

# Better hearing for all

**M**ay is Better Hearing and Speech Month, a time to raise public awareness about hearing and speech issues as well as available treatment options. This year we are focusing on the impact of hearing loss as related to age, from infants and children to working-age

adults to the elderly. Otolaryngologists treat hearing loss in patients of all ages, helping to mitigate the impact hearing loss can have on one's quality of life. You can learn more about Better Hearing and Speech Month online at [www.entnet.org/BetterHearingSpeechMonth](http://www.entnet.org/BetterHearingSpeechMonth). ■

## The real cost of hearing loss on infants and children

By **Dale Tylor, MD, MPH**, Washington Hospital, Fremont, CA, Media and Public Relations Committee

In the United States, two to three of every 1,000 children born have a detectable hearing loss in at least one ear. Further, more than 1 million children ages 1 to 19 years have bilateral mild-to-severe hearing loss, and around 3 million children have unilateral mild-to-severe hearing loss.<sup>1</sup>

Hearing loss in children can cause significant language impairments. Because educational success is substantially impacted by a child's language and communications skills, those with hearing loss face significant academic challenges. The behavioral effects of hearing loss can mimic attention deficit disorders, cognitive or learning issues, or language processing problems. The lifetime educational cost per child of moderate or worse hearing loss in the absence of other disabilities is \$115,600.<sup>2</sup>

Even children with unilateral hearing losses face significant language deficits, and have been found to have lower scores of language comprehension and oral expression than their normal hearing siblings.<sup>3</sup> Those with unilateral loss or mild bilateral hearing loss also face educational impacts, with up to 35 percent failing a grade and

up to 41 percent receiving educational assistance.<sup>4</sup>

School-aged children with hearing loss report significantly more fatigue than their normal hearing peers, which also can have negative academic and psychosocial effects.<sup>5</sup> Parents of children with hearing impairment also are affected, and have been found to have impairment in almost all domains of health-related quality of life.<sup>6</sup>

Health disparities have been noted for children with hearing loss, with hearing services more limited for children from racial and socioeconomic minorities. Those in areas of lower median income and those of non-white or non-Asian minorities are less likely to receive cochlear implants, for example, and even when implanted can demonstrate worse speech and language outcomes.

It should be noted that universal neonatal hearing screening and school-related screening programs have significantly improved detection of pediatric hearing loss, allowing for earlier treatment. Rehabilitation of hearing loss, such as with hearing aid(s), cochlear implant(s), speech therapy, or with individualized education plans, can help to positively impact the quality of life of these children.

References are available at [entnet.org/bulletin](http://entnet.org/bulletin). ■



# ages



## The impact of hearing loss on working-aged individuals

**T**he most common chronic sensory disorder in adults is hearing impairment, and it impacts about 16 percent of Americans aged 20-69 in at least one ear, totaling more than 29 million people in this country. Risk factors for hearing loss include male gender, Caucasian race, and history of smoking, diabetes, cardiovascular disease, and noise exposure, with increasing education being protective.<sup>1</sup>

The impact of hearing loss on employment and income is marked. Compared with peers with normal hearing, those with hearing loss are more likely to be unemployed or partially employed (adjusted odds ratio, 2.2), more likely to have no wage income whatsoever (adjusted odds ratio, 2.5), and have a lower annual wage by almost \$8,000 (\$23,481 vs. \$31,272), but not be more likely to receive Supplemental Security Income.<sup>2</sup> Those with hearing loss may be looked over for a promotion or raise, and may be less comfortable with advocating for themselves at the workplace.

Psychomotor speed and executive function can be impaired with hearing loss in later middle age, to the extent that a drop of 25 dB in hearing was equivalent to an age difference

of seven years. Hearing aids seem to improve cognitive function scores of those with hearing loss.<sup>3</sup> It can be difficult to remember something that wasn't heard correctly in the first place.

Hearing loss can have a dramatic negative impact on one's relationship with their significant other. It has been demonstrated that the hearing loss of a spouse can be predictive of poorer physical, psychological, and social well being in their partner, and this seems to be even more prominent when the male partner is the one with the hearing loss.<sup>4</sup> Men in their 20s to 50s with acquired bilateral sensorineural hearing loss, when compared to normal hearing men, have poorer sexual health in all domains examined including erectile function, orgasmic function, sexual desire, intercourse satisfaction, and overall satisfaction.<sup>5</sup>

Otolaryngologists should question patients about their hearing, even when it is not their presenting complaint. Diagnosing this problem, and treating it, can lead to dramatic improvements in the patient's (and their loved ones) socioeconomic status and quality of life.

References are available at [entnet.org/bulletin](http://entnet.org/bulletin). ■



## SMART TALK TO SHARE WITH PATIENTS

# Age-related hearing loss

By **Kourosh Parham, MD, PhD**, Department of Surgery, Division of Otolaryngology-Head and Neck Surgery, University of Connecticut Health, Farmington, CT/AAO-HNS Geriatric Otolaryngology Committee

*Part of an occasional patient-focused series on geriatric otolaryngological care*

**H**earing loss is the most common sensory problem among older adults. Studies show that by 2060, 22 percent (92 million) of the population will be 85 or older, while 4 percent (18 million) of the population will be around 65 years old. Age-related hearing loss (ARHL, also known as presbycusis) is, by far, the leading cause of hearing loss in developed countries. Currently it affects 50 percent of 65-year-olds and more than 80 percent of those 85 years old and older.

### Evaluation

The diagnosis of ARHL is based on patient

history, physical examination, and a battery of audiologic tests, including an audiogram. ARHL is a progressive condition arising from changes in the inner ear (the cochlea) and the brain. Because of its deceptive nature, people frequently are less aware of their communication difficulties than the people around them and often discuss the hearing problem reluctantly with a physician at the insistence of family members.

### Hearing loss specifics over time

Although early hearing loss is different for all and dependent on a number of factors, often the earliest sign of ARHL appears late in middle age. By this time, cochlear changes are advanced enough to affect hearing within the sound range that makes up our daily lives. Often the experience of loss causes a person to misidentify words that sound the same and then make up for this problem by using the situation to understand the meaning.

Age-related high-pitched hearing loss results in difficulty hearing consonants and makes hearing in noisy places more difficult. Often

these high-pitched sounds work to separate syllables and words from one another. Without them, words tend to run together and sound “mumbled.” As voices of children and women tend to have a higher pitch, the person with hearing loss may complain that women speak too softly or that “my grandchildren mumble.”

Over the years, as a person’s hearing loss increases to include lower-pitched sounds, the loss is a bigger problem. This may result in a person’s lessening ability to understand difficult issues and to think and reason as quickly as would be normal. This means that hearing in noisy places and hearing accented or fast speech becomes more challenging. A common complaint from the person may be, “I can hear the words, but I can’t understand them.”

People find what work-arounds as they can to cope. Some ask others to speak louder or more slowly, while others avoid conversation and social activity. There are also social ramifications to this attribute of age-related hearing loss. Difficulties hearing on the telephone, particularly cell phones in which quality of sound

may fluctuate with the strength of the network signal, serve as a barrier to their effective use as an alternative to face-to-face communication.

### Related problems with hearing loss

Besides speech sounds, other important high-frequency warning sounds (alarms, ringing tones, turn signals, etc.) also become more difficult to hear. Reduced ability to hear alarms raises concern about safety. For example, older individuals with hearing loss have been shown to be at increased risk of motor vehicle accidents while driving. Besides difficulty in hearing communication sounds and alarms, other auditory functions are also impaired such as the accuracy of detecting sound sources.

As hearing loss severity increases, overall function diminishes among older individuals. It has long been speculated that inability to communicate effectively, and potential decreased overall functional status, will lead to social isolation. This association was not affected by use of hearing aids. Social isolation has significant implications for the well-being

of geriatric patients: lonely or isolated older adults are at greater risk for development and progression of cardiovascular disease and are more than twice as likely to develop Alzheimer's disease. Thus besides the insidious nature of the disorder, the isolation associated with hearing loss may be another factor that leads to delayed presentation and diagnosis, primarily because there is little pressure to seek care for communication difficulties.

Inherent difficulties in communication, which result in compounding psychosocial effects such as isolation, may precipitate psychiatric disorders such as depression, but whether hearing loss can contribute to depression remains a subject of debate.

### Tinnitus

Another symptom that affects the well-being of patients with sensorineural hearing loss is tinnitus (intrinsic noises not heard by others). The incidence of tinnitus increases with age: Tinnitus affects 15 percent of the general population and 33 percent of geriatric persons. Presence of

tinnitus by itself is not an independent risk factor for depression, but older individuals who perceive their tinnitus to be a problem or have problems with tinnitus when going to bed often display depression symptoms. In patients who also have ARHL, tinnitus can be a source of emotional and sleep disorders, difficulties in concentration, and social problems. In geriatric patients, it has been shown that tinnitus is associated with worse control of congestive heart failure in geriatric patients and may have important clinical implications for the early identification of patients who need more aggressive management of heart failure.

### Managing hearing loss

Based on the results of medical evaluation, candidacy for different rehabilitation strategies is considered. Depending on the severity of hearing loss, interventions could include improved communication strategies and modification of listening environment, to personal assistive devices and hearing aids, to cochlear implantation. While these strategies are principally directed at compensating for peripheral hearing

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loss, our understanding of age-related changes in the brain, including cognitive changes, have significant impact on rehabilitation strategies.

### Prevention

A number of factors have been recognized as contributing to the development of ARHL. These might be broadly classified into two categories: intrinsic and extrinsic. Intrinsic factors are host factors and are primarily genetic (including gender and race).

There are family genetics that we are born with and those we can help—health issues such as diabetes, hypertension, diabetes, and stroke. Managing these factors can have a critical role in prevention of ARHL. Because ARHL is a progressive condition, awareness of these factors is important not just to the older population, but also the young since their impact is not appreciated until decades later. Individuals with ARHL often report a family history of hearing loss among parents, siblings, and close relatives. Therefore, it has been presumed that ARHL has a genetic component that influences

the age of onset and severity of the loss.

Challenges in separation of environmental from genetic factors have made it difficult to assess the contribution of genetics to ARHL. Overall, the heritability estimates suggest that up to 55 percent of the variance ARHL is attributable to genes. This means in a large group of biologically related people, hearing sensitivity is more similar than in a group in the same general environment, but who are unrelated.

### Modifiable risk factors

The influence of genetics is likely to be modulated by a set of non-genetic factors. Cardiovascular disease, high blood pressure, and diabetes are well recognized as risk factors. Older persons with moderate-to-severe hearing loss have a significantly higher likelihood of reporting previous stroke, but it should be emphasized that ARHL is not predictive of increased risk of stroke. Chronic kidney disease and systemic inflammation may contribute to progression of ARHL. A common thread among these disorders is vascular disease/arteriosclerosis.

### Environmental factors

There is also a set of modifiable environmental factors that have been identified. Noise exposure and cigarette smoking are the best established risk factors. Among older adults, history of exposure to workplace noise raises the risk of cardiovascular disease and angina, and severe exposure was associated with risk of stroke. There is much concern about recreational noise exposure, particularly given prevalence of personal listening devices among the younger population. Smoking-related worsening of hearing loss with age is likely mediated by vascular disease. Long-time smokers with occupational noise exposure tend to have higher risk of permanent sensorineural hearing loss.

Oxidative stress is one possible mechanism for the aging process, and cochlear oxidative stress has been implicated in ARHL. Diets rich in antioxidants have been suggested to reduce ARHL and there is some evidence that healthy diets tend to be associated with better high frequency thresholds in adults. ■

## CALL FOR APPLICANTS: Foundation Coordinator for Meetings

The Foundation Board of Directors is seeking applicants to serve as Coordinator for Meetings (must be an otolaryngologist).

The Coordinator for Meetings is primarily responsible for the development and oversight of the Annual Meeting & OTO EXPO<sup>SM</sup> education program including Miniseminars, Scientific Presentations, and Instruction Courses. This is a core education activity of the Foundation and of financial significance to the AAO-HNS/F. The Coordinator will work closely with the Coordinator for Education to achieve seamless integration of the education activities of the Foundation. The Coordinator works in conjunction with Academy/Foundation staff to solicit, evaluate, select, and schedule each year's Annual Meeting education program and recommend changes as deemed necessary. Other duties include attending Board meetings and serving as board liaison to selected committees.

If elected by the Foundation Board, the coordinator will serve a four year term.



**APPLICATIONS ARE DUE JULY 3, 2015**  
Interested Fellows/Members should contact  
[meetings@entnet.org](mailto:meetings@entnet.org) for more information.