they are. For someone in the precontemplation stage, I might offer them information to read—bibliotherapy. They may shove it in their pocket in my office, but they will likely take it out and read at some point in the future. There are also self-administered questionnaires that can serve to raise an individual’s consciousness about their hearing and how it impacts their daily life and the lives of those around them.

Another wonderful resource is the Ida Institute ([idainstitute.com](http://idainstitute.com)). They are an independent organization that addresses living with hearing loss. There is a wealth of tools for adults, families, children, teenagers and teachers on this site. It’s free and I encourage you to look at it if you are interacting with individuals or families with hearing loss.

For more information, please see Prochaska JO, Velicer WF. The transtheoretical model of health behavior change. *American Journal of Health Promotion: AJHP*. 1997;12(1):38-48. <https://doi.org/10.4278/0890-1171-12.1.38>.

## **4. How can organizations appropriately screen for health literacy especially when the patient has a hearing impairment? We have looked at tools like the nutritional label and the REALM test, but just can’t seem to find one that can be used on all patients.**

There is very little to no research on how to assess health literacy in a hearing impaired or deaf individual. As stated, many of the tools such as the REALM are not normed on individuals with sensory impairments. I think it's somewhat safe to assume that hearing impairment negatively impacts health literacy. So rather than focus on how to assess health literacy in this population, perhaps we should focus on how to train healthcare workers to recognize signs of reduced health literacy and how to improve communication—both aural and written—in this population. I did find one article that looks at health literacy in hearing impaired and deaf adolescents, and I've included the link below. The article suggests that these individuals do have reduced health literacy. The reference list has many articles that deal with how to improve communication with hearing impaired and deaf individuals.

For more information, please see Gur K, Dolaner G, Turn SR. Health literacy of hearing-impaired adolescents, barriers and misunderstandings they encounter, and their expectations. *Disability and Health Journal*. 2020 April 8. <https://doi.org/10.1016/j.dhjo.2020.100929>.

**5. Beyond affordability as a reason why individuals are not wearing hearing aids, could you give more insight on the barriers and advise on strategies on how to overcome these barriers?**

Barriers to hearing aid use include affordability, as you mentioned, as well as accessibility and the negative stigma attached to hearing aid use. Some think that wearing hearing aids is a sign of old age. Also, many people with mild to moderate hearing impairment do not believe that they are receiving enough benefit to justify the cost of hearing aids—even if affordability is not an issue. I think that's why it is so important to educate health care providers and hearing-impaired individuals about the negative consequences of even a mild hearing loss. When individuals understand the negative impact that untreated hearing loss has on cognition, physical functioning, psychosocial health and quality of life in general, they are often more willing to consider amplification. That's why I think it is reasonable for audiologists to entertain the idea of the over the counter (OTC) hearing aids that will soon be available to the public (pending FDA regulations/approval). These can be an entry point to amplification.

Access to hearing health care can be confusing and prohibitive. The traditional model requires several trips to the hearing health care provider. This just might not be possible for some. Many primary care providers and individuals do not know where to start. There are several types of professionals who dispense hearing aids, from a doctoral-level audiologist to a hearing aid dispenser. There are often unrealistic expectations about what hearing aids will accomplish, and misinformation is rampant. Again, I think that the profession of audiology needs to do a better job of educating health care professionals and the general public regarding the impact of untreated hearing loss, how to access care, and realistic expectations. Kudos to you all for your interest in this topic!

**6. There are so many companies that manufacture hearing aids, and this makes it difficult to choose the ones that are right for you. How does a lay person decide or determine what is a reputable brand to purchase?**

There are many very good hearing aids on the market. In general, I could fit a given individual with any number of manufacturers and they would do well. I think the most important factor is the education and expertise of the individual doing the hearing aid fitting. I would recommend seeing a certified, licensed audiologist who has a clinical doctorate in audiology. You also want to choose someone who is interested in working with the individual to determine hearing goals and what is important to that individual on a day-to-day basis. One size does not fit all, so it's more about your comfort with the professional rather than the particular manufacturer. Hearing health care is generally a long-term, collaborative relationship between the provider and the patient.

That said, there are some evidence-based practices that you should look for. There are a couple of good, objective guides to consult. AARP provides a very good guide to purchasing hearing aids for consumers at

[https://assets.aarp.org/www.aarp.org\\_/articles/health/docs/hearing\\_guide.pdf](https://assets.aarp.org/www.aarp.org_/articles/health/docs/hearing_guide.pdf).

Likewise, Consumer Reports also produces a guide. You can find it at:

<https://www.consumerreports.org/cro/hearing-aids/buying-guide/index.htm>.

**7. Do the newer remote devices also cancel out background noise as well as the Pocket Talker?**

A pocket talker is a great alternative if the individual does not wear hearing aids. It's nice if health care providers can keep one or two of these on hand. That said, if an individual wears hearing aids, and those aids are paired to a remote microphone (as pictured in the one slide), then that will likely be a much better outcome. The remote mic is an option that an individual must purchase from their hearing health care provider. First, the connection is wireless. Second, the sound that is delivered to the patient's hearing aids is amplified and shaped specifically for the individual's hearing loss.

**8. Is there much advantage if one learns American Sign Language or do the majority of people read lips?**

American Sign Language is a language unto itself with its own syntax and grammar. In order to communicate via American Sign Language, everyone who communicates with the individual must be fluent in that language. If a person is born deaf and considers himself or herself a member of the Deaf culture, then all those around him or her might also be part of that culture and may know American Sign Language.

However, it seems unlikely that an individual who is part of the hearing culture and who develops hearing loss later in life is going to learn ASL as well as all of those around him or her.

For those who develop hearing loss later in life, a better option might be to work with an audiologist who can help the individual and his/her communication partners to maximize communication. A combination of hearing aids, assistive devices/accessories and communication strategies will likely be most beneficial.

**9. For children with parents who are hard of hearing, what is the appropriate and polite way to address this issue? Many health disparities with children occur due to communication barriers with parents.**

This is an excellent question, and an issue that is important to address. In a health care setting such as a pediatrician's office or a therapist's office (speech-language therapy or physical therapy, for example), I think that some of the tools and strategies that were discussed in the webinar would be helpful. The parent is the legal guardian for the child and is making important medical decisions on behalf of the child. We need to recognize that hearing loss can negatively impact the parent's health literacy and ability to make decisions on behalf of the child and to follow through with the recommendations for the child. So, if the pediatrician's office knows that the parent has a hearing loss, the office may ask the parent to complete the Communication Access Plan as described in the HLAA document. The use of assistive listening devices or various interpreting services would also be important to consider.

The Americans with Disabilities Act guarantees access to all who have a disability or who are perceived to have a disability by others. Title III of the Americans with Disabilities Act covers businesses and nonprofit service providers that are public accommodations, privately operated entities offering certain types of courses and examinations, privately operated transportation and commercial facilities. Public accommodations are private entities who own, lease, lease to or operate facilities such as restaurants, retail stores, hotels, movie theaters, private schools, convention centers, *doctors' offices*, homeless shelters, transportation depots, zoos, funeral homes, day care centers and recreation facilities including sports stadiums and fitness clubs. Transportation services provided by private entities are also covered by Title III. The HLAA website has great summary information about the rights that are ensured to individuals with hearing impairment.

As for how to suggest accommodations politely, I might appeal to the parent from a family-centered care perspective and stress that they are an integral part of the decision-making process for their child. Therefore, there is a need to make sure that everyone is on the same page and understands the options in order to act in the best interest of the child.

**10. What is the relationship between the inner ear and hearing loss, dizziness, lightheadedness and balance, and what can be done to help with balance in individuals who have hearing loss?**

Before I begin, I suggest that a referral to the primary care provider is a prudent first step to rule out any medical conditions or drug interactions/reactions that may be causing dizziness and balance disturbances.

The inner ear houses both the organ of hearing (the cochlea) and the organ of balance (the vestibular system) in a very small and intricately connected way. Some disorders affect one or the other, and some disorders can affect both systems. True vertigo—a sensation that one is spinning, or the room is spinning—is often thought of as originating more from the inner ear—perhaps from some disorder that affects both the cochlea and the vestibular system. Meniere’s disease is one example of a disorder that affect both the cochlea and the organ of balance, for example.

That said, several systems are involved with keeping one “balanced.” These include the vision system, the inner ear and our proprioception—our awareness of our position in space. So, an individual who has vision disorders, peripheral neuropathy that might affect being able to feel their feet on the floor, or an inner ear disorder that affects the organ of balance is at high risk of falls. For example, a person who has hearing loss and is not able to hear environmental sounds well, who has macular degeneration that impairs their vision, and who has diabetic neuropathy that diminishes the signals that the brain is receiving from the feet and legs is at high risk for a fall. Couple this with reduced physical functioning that might come along with a very sedentary lifestyle, and you have a recipe for disaster!

Audiologists are the professionals who are responsible for diagnosing disorders of the balance system. Physical therapists are often involved in treatment of balance disorders and may prescribe balance exercises, therapy, or perhaps assistive devices such as canes or walkers. Helping an individual to make changes in their home such as removing throw rugs or placing furniture at strategic spots in a room so that they always have a piece of furniture to touch is also helpful.

### **11. Is there a hard and fast physiological cause of hearing loss or is it still theoretical at this point?**

There are many very well-known causes of hearing loss. Hearing loss is often divided into three broad types, depending on where in the hearing system the damage/disorder occurs.

#### **Conductive Hearing Loss**

Conductive hearing loss is due to problems with the ear canal, ear drum, or middle ear and its little bones (the malleus, incus and stapes).

#### **Causes of Conductive Hearing Loss**

- Malformation of outer ear, ear canal or middle ear structure
- Fluid in the middle ear from colds
- Ear infection (otitis media – an infection of the middle ear in which an accumulation of fluid may interfere with the movement of the eardrum and ossicles)
- Allergies
- Poor eustachian tube function
- Perforated eardrum

- Benign tumors
- Impacted earwax
- Infection in the ear canal
- Foreign object in the ear
- Otosclerosis (a hereditary disorder in which a bony growth forms around a small bone in the middle ear, preventing it from vibrating when stimulated by sound; read more at [NIDCD](#))

### Treatments for Conductive Hearing Loss

- Surgery may correct conductive hearing loss that is due to a failure of the ear canal to be open at birth, congenital absence, malformation or dysfunction of the middle ear structures (i.e. from head trauma) and otosclerosis
- Amplification may be a solution with the use of a bone-conduction hearing aid; a surgically implanted, osseointegrated device (for example, the Baha or Ponto System); or a conventional hearing aid, depending on the status of the hearing nerve
- Antibiotic or antifungal medications are used to treat chronic ear infections or chronic middle fluid. Tumors usually require surgery

### **Sensorineural Hearing Loss**

Sensorineural hearing loss (SNHL) is due to problems of the inner ear, also known as nerve-related hearing loss.

### Causes of Sensorineural Hearing Loss

- Exposure to loud noise (preventable but not reversible – see more about [prevention](#))
- Aging (presbycusis)
- Head trauma
- Virus or disease
- Autoimmune inner ear disease
- Heredity
- Malformation of the inner ear
- [Ménière's disease](#)
- Otosclerosis
- Tumors

### Treatment of Sensorineural Hearing Loss

- Sudden SNHL, presumed to be of viral origin, is an otologic emergency that is medically treated with corticosteroids
- Corticosteroids may also be used to reduce cochlea hair cell swelling and inflammation after exposure to loud noise
- SNHL can occur from head trauma or abrupt changes in air pressure (e.g., airplane descent), which can cause inner ear fluid compartment rupture or leakage that can be toxic to the inner ear. There has been variable success with emergency surgery when this happens

- Bilateral progressive hearing loss over several months, also diagnosed as autoimmune inner ear disease, is managed medically with long-term corticosteroids and sometimes with drug therapy. Autoimmune inner ear disease is when the body's immune system misdirects its defenses against the inner ear structures, causing damage in this part of the body
- Fluctuating SNHL may be from unknown cause or associated with Ménière's disease. Symptoms of Ménière's disease are hearing loss, tinnitus (ringing in the ears) and vertigo. Ménière's disease may be treated medically with a low-sodium diet, diuretics and corticosteroids. If the vertigo is not medically controlled, then various surgical procedures are used to eliminate the vertigo
- SNHL from disease in the central nervous system may respond to medical management for the specific disease affecting the nervous system. For example, hearing loss secondary to multiple sclerosis may be reversed with treatment for multiple sclerosis
- Irreversible SNHL, the most common form of hearing loss, may be managed with hearing aids. When hearing aids are not enough, this type of hearing loss can be surgically treated with cochlear implants

### **Mixed Hearing Loss**

Mixed hearing loss is caused by a combination of conductive damage in the outer or middle ear and sensorineural damage in the inner ear (cochlea) or auditory nerve.

### **12. Are there genetic links to hearing loss and if so, should individuals be tested if there is a family history of hearing loss?**

Hearing loss has many causes—see answer to the question above! Approximately 50% to 60% of hearing loss in babies is due to genetic causes. There are also a number of things in the environment that can cause hearing loss. It is estimated that 25% or more of hearing loss in babies is due to “environmental” causes such as maternal infections during pregnancy and complications after birth. Sometimes both genes and the environment work together to cause hearing loss. For example, there are some medicines that can cause hearing loss, but only in people who have certain mutations in their genes.

Genes contain the instructions that tell the cells of people's bodies how to grow and work. For example, the instructions in genes control what color a person's eyes will be. There are many genes that are involved in hearing. Sometimes, a gene does not form in the expected manner. This is called a mutation. Some mutations run in families and others do not. If more than one person in a family has hearing loss, it is said to be “familial.” That is, it runs in the family.

About 70% of all mutations causing hearing loss are non-syndromic. This means that the person does not have any other symptoms. About 30% of the mutations causing hearing loss are syndromic. This means that the person has other symptoms besides hearing loss. For example, some people with hearing loss are also blind.

Individuals who have known familial hearing loss should definitely be tested. As mentioned in a previous answer, most babies are tested as part of universal newborn hearing screening.



However, some types of genetic hearing loss are not present at birth, but rather are called “late onset” or progressive in that they develop in the 20s, 30s, or later or progress in early childhood, teen years, or even later.

### **13. What category does tinnitus fall into regarding hearing loss?**

Tinnitus and hearing loss are separate. Certainly, an individual with hearing loss can have tinnitus and they do often go together. However, it is also possible for someone with completely normal hearing sensitivity to have tinnitus, and it is possible for someone who is deaf to have tinnitus! Sometimes, a cause might be obvious— for example, wax occluding the ear canal or a middle ear infection. Other times, such as with normal hearing or deafness, the cause is not obvious. That’s because we are not sure where in the auditory pathway the tinnitus actually occurs. There are theories as to the site or cause of tinnitus, but nothing definitive for all cases.

Tinnitus is very common. It’s fair to say that all of us have experienced occasional tinnitus at some point. However, for some people it is constant and very bothersome. In general, we recommend that someone who has bothersome tinnitus NOT be in a totally quiet environment. Ideally there would always be some low-level noise present such as a fan running or an external noisemaker to help to cover the internal tinnitus. In cases where the tinnitus becomes so bothersome that it interferes with mood, sleep, concentration or mental health, I’d advise that the individual contact an audiologist who is well versed in tinnitus evaluation and treatment.

The American Tinnitus Association has a wealth of knowledge on tinnitus theories, management, and treatment. Their website is [www.ata.org](http://www.ata.org).

### **14. Do you have any suggestions for someone with an acoustic neuroma?**

An acoustic neuroma is a benign tumor on one branch of the auditory nerve. This is located quite deep in the temporal bone, so it is often challenging to remove. It is generally very slow growing. The hearing loss that accompanies an acoustic neuroma is usually very gradual in onset. Common symptoms that raise the suspicion for an acoustic neuroma are gradual hearing loss on one side, tinnitus on one side, dizziness or vertigo or reduced speech understanding on one side.

Anyone who is experiencing such symptoms should consult with an audiologist for a complete hearing evaluation. Based on the findings, a referral to an ear doctor who specializes in such disorders is strongly recommended. Treatment is recommended by the ear surgeon and is often based on the size and location of the tumor, the age and health of the patient and the presenting symptoms.

Once the individual is cleared by the physician, a hearing aid might be recommended if it is appropriate or strategies for improving speech understanding may be recommended by the audiologist.

In general, people who have reduced hearing on one side—an asymmetry in the hearing—have more difficulty when there is background noise present or when the speaker is at a distance. Face-to-face communication in quiet surroundings is best.

If you have questions regarding this document or the content herein, please contact:  
[moreinfo@optumhealtheducation.com](mailto:moreinfo@optumhealtheducation.com).