

# Hearing Health

Winter 2012

GLOBAL SOLUTIONS:

## Hearing Issues in Emerging Nations

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### ALL ABOUT BATTERIES

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10 Signs It's Time for a Hearing Check

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### AUDITORY NEUROPATHY EXPLAINED



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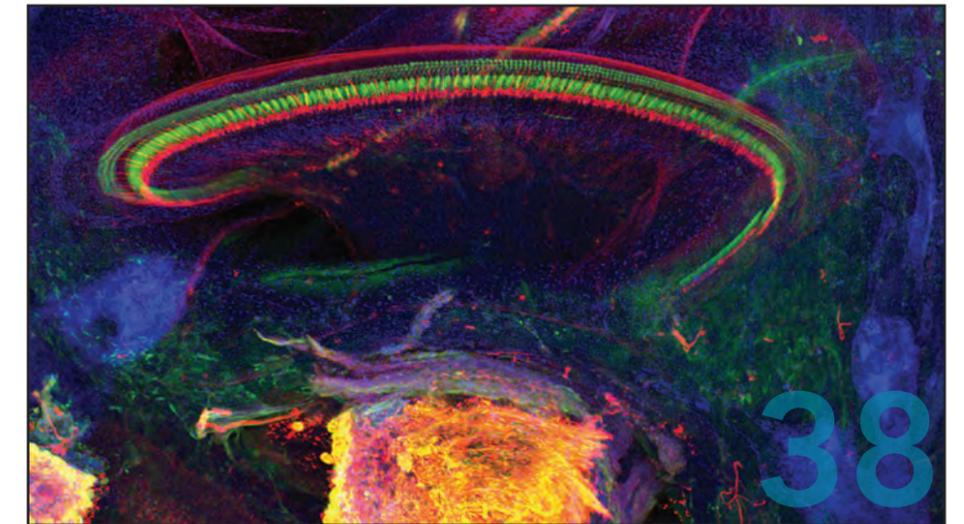
## CONTENTS

### DEPARTMENTS

- 4 From the Chairman
- 6 Mailbag
- 8 Hearing Health Foundation News
- 10 Hearing Headlines
- 42 Hearing Aids 101
- 47 Marketplace
- 50 Meet the Researcher



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### PEDIATRICS

- 12 **Family Voices** *Beating the Odds.* A mother lets her deaf son's love of reading lead the way. Lyn Neisius
- 14 **Research** *All About ANSD.* Auditory neuropathy spectrum disorder is a challenge to diagnose and treat. Charles I. Berlin, Ph.D.

### SENIORS

- 18 **Hearing Health** *10 Signs It May Be Time to Get Your Hearing Checked.* Do any of these scenarios apply to you? Amy Gross

### FEATURES

- 22 **Managing Hearing Loss** *Global Solutions.* Learn how people in emerging nations with hearing loss are getting help. Karen Appold
- 28 **Technology** *Power Up.* Here is everything you ever wanted to know about batteries. Nannette Nicholson, Ph.D., and Joshua Spann
- 36 **Research** *Bilateral Benefits.* Cochlear implantation in both ears instead of only one has clear advantages. Ruth Litovsky, Ph.D.
- 38 **Research** *The Race to Cure Hearing Loss in a Decade.* Leading scientists are collaborating on the Hearing Restoration Project.
- 40 **Living With Hearing Loss** *Taking His Shot.* A champion pool player uses his hearing loss to his advantage. Amy Gross



I am very pleased to write this first introduction as the new chairman of Hearing Health Foundation. Clifford P. Tallman, Jr., our former chairman, remains involved in the organization as an active member of our board of directors and the new chair of our communications committee, and I look forward to continuing the exciting programs of Hearing Health Foundation that were initiated under Cliff's tenure.

The last few months have been busy for us, so while the calendar may say it's a new year now, we feel like we kicked things off last fall. That's when we changed our name to Hearing Health Foundation, to underscore our commitment to fund hearing and balance science research, educate consumers, and prevent hearing loss.

Last fall is also when we launched one of the biggest research and fundraising initiatives in our 54-year history, the Hearing Restoration Project. Our aim is nothing less than to accelerate the search for the cure for hearing loss to within a decade. Learn more about the effort on page 38.

Research has always been a focus of this magazine as well. Learn about auditory neuropathy spectrum disorder, which is often misdiagnosed—and as a result, mistreated—from Charles I. Berlin, Ph.D., a leading researcher in the field (page 14). Ruth Litovsky, Ph.D., who heads the Binaural Hearing & Speech Lab at the University of Wisconsin–Madison, describes the benefits of bilateral cochlear implantation on page 36.

Our magazine is not only about science; it also provides help and inspiration for coping with hearing loss. If you know someone who has a hearing issue but hasn't quite accepted that fact, see "10 Signs It May Be Time to Get Your Hearing Checked" on page 18. Are you a hearing aid wearer? The types and choices among hearing aid batteries can be overwhelming. Check out our comprehensive battery feature on page 28.

Finally, our cover story on page 22, "Global Solutions," is about how selfless individuals are bringing simple technology, innovative solutions, and educational resources to people with hearing loss in emerging nations, where health care, including hearing checks, may not be routine.

We hope you'll find the story as inspiring as we did. And we hope you and your loved ones have a happy, healthy New Year, with many more to come.

Warm regards,

*Shari S. Eberts*

Hearing Health Foundation  
Chairman, Board of Directors

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# Hearing Health

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**Dear Editor:**

Thank you for your notice of hearing loops coming to New York City (“Induction Loops Around the Big Apple,” Winter 2011), thanks in no small measure to the efforts of local hearing advocates.

Across the country there is a growing social network of consumer advocates who, with support from the Hearing Loss Association of America and the American Academy of Audiology, are working to transform the way the United States provides listening assistance to people with hearing loss.

In western Michigan, central Wisconsin, and northern Illinois, where there are now several hundred looped venues, I have a simple solution when having difficulty hearing: I need only push a button and, voilà, my hearing aids become wireless loudspeakers that deliver sound customized to my hearing needs. Ditto many places now in New Mexico, Arizona, California, Florida, and Colorado.

Here in the United States, hearing assistance technology has, until the spread of hearing loops, required people who are having trouble hearing to get up, locate, check out, and wear conspicuous FM or infrared receiver/headset units that deliver generic sound. Alas, few people with hearing loss will do so.

We much prefer hearing assistance that is simple, convenient, and customized.

Having experienced hearing loops in many U.K. venues—churches, cathedrals, auditoriums, and even taxis and post office windows—I installed a hearing loop in my home TV room and office (for phone listening), and in 2002 launched a community initiative. The overwhelming positive response encouraged my further development of Hearingloop.org and related articles. Last October, The New York Times published a front-page article on our collective advocacy that, online, quickly became the paper’s second most e-mailed article published in the prior month, with other national media, including National Public Radio, to follow.

Our consumer-led and now audiologist-supported advocacy is less for hearing loops per se than for hearing technology that enables hearing instruments to serve an important second function—as simple, affordable, wireless loudspeakers. Happily, we are now approaching a cultural tipping point where this dream of transforming American assistive listening looks like an achievable reality.

**David G. Myers**  
Hope College  
Holland, Mich.  
[www.hearingloop.org](http://www.hearingloop.org)

**Dear Editor:**

I read your research article titled “A Digital Drug?” (Fall 2011) with some interest. I have been practicing Transcendental Meditation since 1976. I am also a cochlear implant wearer since 1994. Some years ago I learned to meditate in order to lower stress. In the process I discovered that the tinnitus I had been experiencing

since 1956 was gone. On occasion I experience it, but it lasts less than five minutes. I recently suggested to an audiologist about using meditation for the management of tinnitus. I told him how I had been meditating for decades and have not had any serious amount of tinnitus since. His response was less than favorable. However, I still believe this may be an excellent area for research.

**Al Laframboise**  
Jonesborough, TN

**Dear Editor:**

A very good article was written in the Spring 2011 issue by staff writer Jamie Morrison, “Stop That Swab.” At the end of the article it says, “Put a small amount of baby oil or olive oil in each ear canal once a week.” Do you put it directly in the ear like with a dropper? My 88-year-old aunt had a serious problem with wax buildup and I want to be sure I understand so I can pass the info on to my other aunt, who is her caregiver. Thanks!

**Gail Grayson**  
via email

*From Jamie Morrison: William H. Slattery, M.D., an otolaryngologist at the House Research Institute in Los Angeles, who is quoted in the story, offers this advice: Put some olive oil or mineral oil in an eyedropper. While lying on your side, put two or three drops into one ear canal. Wait for two or three minutes, then turn over on the other side and put two or three drops in the other ear. Wait a few minutes on that side as well. This should allow the oil to get into the ear canal and soften up the earwax. You may need to wipe off any excess oil from the exterior of the ear.*

**CORRECTIONS**

In “Holiday Gift Guide” (Fall 2011), the photo of the Amplicon clock was incorrect. The correct photo of the Amplicom TCL 200 digital alarm clock (\$99.95) is below. For more information, please see: [www.amplicomusa.com/tcl-200-digital-alarm-clock.php](http://www.amplicomusa.com/tcl-200-digital-alarm-clock.php).



In “Presenting the 2011 Grantees” (Fall 2011), the research information for grantee Keith E. Bryan, Ph.D., was incorrect. The correct information is

as follows:

**Keith E. Bryan, Ph.D., University of Iowa Carver College of Medicine**

Bryan earned his B.A. in biology from Simpson College in Iowa and his M.S. and Ph.D. in biochemistry at the University of Iowa, where he is now a postdoctoral fellow. During his Ph.D. work, Bryan studied how mutations in actin, an important structural protein in the specialized hair cells of the inner ear, may cause deafness. He furthered his interest in hearing research by participating as a student in the “Biology of the Inner Ear” course at the Marine Biological Laboratory in Woods Hole, Mass.

**Research area:** fundamental auditory research (molecular biology, electrophysiology, biochemistry)

**Investigating the role of CaBP1 in KCNQ4 channel modulation:** KCNQ4 potassium channels play

an important role in controlling the responsiveness of auditory hair cells to sound stimulation. Mutation of the gene encoding this channel causes deafness in humans, which may be due to the improper functioning of these channels in the ear. Bryan has identified a novel interaction between Ca<sup>2+</sup> binding protein 1 (CaBP1), which is highly expressed in auditory hair cells, and KCNQ4. The goals of this research are to evaluate the functional consequences of this interaction on the cellular localization and biophysical properties of KCNQ4 channels in auditory hair cells.

**Long-term goal:** to understand at the molecular level how hair cells function normally in sound detection and to develop new therapeutic strategies for treating patients with genetic forms of hearing loss.

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# NEWS



Royal Arch Masons Steven Rubenstein and Edmund Harrison are flanked by (from left) Hearing Health Foundation's Andrea Boidman, Shari Eberts, and Clifford Tallman, Jr.

### Help Us Give Thanks

Edmund Harrison, Most Excellent General Grand High Priest of the General Grand Chapter of the Royal Arch Masons International (GGCRAMI), and his colleague Steven Rubenstein, Right Excellent and Associate General Grand Chaplain of GGCRAMI, presented Hearing Health Foundation with a generous donation of \$100,000 on October 27, 2011, for research in the area of central auditory processing disorders (CAPD). This year the Royal Arch Research Assistance will be supporting the work of four 2011 Hearing Health Foundation Emerging Researchers: Edward L. Bartlett, Ph.D., at Purdue University; Elizabeth Dinces, M.D., M.S., at Albert Einstein College of Medicine; Zhengqing Hu, M.D., Ph.D., at Wayne State University School of Medicine; and Kirill Vadimovich Nourski, M.D., Ph.D., at the University of Iowa Hospitals and Clinics.

To learn more about the work of these investigators, please see [www.hearinghealthmag.com](http://www.hearinghealthmag.com) to read "Presenting the 2011 Grantees" in the Fall 2011 issue. Hearing Health Foundation is grateful to the Royal Arch Masons International for their dedication to healthy hearing and their commitment to funding research on CAPD.



(From left) The Hearing Restoration Project's George Gates, M.D., with Edwin Rubel, Ph.D., Sujana Chandrasekhar, M.D., Jon LaPook, M.D., Andy Groves, Ph.D., and Stefan Heller, Ph.D.

### Catch Up on Clips

On October 3, 2011, Hearing Health Foundation brought together the leaders in the cell regeneration field to discuss the topic of cell regeneration in the ear. Speakers included George Gates, M.D., medical director of Hearing Health Foundation; Sujana Chandrasekhar, M.D., of New York Otology; Edwin Rubel, Ph.D., of the University of Washington; Stefan Heller, Ph.D., of Stanford University; and Andy Groves, Ph.D., of Baylor College of Medicine.

The afternoon began with a panel discussion moderated by Jon LaPook, M.D., from CBS News and was followed by five presentations and closing remarks. Captioned video clips from each aspect of the summit are available at [www.hearinghealthfoundation.org/hri](http://www.hearinghealthfoundation.org/hri).

### Note Our New Name

We have changed our name! By now you will have noticed that Deafness Research Foundation has become Hearing Health Foundation. Although we have a new name, we remain committed to our mission: to help people attain a lifetime of healthy hearing through quality research, education, and advocacy. Hearing Health Foundation is the United States' leading source of private funding for research in hearing and balance science. Past research made possible by our grants has resulted in dramatic innovations that have increased options for those living with hearing and balance disorders, and protected those at risk. Since our inception in 1958, we have awarded more than \$26.5 million through more than 2,000 scientific research grants to researchers who are dedicated to exploring new avenues of hearing and balance science. [?](#)

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## CAN SECONDHAND SMOKE CAUSE HEARING LOSS?



It's no surprise that secondhand smoke has been linked to respiratory infections and lung cancer. But could secondhand smoke lead to hearing loss in adolescents? Yes, according to research published in the July issue of The Archives of Otolaryngology-Head and Neck Surgery.

Scientists from New York University Langone Medical Center tested nonsmoking teenagers ages 12 to 19 for cotinine, an indicator of exposure to tobacco smoke. They found 799 whose cotinine levels indicated exposure to secondhand

smoke, and 754 who had not been exposed to cigarette smoke. The higher the cotinine level in a participant's blood, the greater the likelihood there was some type of hearing loss. More than 17 percent in the highest quartile for cotinine levels had hearing loss at low frequencies. Most of the teenagers were unaware of their hearing loss.

The study does not prove that secondhand smoke causes hearing loss, but the results call for further research. Though tobacco is known to affect blood flow through the smallest blood vessels, like those in the inner ear, it is not clear

how exposure to secondhand smoke actually causes the damage. Additional research may explore the facts that secondhand smoke raises the risk of ear infections, and that toxins in smoke may cause some dysfunction in the Eustachian tubes.

"Most affected individuals are unaware of the hearing loss," writes Anil Kumar Lalwani, M.D., the lead author of the study (and a member of Hearing Health's editorial committee). "Thus, adolescents exposed to secondhand smoke may need to be closely monitored for early hearing loss with periodic audiologic testing."

# HEARING HEADLINES



### ANTIOXIDANTS FOR BETTER HEARING

Eat well, hear better? Maybe, according to a study from Vanderbilt University and Australia's University of Sydney. Published in last July's issue of The Journal of Nutrition, Health & Aging, the research found that antioxidants may reduce the prevalence of age-related hearing loss (presbycusis) by as much as 47 percent. Presbycusis affects about one in three people ages 65 to 75.

Researchers looked at 2,956 participants ages 50 and above in Sydney. Subjects were examined from 1997 to 1999 and 2002 to 2004. The authors looked at the link between dietary and supplement intakes of antioxidants, including vitamins A and E, and both the

prevalence and five-year incidence of measured hearing loss. Dietary data were collected in a questionnaire.

After adjusting for several relevant variables, the researchers found that the highest intake of vitamin A was associated with a 47 percent reduction of presbycusis risk; with vitamin E intake it was 14 percent. The researchers believe that the antioxidants counteract oxidative damage to the inner ear.

The bottom line? What you eat is one of the few risk factors you can control in order to prevent age-related hearing loss.



### GENETIC FINDING

Genetic research has identified six critical gene mutations in Israeli Jewish and Palestinian families, one

of which was found to have been involved in genetic hearing loss. The discovery, published last September in the journal Genome Biology, could help affected families undergo genetic counseling to avoid such a defect in future children.



### SHOP SMART FOR CELL PHONES

When it comes to using a cell phone, one style does not fit all. To help savvy shoppers, the Better Hearing Institute released a comprehensive list of cell phones that are compatible with hearing aids. Top ratings went to those with the least microphone interference and the best telecoil coupling compatibility. Visit [www.betterhearing.org](http://www.betterhearing.org) to view the complete list. 



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# Beating the Odds

A mother lets her deaf son's love of reading lead the way.

By Lyn Neisius

“AS THE MOTHER OF A DEAF child, I have been intimidated by statistics of low academic achievement, poor literacy skills, and difficulty learning foreign languages for my son Eiler. With the twin graces of medical technology (cochlear implants) and a hard-working personality, he has managed to avoid these difficulties. I don't mean to brag, but of course I'm proud. Did I mention that at his eighth grade awards ceremony last May, Eiler was awarded for being the top Spanish student in his school? And he was awarded for being the strongest English student in the highest level English class? What a tribute to his many hours of devoted study.

It wasn't always this way. You see, Eiler struggled to learn to read. In first grade, I watched as he gnawed pencils (eraser, metal, wood, even lead) when it came time to decipher the instructions on a worksheet. He sat gripping the edges of his

desk in fear of being called upon to read out loud. In second grade, a family friend gave him the newest Harry Potter book. I remember him proudly flipping through the pages, pausing on one, and then pointing out the words “with” and “and,” the words he recognized at that time.

In second grade his tutoring began twice a week: phonemic awareness led to tears, sight word memorization to tantrums. Yet through it all Eiler loved books. He was always studying pictures in books, asking us to read to him and poring over comic books like the European classics, “Tintin” and “Asterix and Obelix.” So we kept at it. Computer programs for reading, sitting by his side as he struggled to complete his homework—it was a multifaceted team effort. However, in the end the hardest work was always Eiler's.

By fourth grade, Eiler caught up. He could read the texts and books required for school. However, he continued to skip over words here and there, using his intuition and luck to figure out meanings rather than taking the time to “sound it out.”

I can't say for sure what happened in the meantime, but I can tell you that Eiler still loves books. He just kept on reading. Currently, he is reading a science

fiction series by Stephen King. Last summer, he volunteered six hours a week in a bilingual enrichment program with infants and toddlers where he worked on learning more Spanish. The best part of being a proud mother is the knowledge that my son is reaping the rewards of his own efforts. Here is a poem he wrote at age 12, called “I Am.”

I am noisy yet silent.  
 I wonder what lyrics in music sound like.  
 I hear nothing when I sleep.  
 I see the world around me.  
 I want to hear in water.  
 I am noisy yet silent.  
 I pretend to listen to the lyrics in music.  
 I feel settled.  
 I touch the satin of life.  
 I worry about the future.  
 I cry over the news.  
 I am noisy yet silent.  
 I understand what it's like for a turtle.  
 I say God gave me this.  
 I dream of science.  
 I try to listen.  
 I hope that few problems come my way.  
 I am noisy yet silent. 🦻

*Eiler, now 14, has bilateral cochlear implants and received Auditory-Verbal Therapy at the Listen Foundation in Littleton, Colo. Lyn Neisius is a Cochlear Connection volunteer and school psychologist. The family lives in Colleyville, Texas.*

Email [editor@hearinghealthmag.com](mailto:editor@hearinghealthmag.com) to share your parenting and hearing loss story.



The author attributes her son Eiler's academic success to hard work.



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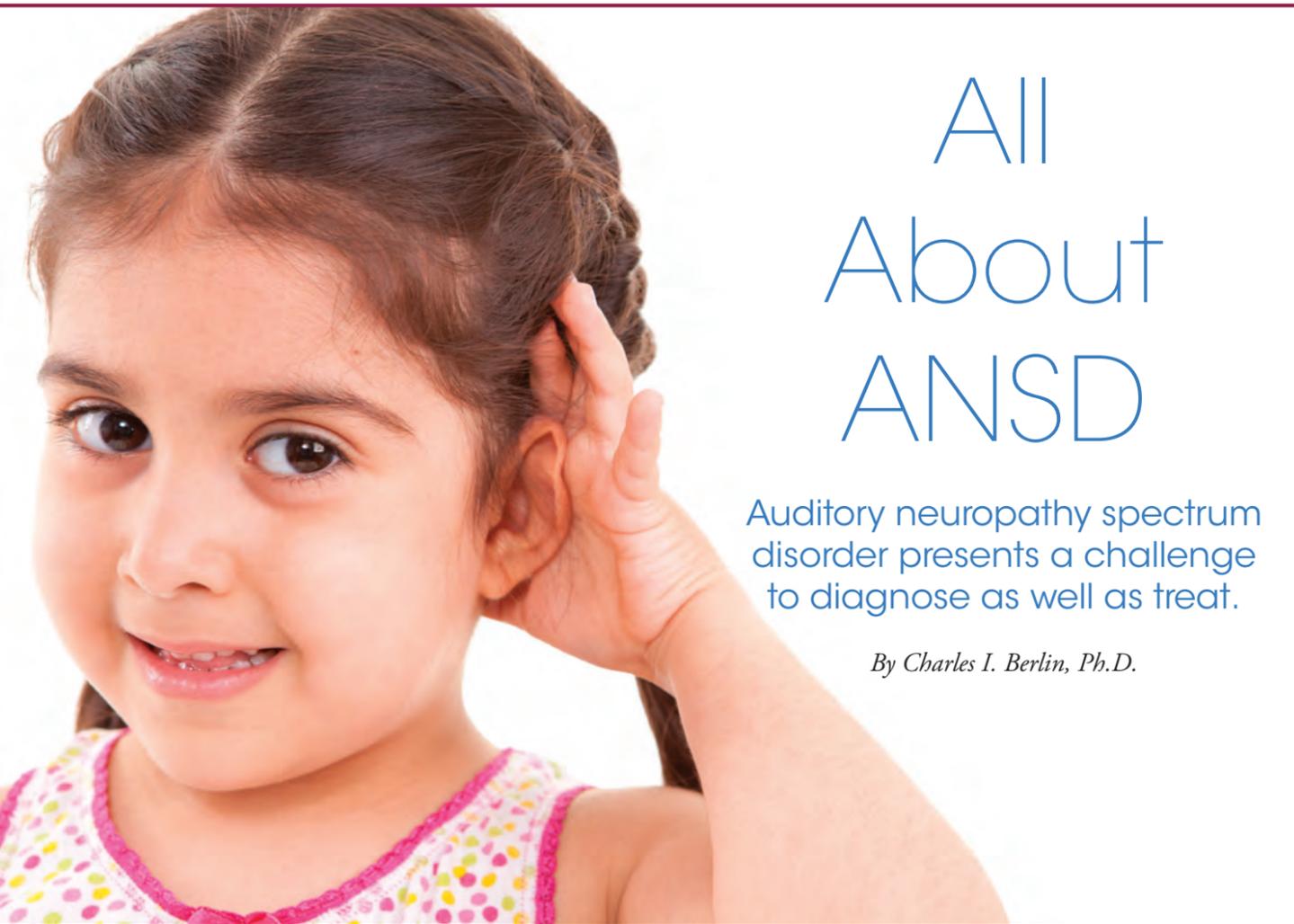
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# All About ANSD

Auditory neuropathy spectrum disorder presents a challenge to diagnose as well as treat.

By Charles I. Berlin, Ph.D.

When two common hearing tests show divergent results, auditory neuropathy spectrum disorder (ANSD) may be the diagnosis. The two tests are the otoacoustic emissions test and the auditory brainstem response test. The first measures the presence of nearly inaudible sounds emitted from a normal-functioning inner ear in response to an external sound. The second measures how parts of the nervous system, including the auditory nerve, react to sound.

In ANSD, the patient has—or had—otoacoustic emissions, but the auditory brainstem response is abnormal or missing. In addition, the patient's pure-tone audiogram hearing test, which measures the ability to hear sound at different frequencies, may range anywhere from essentially normal to a profound hearing loss. This range is the reason the term “spectrum” is part of the condition's name.

It is important to note that “neuropathy” seldom means nerve damage here. It more often than not means

damaged or compromised inner hair cells, located in the inner ear. (These inner hair cells are distinct from the outer hair cells in the inner ear.)

Inner hair cells activate the auditory nerve, which is made up of about 30,000 fibers. If inner hair cells are missing or damaged, it gives the appearance that the nerve is not working correctly, when in fact it is a problem caused by the inner hair cell.

This is why the term “dys-synchrony” has also been used to describe this condition. Labels we use affect our actions. Calling this a “neuropathy” may make us believe that the neurons are irreparably damaged or unavailable, and block the hearing healthcare professional from even considering implantation as a treatment method, when in fact implantation is likely to be useful.

The etiology here is critical. Patients who were born prematurely or who had serious jaundice are the only ones likely to show some recovery.

Genetically affected patients do not seem to show

some recovery. Patients who have congenitally absent or underdeveloped nerves or who have degenerated nerve fibers (such as from Charcot-Marie-Tooth disease or Mohr-Tranebjaerg syndrome) in fact do have neuropathy.

People with ANSD describe it as listening to a mistuned radio and hearing only static. They generally have poor speech recognition, particularly in noise, although in some patients speech recognition is good in quiet environments. In addition, some may have listening abilities that fluctuate, occasionally associated with body temperature (such as during a fever).

Often misdiagnosed ANSD patients have been labeled failures after using hearing aids and other therapies that led to cochlear implantation, without recognizing that they have this condition. Other misdiagnosed patients become “miracles” in which clearly deaf children begin to hear and speak by 2 or 3 years old and appear to “outgrow” their deafness.

In some of these patients the auditory brainstem response is never normal. For others, whose condition is better labeled “auditory immaturity,” both the auditory brainstem response and language acquisition ultimately reach normal values. The unpredictability of ANSD coupled with the superficially conflicting nature of the tests leads to the challenge in diagnosing and treating it.

## TREATING THE YOUNG PATIENT

Children diagnosed with ANSD need to be able to eavesdrop on language in the same way normal hearing children do in order to develop their language ability in a normal way. A speech-language pathologist should monitor the child's progress and guide the family as to whether suitable progress is being made. The goal is to allow the child to be linguistically and socially interactive during the preschool years so that the child can join normal hearing peers by kindergarten.

The primary responsibility in planning management of the child with ANSD is to do no harm. What has harmed such children in the past? Treating the ANSD patient with the immediate application of powerful hearing aids and relentless mouth-covered Auditory-Verbal Therapy (AVT), a type of therapy that uses residual hearing and active listening to hear as well as speak better. Covering the mouth during this therapy teaches the patient to stop relying on visual cues.

This strategy has been especially detrimental when applied to two different types of children. The first example is a child who has “auditory immaturity.” This child will eventually outgrow the disorder by developing a normal auditory brainstem response and normal hearing

audiogram, but may suffer a noise-induced hearing loss from using hearing aids.

The second example is a child whose ANSD dys-synchrony is so severe, even with a mild-to-moderate pure-tone audiogram, that mouth-covered AVT is of absolutely no help. A sophisticated AV therapist should recognize quickly in this child that traditional mouth-covered AV methods do not work and that other options with more visual support must be considered.

Assessment sessions and routine retesting, including auditory brainstem response tests, during early language training will help determine whether a patient has auditory immaturity or true ANSD.

Treatment should be non-invasive, visually supported language training while waiting and watching children who have histories of premature birth and other significant birth conditions that can lead to ANSD. The goal is to minimize language delay in the critical early months and years of life, regardless of the child's language trajectory or therapeutic and educational choices.

## FAULTY GENES

In children who have genetic histories such as mutations in genes critical for normal hearing, hearing implants have been the most successful. The hearing healthcare professional should take a complete birth history and hearing loss assessment. If there is no birth complication and there is a putative genetic cause, early cochlear implantation without waiting for spontaneous recovery has been shown to be quite powerful.

If genetic testing is possible and mutations in the *otoferlin*, *pejvakin*, or *MPZ* genes are found—the three genes known to be critical for normal hearing—the likelihood is lower that this is a form of auditory immaturity, regardless of birth history. It is essential to perform an MRI focusing on the auditory nerve, as researchers have shown a surprising incidence of total

## BY THE NUMBERS

A comprehensive review of 260 then-documented ANSD cases reveals that 85 patients used hearing aids and 49 used cochlear implants. About 15 percent reported some benefit from hearing aids for language learning, while improvement in speech comprehension and language acquisition was reported in 85 percent of patients who were implanted. Approximately 5 percent of the 260 developed normal speech and language without intervention. —C.I.B.

## Trust Your Instincts

By Haleh Rabizadeh Resnick



I was thrust into the world of hearing issues after the birth of one of my children. And, like many, I was forced to learn the ins and outs quickly to help my son. But first, let me jump to the end and say, “Trust your gut and always question.”

When our son Alex was born they told us that he failed his newborn hearing test in one ear, but we weren’t concerned. We figured that he probably, as the nurse suggested, had fluid in his ears. Six weeks later when I went to have his ear rechecked, I was surprised to find that he failed again. The diagnosis was unilateral hearing loss. He had normal hearing in one ear and wouldn’t need hearing aids or any other kind of therapy. He just needed an auditory brainstem response (ABR) test to confirm the results.

A few weeks later we went for the sedated ABR. This time we were shocked. The results now indicated that he had severe hearing loss in both ears. Our doctor told us Alex would need hearing aids by the time he was 6 months old or he would not be able to speak normally. The trouble was I just didn’t buy it. It made absolutely no sense to me.

Alex was highly aware of his surroundings, responded to sounds, and woke at the slightest disturbance—you’d figure with a baby with severe hearing loss at least we’d get a little more sleep. I asked questions nonstop for the 30 minutes remaining during our appointment, about the diagnosis and about my doubts. We scheduled another ABR since results can change from test to test. Six weeks later, the ABR once again confirmed severe hearing loss in both ears.

I was at a loss. I simply didn’t accept the diagnosis. My son could hear. I was sure of that. By now I spent my days testing his hearing every way I could. The doctor thought I was in denial. The audiologist thought I was in denial. And every other professional I contacted deferred to my doctors because Alex was tested at one of the top hospitals in the country.

So, what were we to do? I enrolled him in speech therapy. I signed up for support groups. I got him hearing aids. Struggling with a 5 month old who clearly did not want hearing aids and with my own feelings that this just wasn’t right, we continued searching.

Two weeks after Alex got hearing aids, we found a doctor who believed us. In retrospect we now know that the absent ABR was simply misread as an irrefutable sign of deafness, without including the assessment of otoacoustic emissions and middle ear muscle reflexes. The absent reflexes and present emissions showed that he did not in fact have a severe hearing loss, just a de-synchronized ABR and normal or nearly normal hearing sensitivity.

At this point Alex was properly diagnosed with auditory neuropathy. He was not a candidate for hearing aids. As a matter of fact, had he been wearing the hearing aids any longer, his normal hearing would have been damaged permanently—requiring him to have hearing aids. The truth he was hearing everything, and I wasn’t in denial.

Today Alex is 4. He speaks beautifully with normal hearing yet continues to be monitored because of his diagnosis. It’s true that professionals can help guide and inform us. But as parents we bring something to the table as well. We know our children best and we are our children’s greatest advocates.

*Haleh Rabizadeh Resnick, who lives in New Jersey with her family, is a speaker, educator, and author of the book “Little Patient Big Doctor: One Mother’s Journey.” To learn more, see [www.littlepatientbigdoctor.com](http://www.littlepatientbigdoctor.com).*

absence of this nerve in children with signs of ANSD.

This absence of the auditory nerve, of course, immediately rules out success with cochlear implants and should be noted as early in the child’s development as possible. If the absence is in one ear only, it makes the choice of ear clear for cochlear implantation. If it is absent in both ears, other routes must be considered, including brainstem implants, cued speech, and sign language.

### CONCLUSION

ANSD patients make up at least 10 to 15 percent of children in schools for the deaf, although some report an incidence of roughly 1 percent. Still others have estimated the occurrence at 40 percent in hearing-impaired newborns who had been in a neonatal intensive care unit.

There are likely to be many patients who have already been implanted because of failure to succeed with hearing aids and AVT. Only in retrospect can the hearing healthcare professional see that the pure-tone audiogram has not generally been valuable in these patients as a management tool for hearing-aid fitting. Success with hearing aids in quiet as reported by others has not led to age-appropriate language acquisition in the majority of

ANSD patients (see “By the Numbers,” page 15).

Work with speech-language pathologists, neurologists, and teachers of the deaf is of great value to patients and their families. While the hearing healthcare professional is likely to be among the first professionals to encounter a patient with ANSD, treatment should focus on the communication skills and abilities of the patient to acquire language, become literate, and be self-sufficient.

*This article was edited and adapted with permission by Charles I. Berlin, Ph.D., the lead author of a 2010 paper in the International Journal of Audiology about ANSD, and a paper presented at the annual Newborn Hearing Screening Conference in Lake Como, Italy, in 2008.*

*Charles I. Berlin, Ph.D., is a research professor in Otolaryngology—Head and Neck Surgery and Communication Sciences and Disorders at the University of South Florida in Tampa. He is the clinical coordinator for the Auditory Neuropathy Spectrum Disorders Program at All Children’s Hospital in St. Petersburg, Fla. The hospital will host a conference from March 15 to 17 about ANSD. See [www.allkids.org/audiology](http://www.allkids.org/audiology) for more information. Additional ANSD resources are available at [www.kresgelab.com](http://www.kresgelab.com).*

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## 10 Signs

### It May Be Time to Get Your Hearing Checked *By Amy Gross*

As we age, we may notice signs that it's time to visit a hearing healthcare professional for a hearing examination. But sometimes it's hard to admit that it's actually time to take that step.

Often the reason for putting off this exam is pure vanity—the belief that wearing a hearing aid makes one “look old,” for example. But in many cases the hearing loss is so gradual that the person experiencing it truly has no idea it's happening, or incorrectly attributes the symptoms of hearing loss to something else. Hearing loss is not exclusive to the senior population; young people are also at risk and may be even slower to accept that their hearing may be deteriorating.

In this day and age, cutting-edge hearing technology is plentiful, ranging from hearing aids that fit almost invisibly inside the ear, to cochlear implants. Assistive hearing devices (such as amplification products, purpose-designed phones, and the use of induction loops in public settings) allow the hard of hearing

to stay in touch with loved ones and actively participate in social activities.

Is it time for you to get your hearing checked, and perhaps take advantage of some of this wonderful technology? The following are 10 signs that you should consider making an appointment with a hearing healthcare professional.

**1. You find yourself saying “what?” or “excuse me?” a lot, or asking people to repeat themselves.** Missing conversation is a key signal that you may have a hearing loss. If you get tired of having to ask people to repeat themselves, consider how they must feel having to do it. Worried about looking “old” with a hearing aid? How do you think it looks to cup your hand behind your ear and constantly say, “Sorry—what did you say?”

**2. You feel like no one speaks clearly anymore.**

Yes, it's true, some people do m u m b l e . But not everyone does. If you

find yourself annoyed that everyone around you seems to be mumbling, you need to accept that the issue is probably yours.

**3. Friends and family members remark that you keep the volume of your TV up very loud.** If a loved one tells you that your hearing seems to be less than optimal, and especially if that sentiment is echoed by others, chances are extremely likely that you have a hearing loss. Fair or not, the hearing loss of one person directly affects every other person with whom they come into contact. This may be the clearest and most important sign of which to be aware.

**4. You can't hear the person sitting in front of you in a restaurant because of the deafening background noise.** Known as “cocktail party syndrome,” the inability to hear a conversation because of high background noise is very common. By some estimates it affects at least 20 percent of the population, young people included. If this sounds like you, there is therapy and technology available that could help you hear better over background noise without advertising that you have a hearing loss.

**5. People shout at you.** You shout at others. Not only is this hard on the voice box, it's hard on the psyche. You may just be trying to have a conversation, but shouting and yelling in quiet places is usually indicative of argument. Raising one's voice constantly is wearying and can send negative signals.



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Having your hearing checked could be an important step toward maintaining harmony in your home.

**6. You misinterpret conversations.** You and a friend make plans to have lunch and catch up. She suggests “Thursday at Lucy’s” but you hear “Tuesday at Louise’s.” Clearly, this is going to be a problem.

**7. You find yourself less willing to talk on the phone or go out in public.** The most insidious thing about hearing loss is its ability to steal self-confidence. People who suffer from hearing loss, especially gradual hearing loss, may feel socially isolated and withdraw from situations which previously never caused any discomfort. If you find yourself dreading grocery shopping because you may have to talk to the checkout attendant, or worrying that you won’t be able to understand

a relative when called on the phone, you are subconsciously allowing your hearing loss to monopolize your social life.

**8. The ringing in your ears never stops.** A constant ringing in the ears may be tinnitus or another hearing condition. If you have ringing in your ears, and especially if, at some point during your life, you were exposed to excessively loud noise (on the job or in active military duty, for instance), get your hearing checked. Tinnitus is not curable, but there are ways you can manage it to make it less distracting.

**9. Your boss has indicated that your hearing may be affecting your job performance.** If a supervisor or coworker suggests that you are missing important conversation on the job, see a hearing healthcare professional. In most cases, there is

no reason why a hearing loss should affect your ability to do your job. But allowing it to progress unchecked could affect your performance, job reviews, and continued employment.

**10. You have failed a hearing exam.** This may seem like the most obvious sign, but it’s easy to scoff at negative results if you don’t want to hear them. If you’ve failed a casual hearing exam (such as those found on the Internet or as an app on a smartphone), don’t automatically discount the findings. If the hearing test you failed was in the office of a hearing healthcare professional, good for you. You’ve already taken that first hard step. Now it’s time to really hear—literally and figuratively—what your options are for improving your hearing and your quality of life. 📞

*Amy Gross is a staff writer.*

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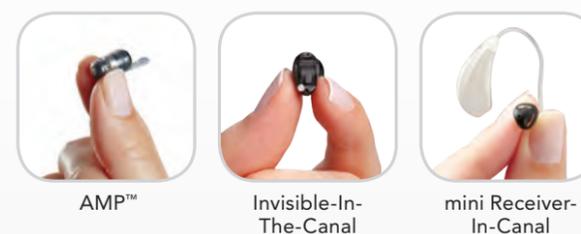
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# Global Solutions

Education and access to medical care, low-cost innovations, and scalable technology are helping people prevent and manage hearing loss in developing countries.

By Karen Appold



PHOTO CREDIT: ©STOCKPHOTO.COM/TERRY/C3D (THIS PAGE) AND COURTESY OF FOWARD WEINSTEIN (NEXT PAGE)

**H**earing loss is one of the world's most common and least recognized disabilities. The United Nations World Health Organization (WHO) estimates it affects 642 million people worldwide, with 208 million suffering moderate to severe hearing loss. The poor carry most of the burden. Eighty percent of hearing impairment occurs in developing countries, due to middle ear infections, excessive noise, improper use of certain drugs, vaccine-preventable infections, and problems during childbirth. But the WHO believes that at least half of hearing loss cases worldwide can be prevented through proper immunizations, education, and early intervention.

In Bangladesh more than 11 million citizens are deaf. “The issues there are growing due to a lack of education, lack of resources, and lack of immunizations,” says Michael D. Seidman, M.D., director of the Division of Otologic/Neurotologic Surgery in the Department of Otolaryngology–Head and Neck Surgery at Henry Ford Hospital in Detroit. Seidman recently traveled to Bangladesh with Samantha Caccamo, founder of Social Business Earth, a nonprofit that helps create companies that address social issues, to look for solutions for the hearing issues Bangladesh faces.

Vaccinations play a critical role in preventing hearing loss. Mumps, measles, and rubella (MMR) are common causes of hearing loss. Proper MMR vaccinations help to significantly decrease the rates of

these diseases and rates of hearing loss associated with the diseases. This is especially true in Bangladesh, Seidman says.

He adds that cultural mores in the South Asian country are such that consanguinity (for example, marrying and procreating with a first cousin) is not discouraged. As a result, genetic issues can result, including certain types of hearing loss. The inability to medically treat common ear infections also can lead to hearing problems, Seidman says.

Seidman is working with an international healthcare team to make MMR vaccines available and to better educate people about how to prevent hearing loss in Bangladesh. His group is also in the initial phases of trying to build the Grameen Ear Hospital in a rural area of Bangladesh.

Seidman is one example of how individuals are making a difference in the developing world, in the effort to prevent and manage hearing loss. They are supplementing the work of larger organizations such as the Starkey Hearing Foundation, whose focus is to assist people in need. (Its global missions have distributed roughly 500,000 Starkey hearing aids since 2000.)

In emerging nations, where finding a professional audiologist is a rarity, and where people with hearing loss have very limited—if any—access to life-changing assistive listening technologies, these individuals are making a difference.

Based in Brazil, Solar Ear employs people with hearing loss to make its products.



## A Global Foundation

An estimated 180,000 children under age 18 have been identified with hearing loss in Vietnam, according to the country's Ministry of Education and Training. “This number will continue to rise as more hospitals use newborn hearing screening as part of their post-natal checkup,” says Paige Stringer, founder of the Global Foundation for Children With Hearing Loss, a nonprofit based in Seattle. She adds that this estimate does not include children whose families have not sought services for hearing loss because of lack of awareness, shame, or distance to services.

Vietnam's government and healthcare companies do not provide any support for purchasing hearing technology. Newborn hearing screening is not widespread, and infants born outside of hospitals are unlikely to get a hearing test until they are older and have developed problems with speech or social interaction, if they are tested at all.

“Children with hearing loss can learn to listen and talk,” Stringer says. “Doing so successfully requires that they be identified early and be fitted with hearing technology, such as hearing aids.” She adds that they must also have access to trained teachers and professionals who can

**In Vietnam, infant hearing screening is not widespread, and infants born outside of hospitals are unlikely to get a hearing test until they are older and have developed problems with speech or social interaction, if they are tested at all.**

help them process sounds so they can develop auditory verbal skills.

“Listening and spoken language skills increase children’s potential to achieve higher education, have better employment opportunities, and enjoy a greater chance of an independent life,” Stringer says. “Society benefits from a reduction of reliance on state disability support.”

Stringer’s organization is working to address issues with training programs for teachers and medical teams as well as hearing aid distribution in Vietnam. Its Deaf Education Program is a multiyear collaboration with Thuan An

Center, a school for the deaf in Lai Thieu, and Ho Chi Minh University, and involves 35 schools for the deaf in Vietnam. The program includes teacher training, family support, audiology training, and hearing aid distribution to help young children develop spoken language skills. In 2010, its first year, the program helped about 900 children with hearing loss.

A California native, Stringer was born profoundly hard of hearing and wears two hearing aids. She says she had the advantage of early support to successfully assimilate into hearing society.

She founded the Global Foundation for Children with Hearing Loss after an eye-opening journey across Southeast Asia in 2008. “I saw that limited teacher training, shortage of quality hearing aids, and a general lack of awareness about hearing loss was having a detrimental effect on the livelihoods of thousands of deaf and hard of hearing children,” she says. “It was a stark contrast to my personal experience in the United States, where expert teachers and resources are in ample supply.”

The Global Foundation for Children With Hearing Loss intends to take its model of sustainable training programs and hearing aid

distribution to other developing countries around the world. The foundation fits hearing aids, including brands from Oticon, Phonak, and Solar Ear, on children whose families cannot afford them. The hearing aids are donated or purchased via grants.

“Since putting a hearing aid on a child is not enough, our primary focus is developing the expertise of teachers and professionals on follow-up care, early intervention support, and an auditory-verbal deaf education,” Stringer says. “Our goal is to help young children with hearing loss develop the listening and language skills they need to succeed in neighborhood schools alongside their hearing peers.”

### Rechargeable Hearing Aid

Solar Ear is a unique, low-cost hearing aid produced by a nongovernmental organization (NGO) based in São Paulo, Brazil. The hearing aids were designed especially for people with hearing loss in the developing world, and they are available in one analog and three digital formats.

“Solar Ear is a good, solid hearing aid that provides amplification for severe to profound hearing losses,” Stringer says. “The low cost and good quality make them an attractive choice for families in Vietnam who otherwise cannot afford hearing aids.” The families she has given Solar Ear hearing aids say they are satisfied with performance, she says.

As the first rechargeable hearing aid, it features a solar battery charger and rechargeable hearing aid batteries, which cost the same as disposable zinc air batteries.

The key to Solar Ear is its palm-sized solar charger. Sunlight, a

Solar Ear’s palm-sized solar charger recharges its hearing aids.

household light, or electricity can charge the two AA batteries in the solar charger in six to eight hours. The batteries then charge the hearing aid batteries for about a week. These hearing aid batteries can be used not only in Solar Ear’s hearing aids but also in more than 90 percent of behind the ear (BTE) hearing aids. (In addition, the rechargeable AA batteries are suitable for anything that uses them.)

Howard Weinstein, the founder of Solar Ear, says one of the NGO’s missions is to get a child as young as possible equipped with a hearing aid, so that the child can develop communication skills and have the opportunity to go to a regular school. “Although anyone can use our hearing aids, we wanted to focus on the developing world because

those countries have been ignored,” he says. These rechargeable hearing instruments are one solution (see “Do the Math,” opposite page).

“Another goal is to help people who are deaf or have a disability gain employment,” he adds. Solar Ear makes a point of leading by example; it hires people who are deaf to put together the Solar Ear hearing aids.

Solar Ear’s hearing aids, charger, and batteries are available in more than 30 countries including Bolivia, Kenya, and Mexico, as well as Canada, France, Japan, and the United States. New Solar Ear operations will open in China, India, Ethiopia, Serbia, and the Philippines within the next few years.

While this inexpensive solution benefits the environment as well as low-income people with hearing



loss, the work of hearing healthcare professionals remains important. “Sound discrimination, localization, and customized fit are just a few of the things that a hearing healthcare professional can offer,” says Ross Cushing, Au.D., an audiologist in Maryland. (For more on fitting hearing aids, see Cushing’s article, “Why Getting the Correct Hearing

## Do the Math

A typical disposable hearing aid battery costs \$1 to \$2 and lasts seven to 10 days. If a person uses two hearing aids (and most people do), that would total roughly \$75 to \$200 per year in battery costs alone. By contrast, Solar Ear’s solar charger retails for \$49 (NGOs get a discount), comes with two rechargeable AA batteries as well as two hearing aid batteries, and lasts two to three years. A study conducted by Central Michigan University in the winter (when there is less sunshine) tested Solar Ear’s solar charger and batteries with other companies’ hearing aids. The study showed that Solar Ear’s batteries last 40 to 60 percent as long as disposable batteries, and it confirmed that they can be recharged for two to three years. —K.A.

PHOTO COURTESY OF HOWARD WEINSTEIN

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teachings, which is the lifeblood of their culture.”

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SuperEar was originally developed in the late 1980s for bird-watchers to hear birdsong. Soon after, a new market developed when individual consumers and institutions began to use SuperEar for slightly- to moderately-hearing-impaired people who could not afford hearing aids or who needed only mild amplification.

The unit, a simple sound amplifier, boosts all ambient sound by about 50 decibels. The unit incorporates miniaturized circuit technology combined with a multi-element electronic microphone and matched output headphone drivers that aim to deliver the best possible sound gain and quality in a moderately priced (\$40) amplification device.

It uses one AAA battery and has a three-year warranty. “The average shelf life is five years, but I can attest that some customers have had units for well over 10 years,” Sullivan says.

### Newborn Hearing Screener

One challenge for developing nations is a simple, scalable, and inexpensive method to identify hearing problems at the earliest stages in order to ensure proper follow-up and treatment and best outcomes.

OZ Systems, of Arlington, Texas, develops centralized newborn hearing screening systems for public health departments worldwide. Since 2000, the company’s eScreener Plus solution has helped protect the health of more than 8 million newborns around the world.

The system uses a software-as-a-service (SaaS) Internet platform that integrates with most testing devices to capture screening data. “With a Web-based, SaaS system we’re able to provide a turnkey solution that makes deployment and maintenance easy for our public health clients,” says Terese Finitzo, Ph.D., the CEO of OZ Systems. “Many of their IT departments already have a lot on their plate, so a Web-based solution provides a flexible and cost-effective alternative to traditional models.”

Aid Fit Is Vital,” in Hearing Health’s Summer 2011 issue, available at [www.hearinghealthmag.com](http://www.hearinghealthmag.com).)

### Simple Solutions

As a student of the Dalai Lama, Melanie Sullivan made a commitment to share the Tibetan spiritual leader’s teachings of nonviolence. The founder of a small technology nonprofit, Tibetech.org, and the director of Internet marketing at Sonic Technology Products in Grass Valley, Calif., Sullivan found a great opportunity to do just that when Sonic agreed to donate a small inventory of their inexpensive personal sound amplifiers, called SuperEar.

Sullivan personally delivered the devices to a remote Tibetan refugee camp in Mundgod, India, in 2007. “These people have no opportunity to obtain health care,” she says. “They are essentially living off the kindness of international support.”

The settlement camp has about 15,000 residents, including a home for older adults. Here, hearing loss is significant, although there are no formal hearing screenings. “These people have gone through grave hardships,” Sullivan says. “To them the most precious thing is to hear the Tibetan teachings based on wisdom and compassion. By offering them SuperEar they could hear these



Seattle’s nonprofit Global Foundation for People With Hearing Loss has helped children in Vietnam.

OZ Systems typically charges a monthly or yearly fee based on the number of system users. The fee includes the ability to centrally and automatically update the software and securely maintain the vital data stored on its servers.

The SaaS model gives countries such as Tasmania, where it is being used, the ability to develop more centralized newborn health records that can be accessed by any approved health facility. It also eliminates upfront technology costs (such as for data servers) as well as ongoing IT maintenance. OZ Systems is being tested for use in South Africa and Brazil.

### Basic Amplifier

It is often the simplest approaches that are the easiest to maintain

and cheapest to deploy. One such effective, low-tech solution is a one-on-one amplifier, says Arlene Romoff, the president of the Hearing Loss Association of New Jersey and author of the memoir “Listening Closely: A Journey to Bilateral Hearing.”

The one-on-one amplifier is used with headphones or ear buds and is wired to a beeper-sized device, which can be held or worn on the person’s body (in a shirt pocket or clipped to a waistband). The microphone can be put near the speech source, eliminating distance and improving functioning in background noise.

Hackensack University Medical Center in New Jersey uses these devices on intake for patients with hearing loss who either don’t have hearing aids or are doing poorly with them. It is being used

extensively with geriatric patients. The most elegant of these devices is the PockeTalker made by Williams Sound. It retails for about \$150. But there are less expensive alternatives, including Sonic’s SuperEar.

While they can’t be custom-fitted to the individual’s hearing loss like traditional hearing aids, these amplifiers are effective in getting sound to the ears. Volume is adjusted like a radio dial. And since they are usually used with headphones or earbuds, they transmit sound to both ears, providing the benefit of bilateral hearing.

“These devices offer simple amplification,” Romoff says. “Although they’re not elegant, they provide amplification across a range of frequencies.”

*Karen Appold is a staff writer.*

PHOTO COURTESY OF PAIGE STRINGER

# Power Up



## EVERYTHING YOU EVER WANTED TO KNOW ABOUT BATTERIES

By Nannette Nicholson, Ph.D., and Joshua Spann

PHOTO CREDIT: @ISTOCKPHOTO.COM/ULTRA\_GENERIC

The options for hearing instrument and implant batteries are wide-ranging and can be overwhelming. Here is an introduction to their technology, care, and use.

Every wearable listening or assistive hearing device requires some type of portable power. First invented by the Italian physicist Alessandro Volta in 1800, the battery has remained the mainstay among power options for two centuries.

Named after the inventor, the volt (V) is used to describe battery cell strength. The chemical compounds used in the cell determine whether the battery is a “primary cell” for one-time use, or a “secondary cell” that can be recharged.

The voltage generated by the battery cell is dependent not upon the size but upon the chemicals used to construct it. Multiple batteries used together provide greater power—and a bigger size. While different types of cells made in the same size can be used interchangeably as a power supply, its life and stability may be affected.

It is important to note that using a battery with more voltage than the equipment is designed for can cause permanent damage to the device. In addition, the use of a cell with the right voltage but incorrect chemical characteristics can lead to a shorter battery life or improper functioning of the device. For this reason, only cells of fairly similar voltages are made in any given size.

### HEARING AIDS AND IMPLANTS

Battery options for hearing aids and implants vary depending on the device design and manufacturer’s recommendations. Some devices use regular zinc air batteries while others require the use of “power” zinc air cells. And some devices require more power than rechargeable cells can provide.

In general, power options for hearing aids and bone-anchored implants (BAIs) include disposable zinc air or rechargeable nickel-metal-hydride (NiMH) button cells. BAIs can also use rectangular cells (9V). Cochlear Americas’ BAI line, called the Baha, uses size 13 or 675 disposable button cells. Cochlear’s Baha Cordelle model uses a 9V disposable or rechargeable battery. The Ponto family of BAIs from Oticon Medical uses disposable or rechargeable button cells, depending upon power needs.

For cochlear implants, the options are a little more diverse, with three general power configurations. The first are disposable or rechargeable button cells. The second are AA alkaline disposable or NiMH rechargeable batteries. The third are a proprietary rechargeable NiMH (from

### TYPES OF BATTERY CELLS, VOLTAGE, AND USE

#### Primary Cells: Disposable or Single-Use Nonrechargeable

- \* Alkaline 1.5V
- \* Mercury-oxide 1.4V
- \* Silver-oxide 1.55V
- \* Zinc-air 1.4V

#### Secondary Cells: Repeated Use Rechargeable

- \* Lithium-ion 3V
- \* Nickel-cadmium 1.25V
- \* Nickel-metal-hydride (NiMH) 1.25V

Advanced Bionics, MED-EL) or a lithium-ion (from Cochlear) battery module with a charger. Proprietary rechargeable systems may also have battery module size choices, depending on the device and power needed.

Many hearing aids have an audible low battery indicator while others, specifically those designed for children, may have a visual low battery indicator so adults can be aware when batteries need to be changed.

### BUTTON CELLS

Silver oxide batteries were once a popular choice for high-power, behind-the-ear (BTE) hearing aids due to their increased voltage; however, they were expensive

### BATTERY TYPES AND SIZES FOR HEARING AIDS AND IMPLANTS

	TYPE OF TECHNOLOGY	BATTERY SIZE
Hearing aids	Disposable Rechargeable Proprietary	10, 312, 13, 675 zinc air 10, 312, 13, 675 NiMH NiMH module
Bone-anchored implants	Disposable Rechargeable	13, 675 zinc air, 9V alkaline 13, 675 NiMH, 9V NiMH
Cochlear implants	Disposable Rechargeable Proprietary	675 zinc air, AA alkaline 675 NiMH, AA NiMH NiMH or lithium-ion module



Siemens' eCharger charges and dries out batteries overnight.

and coded by color for consumer convenience. These standards are followed whether the batteries are disposable or rechargeable. This color-coding makes it easier to remember what size battery your hearing device uses.

Some battery manufacturers (such as Duracell, Energizer, and Panasonic) offer hearing aid and implant batteries via traditional retail outlets such as chain drugstores. Others—such as Germany's VARTA Microbattery Power One, Switzerland's Renata, and China's Zenipower—offer a professional product line that is only available through a dispenser, distributor, or hearing healthcare professional. Some offer both options, such as Rayovac.

To optimize the life and strength of your zinc air battery, follow these guidelines. Don't remove the tape until you are ready to use the battery. After you remove the tape, let the battery sit for a minute to let air go into the cell to activate it. Store your hearing aid and battery in a "hearing aid dryer" (dehumidifier) when not in use.

At one time, it was common to store mercury hearing aid batteries in the refrigerator to increase shelf life. This is not recommended for zinc air batteries. Cold air can cause water particles to collect, loosening the tape seal and causing oxygen to come into contact with the zinc. This activates the battery before you are ready to use it.

### RECHARGEABLE BUTTON CELLS

Power One's ACCU Plus is one rechargeable hearing aid and implant button cell series available. It uses NiMH as the chemical compound housed in stainless steel. Its voltage is compatible with zinc air batteries, and it is best suited for hearing aids that can operate for 10 days or more without needing a change of battery. Some hearing aids and implants require more power than that provided by this rechargeable battery, so check the manufacturer recommendations for rechargeable options.

The manufacturer says each ACCU rechargeable battery



Siemens' Motion hearing aids (shown with remote controls) use disposable or rechargeable batteries.

PHOTOS COURTESY OF SIEMENS

and abandoned as mercury batteries gained popularity. The popularity of mercury batteries soared due to the decreased cost, but unfortunately and unknown at the time, they were also toxic.

Have you heard the term "mad as a hatter"? It referred to poisoning from mercury compounds in the felt used to make hats. The toxicity of mercury is widely recognized today, and efforts have been made to reduce the use of mercury in batteries. Prompted by the 1996 Mercury and Rechargeable Battery Management Act, members of the National Electrical Manufacturers Association voluntarily agreed to eliminate mercury in button cells by 2011.

Today, the majority of button cell batteries manufactured for use in hearing aids—such as BTE, ITE (in-the-ear), ITC (in-the-canal), RIC (receiver-in-canal), and CIC (completely-in-canal)—as well as bone-anchored and cochlear implants are mercury-free, zinc air button cells that provide 1.4V. (Rayovac's new mercury-free cochlear implant battery is 1.45V.)

Zinc air button cells last twice as long as their mercury counterparts did. They are environmentally friendly and cost half as much. The cell is activated by oxidizing zinc with oxygen from the air when the colored-tape seal is removed. Zinc air batteries have a long shelf life if adequately sealed to keep air out, and can be stored for up to three years at room temperature with little loss in capacity as long as the seal is not removed.

The size of button cells is universally standardized

Size and Color Code	Dimensions (Diameter x Height)	Common Uses
675	11.6 mm x 5.4 mm	High-power BTEs, cochlear implants
13	7.9 mm x 5.4 mm	BTEs, ITEs
312	7.9 mm x 3.6 mm	miniBTEs, RICs, ITCs
10	5.8 mm x 3.6 mm	CICs, RICs

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DISPOSABLES VS. RECHARGEABLES

DISPOSABLE BATTERIES

Pros	Cons
<ul style="list-style-type: none"> <li>• High capacity batteries that last for days</li> <li>• Shelf life of three years</li> <li>• Work well for high-drain hearing aids</li> <li>• Do not need recharging</li> <li>• Can dispose of in household waste</li> <li>• Convenient for busy lifestyles</li> </ul>	<ul style="list-style-type: none"> <li>• High disposal rate for batteries and packaging</li> <li>• Overall higher cost over time</li> </ul>

RECHARGEABLE BATTERIES

Pros	Cons
<ul style="list-style-type: none"> <li>• Slightly lower cost overall</li> <li>• Lower rate of disposal for batteries and packaging</li> </ul>	<ul style="list-style-type: none"> <li>• Lower capacity means shorter use time</li> <li>• Requires charging unit and power source</li> <li>• Requires daily or nightly recharging</li> <li>• May need a spare, charged battery</li> <li>• Not recommended for some devices</li> <li>• Size-10 cell may not last through an entire day's use</li> </ul>

and also dries out instruments overnight.

Solar Ear, produced by a Brazilian nonprofit, is a hearing aid whose batteries are rechargeable using solar energy. Its solar charger powers three NiMH battery sizes as well as NiMH AA batteries that can be used in other assistive listening devices. (See "Global Solutions," page 22.)

ROUND AND RECTANGULAR BATTERIES

AA and AAA are the most common round batteries and 9V the most common rectangular battery used by consumers today. While these batteries are too large for today's miniature hearing aids, they are options for cochlear implants, FM systems, assistive listening devices, and other portable electronic equipment.

The majority of AA, AAA, and 9V alkaline batteries have been mercury-free since the early 1990s and can be disposed of with normal household waste. However, do not throw the batteries into a fire due to risk of explosion, and do not throw away a large amount of them at one time. Because batteries are not 100 percent discharged when disposed of, disposing multiple batteries at one time can cause them to feed off the charge, creating a safety risk. Currently there are no universal, data-based,

PACKAGING, POWER, AND PERFORMANCE

When it comes to hearing aid batteries, Energizer is focusing on packaging and convenience. The company recently launched a spin-pack package, called the EZ Turn & Lock, that keeps batteries secure in the dial even after the back tab is opened. Longer tape tabs make it easier to insert the battery into the hearing aid. As an added benefit, the perforated top of the package enables you to take only the number of batteries you need with you when on the go.

Cochlear implants require more power than hearing aids. Although they use the same size-675 battery that many power hearing aids use, they generally require more current and have a higher drain. Power One's IMPLANT Plus is designed to address these needs. Rayovac's new 675 CI battery is 1.45V instead of 1.4V.

Panasonic hearing aid batteries use a special technology with an embedded Teflon layer to allow optimal airflow through their zinc air batteries. This feature results in a reliable power supply in varying temperature conditions.

TABLE SOURCE: WWW.MICROBATTERY.COM

replaces up to 57 conventional batteries. Although varying with hearing instrument and power drainage, the life span is between 12 and 18 months. ACCU is designed to save the user money over time, after an up-front investment in the charger as well as the cost of each battery.

Keep in mind that rechargeable batteries used in hearing aids with a higher power drain or with advanced features may not last throughout the day. They may require changing and recharging, which some consumers may find inconvenient or cumbersome.

Like zinc air batteries, rechargeable button cells should be stored at room temperature. There are no tabs to remove for activation of the cell; it is a self-contained, sealed system. Because they are environmentally friendly and do not contain mercury, lead, or cadmium, they can be disposed of in normal household waste. Power One offers a complete line of rechargeable options for all four button cell battery sizes, along with charger solutions that include a pocket charger and a pen charger.

Siemens' Motion, Pure, or Pure Carat series hearing instruments operate using either disposable or rechargeable button cells. The Siemens eCharger recharges batteries

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cost-effective, and safe recycling programs for alkaline batteries, although local programs may exist.

Alkaline batteries should be stored at room temperature. They have a shelf life of seven to 10 years. Battery contact surfaces and battery contacts within the device can be kept clean by rubbing with cloth or a pencil eraser. While disposable and rechargeable batteries can often be used in the same device, never use a disposable battery in any device stored in a battery charging station. The chemicals are not compatible with the charger and will cause prolific

leaking and corrosion.

Rechargeable AA, AAA, and 9V batteries are available in a number of metals and from various manufacturers. These include nickel-cadmium (NiCad 1.5V), NiMH 1.5V, and lithium-ion 3V. NiMH rechargeable batteries are the most commonly manufactured and used in assistive listening devices.

Keep in mind that although lithium-ion batteries in AA and 9V sizes have been introduced, they are not compatible with devices that use traditional disposable or

## IMPORTANT BUTTON CELL PRECAUTIONS

Every year, more than 3,500 people accidentally swallow a button cell battery, according to the National Capital Poison Center in Washington, D.C. Although many button cells may pass through the body and be eliminated naturally, sometimes they get stuck and cause problems. A button cell stuck in the esophagus can cause a serious burn or other tissue damage.

If a button cell is ingested, it is important to follow the tips outlined by the National Capital Poison Center at [www.poison.org/battery](http://www.poison.org/battery). Injury can also be caused if a button cell is lodged in the nose or ears. Do not use nose drops or ear drops, and consult your physician for removal or visit the emergency room. The majority of fatalities and cases of severe injury occur in children younger than age 3. The following safety tips apply to all small-size batteries (button or coin).

### TIPS FOR PROTECTING YOUNG CHILDREN

- Never leave batteries sitting out. Store spare batteries, and batteries to be recycled, out of sight and reach of young children. If recycling is not possible, wrap used batteries securely and discard them where a child can't find them.
- Check all household devices to be certain the battery compartment is securely shut. Use strong tape to secure compartments children can open or that might pop open if the device is dropped. Only purchase products that require a screwdriver or tool to open the battery compartment.
- Don't allow children to play with batteries or with battery-powered products that have easily accessible batteries.

- Make sure all hearing aids for children have child-resistant battery compartments and make sure the lock is activated when the child is wearing the aid.
- Alert family members who wear hearing aids to the importance of keeping the batteries out of reach of small children at all times. This is important since most hearing aid users remove the batteries from the aids each time they take the aids off.
- Don't insert or change batteries in front of small children.
- When possible, buy batteries in blister packs, as these are harder for children to open.

### TIPS FOR PROTECTING OLDER CHILDREN & ADULTS

- Never put batteries in your mouth. They are slippery and easily swallowed.
- Don't store batteries near pills or in pill bottles. Don't leave them on bedside tables or place them loose in your pocket or purse. Look at every medicine you intend to swallow. Turn on the lights, put on your glasses, read the label, and look at the medicine itself.
- If you use a hearing aid, these steps are especially important. All too often, the tiny hearing aid batteries are ingested with or instead of medications.
- Avoid storing or leaving batteries where they might be mistaken for, or swallowed with, food.
- Don't leave batteries in drinking glasses or adjacent to food.



Energizer's EZ Turn & Lock packaging makes it simpler to remove batteries and insert them into hearing aids.

NiMH rechargeable cells, due to their increased voltage. They could cause damage to the device.

### PROPRIETARY RECHARGEABLE BATTERIES

Two hearing aid manufacturers offer rechargeable hearing instruments. Solar Ear offers two digital BTEs and one digital RIC that are rechargeable using its solar charger. Last year, Hansaton introduced the AQ X-Mini, a rechargeable RIC. This hearing instrument system has an inductive charging station and sealed battery compartment that prevents insertion of the wrong battery. The digital charging system allows 20 hours of operation

per charge, with an expected battery life of five years.

Cochlear implant manufacturers Advanced Bionics, Cochlear, and MED-EL each use proprietary rechargeable systems for their implants. Advanced Bionics' rechargeable NiMH power system is called the Auria PowerCel, and is available in two sizes. Cochlear offers a lithium-ion rechargeable system in two sizes as well. MED-EL's NiMH rechargeable system is called DaCapo.

Consider the battery options appropriate for your device, and check with your hearing healthcare professional if you are unsure. Keep in mind that new options become available as technology changes and improves. Then weigh the benefits and limitations for each and decide which best suits your needs.

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*Joshua Spann is a second-year doctor of audiology student at the University of Arkansas for Medical Sciences and a graduate assistant in the Department of Audiology and Speech Pathology.*

SIDEBAR SOURCE: NATIONAL CAPITAL POISON CENTER; PHOTO COURTESY OF ENERGIZER

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# Bilateral Benefits

Cochlear implantation in both ears has shown better results than implantation in only one ear.

By Ruth Litovsky, Ph.D.

**B**ilateral cochlear implants (CIs) are being provided to a growing number of individuals who have severe to profound hearing loss in both the right and the left ear, and are becoming standard in many clinics worldwide. Bilateral implantation—that is, in both ears—is motivated, in part, by the fact that human beings normally use two ears to hear. Binaural hearing plays an important role in facilitating sound localization and understanding speech in noise, or what is known as spatial hearing.

Without spatial cues, listeners can feel disoriented and must work harder to listen in different environments and to pair auditory information with visual cues. They have difficulty locating the direction of sound sources. In addition, when listening in complex,

noisy conditions—such as social gatherings, classrooms, restaurants, and loud work environments—people with a single cochlear implant generally must expend greater effort to identify the content of sounds.

Bilateral implantation also ensures that if one of the two CIs stops working temporarily (such as when batteries need replacing or the uncommon event that one of the CIs fails), the patient is never “out of sound.”

In addition, bilateral implantation guarantees the “better ear” is always implanted. This is because after someone becomes deaf, the disease or cause of deafness doesn’t always affect both ears in exactly the same way. One ear may be “more deaf” and be less successful with an implant than the other.

But when someone only gets a single implant, their doctor must decide which ear is best to implant.

When both ears are implanted, the surgeon gets a better shot at implanting the best ear.

## SIGNIFICANT BENEFITS

Bilateral CIs were provided in small numbers in the 1990s and the first few years of the 21st century. Data suggesting benefits from bilateral CIs and changes in health insurance coverage for the second CI have led many clinics to consider offering the second CI as a new standard of care. Cochlear implantation in seniors, even in their 80s and 90s, has been shown to be safe and effective. (See “An End to Isolation” in Hearing Health’s Winter 2011 issue, available online at [www.hearinghealthmag.com](http://www.hearinghealthmag.com).)

Numerous studies show that adults who are bilaterally implanted experience significant benefits from this treatment.

First, adults demonstrate much

better sound localization abilities when using both CIs than when using a single CI. As an example, consider the task of having to identify where a sound source is located, in the absence of visual cues. With the use of a single CI, adults report that sounds are “collapsed inside the ear” with no information regarding location or distance.

In a laboratory setting, we measure sound localization ability by asking patients to select the perceived location of a sound from among several possible locations (usually eight to 15 possible options). When using a single CI, typical error rates are such that the perceived location can be 30 to 90 degrees away from the actual location. Average errors are 50 degrees.

In contrast, when two CIs are being used, error rates can be as low as 10 to 20 degrees. From a functional point of view, being able to orient toward an important sound source is critical—such as knowing where to turn your head if someone is calling or being able to perceive where the bus is coming from when crossing the road. This low error rate indicates a high level of improvement in sound localization.

Second, speech understanding in noise is generally better when using two CIs vs. one CI. When using a single CI, patients can certainly understand speech, especially in quiet situations, and children with one CI have been shown to acquire language at an impressive rate.

But hearing speech in noise is quite challenging. Research shows that when using bilateral CIs, the ability of patients to understand speech improves significantly compared with a single CI. The same auditory cues that are available for sound localization become available for hearing speech in noise.

In addition, the fact that listeners have two ears provides independent interpretations of the incoming speech signal, especially when the speech and noise are separated into different locations. The same cues that help us to localize sounds help us to separate important sounds, such as speech, from background noise.

Third, bilateral CI users typically report that their quality of life is significantly better when they are able to use both CIs than when only one of their CIs is available. They report a general “ease of listening” and needing to work less hard to extract meaning from incoming speech streams.

And if a CI battery ceases to function in one ear, the person is not rendered deaf, as they have the other ear to fall back on temporarily.

## REMAINING CHALLENGES

It is important to note that there are remaining challenges for CI users, even when using bilateral CIs. The hearing of bilateral CI users is not the same as in people with normal hearing.

There are numerous possible explanations for this fact. Many people who are CI users have experienced hearing loss over a long period of time, depriving them of acoustic input. This can result in some of their auditory nervous system being less functional than normal, which cannot be overcome with the use of bilateral CIs.

In addition, the bilateral CIs that are currently available on the market are fitted as two separate CIs, one in each ear. They are not by design intended to process binaural signals. That is, they do not compare the signals arriving at the ears in the way that a normal auditory system does. In order for the patient to benefit

from having a CI in each ear, the CIs would have to be synchronized.

To explain further: In a normal auditory system, the brain has specialized circuits that compare information arriving at the ears from different locations in space, and the brain relies on the arrival of sounds at the two ears in a coordinated way.

However, two CIs can vary as to when they are activated, they can be programmed differently, and the loudness in each ear may not be the same. Future directions in this field should be to develop engineering tools for bilateral CIs that provide synchronized information from the two ears to the brain, so that users can maximize their performance, especially in complex listening environments.

Our lab is now conducting studies with prototype cochlear implants that will hopefully lead to improved technology. Because these implants are large and bulky, they sit on a desk while we run tests with patients in our labs.

Using these research CIs, we are able to synchronize the information to the right and left ears, and to improve the hearing abilities of bilateral implant users.

We are thus able to restore the normal binaural cues that the brain is looking for. Our results show that this approach leads to notable improvement. This is especially the case for people who became deaf after acquiring speech and language, whose brain was able to learn how to process sounds early in life. 

*Ruth Litovsky, Ph.D., is the director of the Binaural Hearing & Speech Lab at the University of Wisconsin–Madison, where she is also a professor in the Department of Communicative Disorders and in the Department of Surgery, Division of Otolaryngology.*

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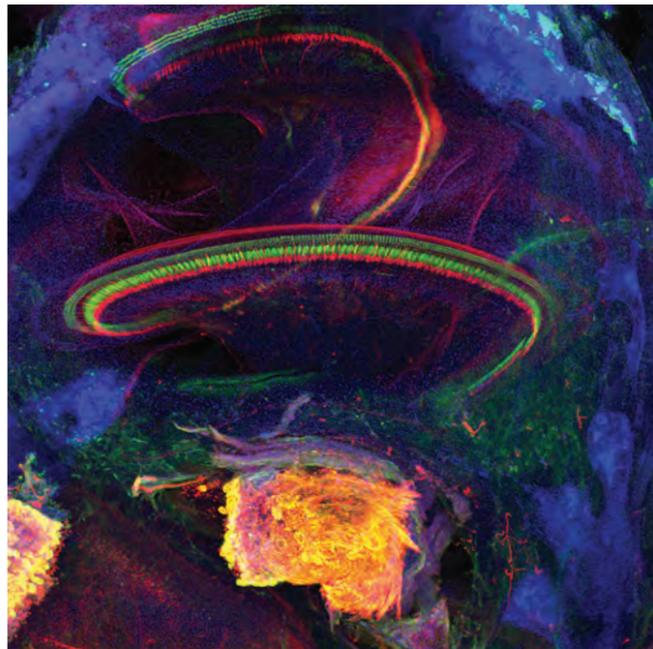
# The Race to Cure Hearing Loss in a Decade

Hearing Health Foundation has assembled a “dream team” of scientists collaborating to research and cure hearing loss.

**T**wenty-five years ago, research funded by Hearing Health Foundation yielded the discovery that birds have the ability to spontaneously regrow damaged hair cells in their inner ears. Hair cells convert sound information into electrical signals that are sent to the brain. Once human hair cells die, hearing loss is permanent.

The challenge is to find a way to trigger hair cell regrowth within humans, with scientists leveraging findings in chicks and zebrafish, which have demonstrated the ability to automatically regenerate damaged hair cells that conduct auditory signals to the brain.

“If we can replicate in mammals the regeneration that occurs in chicks, it may hold the promise for a cure for hearing loss in humans,” says George A. Gates, M.D.,



A view of normal mammalian hair cells (light and dark green spirals) with the bone and other structures dissected away.

scientific director of the Hearing Restoration Project.

“Many labs are on the cusp of major breakthroughs in this field of research, using technologies—in the areas of stem cell research and gene mapping, for example—that didn’t exist 25 years ago when the discovery of regeneration was first made in chicks,” Gates adds. “So we are hugely optimistic about the outcome.”

To this end, Hearing Health Foundation launched the Hearing Restoration Project (HRP) last fall. According to a recent study conducted by researchers at Johns Hopkins University, forty-eight million Americans over age 12 suffer from some form of hearing loss. That number is expected to double by 2030. Impairment of hearing loss and tinnitus also occurs in 60 percent of veterans returning from Iraq and Afghanistan; it is even more prevalent than post-traumatic stress disorder.

Additionally, adolescent hearing loss is on the rise—a jump of 15 percent in the last decade, according to a recent article published in the Journal of the American Medical Association. It is estimated that one in five teenagers is now suffering from hearing loss. (See “Basic Facts About Hearing Loss,” next page.)

The HRP is a consortium made up of some of the most talented, creative, and inspired researchers in the area of cell regeneration in the ear. The group is comprised of both mid-level and senior-level investigators whose work has already contributed significantly to the field. These scientists are working collaboratively and interactively with the goal of developing a biologic cure for severe sensorineural hearing loss in the next decade. At Hearing

Health Foundation’s summit, “The Promise of Cell Regeneration,” held in New York City last October, these experts discussed an area of particular promise: hair cell regeneration in humans.

“Hearing Health Foundation understands that it is important to invest in researchers who are working in hair cell regeneration as this will be an important component in the next wave of hearing treatments,” says Andrea Boidman, Hearing Health Foundation’s executive director. “Hearing research needs to be a national priority, and people need to know that there are treatments on the horizon that could really impact their lives.”

The HRP is an innovative model of collaboration among 13 major hearing loss research labs in the United States, with full sharing of technologies, data, and credit. Significant funds have already been raised, but the HRP needs \$50 million over 10 years to fund this important work.

Members of the HRP include top researchers in the field, affiliated with Baylor College of Medicine, Harvard Medical School, House Research Institute, Oregon Health & Science University, Stanford



Research scientists who are part of the Hearing Restoration Project’s collaborative consortium met in Alexandria, Va., last September.

University School of Medicine, Stowers Institute for Medical Research, University of Michigan, University of California San Diego, University of Washington, and Washington University Medical Center. (To learn more, please see [www.hearingrestorationproject.org](http://www.hearingrestorationproject.org).)

For John Brigande, Ph.D., an HRP consortium member who works at Oregon Health & Science University, it’s personal. “My hearing loss has inspired my work in a way that would not have been possible without experiencing it firsthand.”

Hearing Health Foundation’s October summit was followed by a fundraising reception, “Celebrating the Senses,” which featured a live performance by SRC/Universal Republic recording artist Shontelle

and the premiere of a multimedia art installation by composer and artist Jay Alan Zimmerman, whose work utilizes rhythmic video projections, visual music, and synesthesia. The installation was an outcome of Zimmerman’s own hearing loss.

“As a composer, losing my hearing made me lose my sense of self. Like a chef losing his sense of taste, I mourned all the tasty morsels of sound I would never get to enjoy again, and finally got so frustrated I wrote a musical about it,” Zimmerman says. “Hearing loss is not something you ‘get over’—you have to face it, fight it, mourn it every day.”

“Maybe the next generation will never have to find out what it feels like to lose a sense you love,” he says.

## Basic Facts About Hearing Loss

- Men are more likely than women to experience hearing loss.
- One in five Americans over age 12 has hearing loss in at least one ear. This number is expected to double by 2030.
- There is a direct link between age and hearing loss: About 18 percent of American adults between the ages of 45 and 54, 30 percent of adults between ages 65 and 74, and 47 percent of adults ages 75 and older have hearing impairments.
- In the United States, three out of every 1,000 children are born deaf or hard-of-hearing.
- About 26 million Americans between the ages of 20 and 69 have high-frequency hearing loss due to exposure to loud noises at work or during leisure activities.
- About 60 percent of deployed military servicemen and women have noise-induced hearing loss, tinnitus (ringing in the ear), or other hearing injuries.
- Impairment of auditory activity and tinnitus are more likely to occur in Iraq and Afghanistan war veterans than post-traumatic stress syndrome.
- High levels of cotinine, the chemical that indicates exposure to tobacco smoke and secondhand smoke, have been directly linked to higher risks of some types of hearing loss.

PHOTO CREDIT: BRANDON NEUBAUER (NEXT PAGE)



Born nearly completely deaf, Van Boening comes from a family of national billiards champions and grew up watching the game being played all day long.

# Taking His Shot

**Pool player Shane Van Boening uses his hearing loss to his advantage.**

By Amy Gross

While not the most conventional upbringing, being raised in a pool hall was precisely the education Shane Van Boening needed. Currently ranked the number one pocket billiards player in the world, Van Boening learned from the best:

his own family. His grandfather, grandmother, mother, and aunt were all national billiards champions in various circuits, and he got to watch them practice from the best vantage point in the room.

“My grandfather owned a pool room and I was always there,” the

South Dakota native says. “My mom would put me in a baby chair and I’d just watch people play all day long.”

Born almost completely deaf, Van Boening was fascinated by the colors of the balls, how they bounced against one another, and how they fell, so smoothly, into the pockets.

He was given his first pool set at age 2. By age 6 he was performing trick-shot exhibitions on the road with his grandfather, trick-shot legend Gary Bloomberg.

Van Boening also received his first hearing aids at an early age—16 months—and wears them to this day. Without the hearing aids, he has about a 97 percent hearing loss. His mother, national amateur pool champion Timi Bloomberg, was adamant that her son attend mainstream schools and learn to talk. Van Boening himself acknowledges that it was spending time in the pool hall at an early age that taught him how to communicate.

Now 28, Van Boening is quiet, reserved, and extremely focused. In pool, as with most solo-player sports, focus is the key to winning. His legendary tunnel vision during play draws admiration from both fans and opponents. Van Boening freely admits that part of the reason he is able to concentrate so completely during stressful tournaments is because he can turn off his hearing aids. “Yeah, I hear the complaints,” he says. “A lot of players tell me they’re jealous. They wish they couldn’t hear [the distractions].”

After graduating from high school and then Black Hills State University in Spearfish, S.D., Van Boening decided to take a run at the pro pool circuit. In 2005, he played his first professional tournament, the U.S. Bar Table Championship in Reno, Nev., and took third. He was hooked, but after lackluster performances at a few subsequent tournaments, knew he had to get serious about his game.

Van Boening had met Chuck Moss, a local Sioux Falls real estate broker and developer, prior to his first pro appearance. Moss quickly set him up as house pro at Lucky’s pool hall, which Van Boening now co-owns. But the “South Dakota

Kid,” as he is known, uses Lucky’s as his own personal training ground.

“They set up a table for me to practice all by myself, and no one is allowed to interrupt me,” Van Boening says. “Some days I’ll practice eight to 10 hours. I remember once playing for 17 hours straight.”

The practice has certainly paid off. In 2007, after placing third in the Music City 9-Ball Open and then losing to Dennis Orcollo of the Philippines at the EnjoyPool.com 9-Ball Championships, Van Boening won his first pro title at the Predator 10-Ball World Championship, that time taking the game from Orcollo.

Van Boening says spending time in the pool hall at an early age taught him how to communicate.

Last October, he beat out 232 other players to win the U.S. Open 9-Ball Championship in Chesapeake, Va., the toughest billiards tournament in the world, and pocketed the tournament’s \$50,000 prize. This win was arguably Van Boening’s most critical; in addition to the financial reward, he earned the coveted title of Player of the Year and an invitation to the Mosconi Cup.

Patterned after golf’s Ryder Cup, the Mosconi Cup pits teams from the United States and Europe against one another in a four-day 9-Ball tournament. Participation is by invitation only and based on a player’s ranking after competing in 10 events throughout the year, culminating in the U.S. Open.

Although 2007 was Van Boening’s

first appearance at a Mosconi Cup, he emerged as the U.S. team’s top player, finishing with a 4-2 overall match record even as the United States lost to Europe. He has earned a spot on the U.S. team at the Mosconi Cup every year since 2007, and after winning the Steve Mizerak Championship last September, was ranked high enough to become the first American player to secure a spot in the 2011 Mosconi Cup.

For a self-described shy, quiet introvert, winning on this scale could be heady stuff. But just as Van Boening downplays his deafness, he also takes his success in stride. “I’m very thankful,” Van Boening says. “I guess I have a gift, but I don’t like to brag about myself too much. We all have one life and I think we should enjoy it. I think it’s important to respect other players and have fun.”

Still, when the sport most people consider “play” is actually “work,” Van Boening recognizes the need to get his mind off the game and to step back once in a while—as much as a 50-weeks-a-year playing and international traveling schedule can allow. “I love all outdoor activities,” he says. “It’s important to take time off from the game.”

Van Boening eschews the vices often associated with the pool hall lifestyle. He doesn’t drink or smoke, and is delighted that many of today’s pool halls are cleaner, and even child-friendly. He hopes that if a youngster who came into his pool hall had the chance to play pool professionally, they would take it.

The pool player says he might consider retiring in a couple decades, getting a different degree, and going in a new direction entirely from pool. But right now, there are tournaments to be won, and Van Boening is at the top of his game. 

*Amy Gross is a staff writer.*

PHOTOS COURTESY OF SHANE VAN BOENING



## Why Hearing Healthcare Professionals Still Matter

By Ross Cushing, Au.D.

Increasingly, hearing aids are being sold online, through catalogs, and directly to the consumer, bypassing the hearing healthcare professional. Even Hammacher Schlemmer, a gift and gadget retailer, is selling hearing aids as an over-the-counter product.

Leaving aside whether it's legal (it's not), the main argument for buying direct is that it will provide greater access to more products, which will make manufacturers more competitive, and this will ultimately provide a less expensive, higher quality product for the consumer.

Here's the problem. Although it is true that the distributors of these products can almost always provide hearing aids at lower costs, the purchase and use of a hearing aid without a proper examination, diagnosis, fitting, programming, and counseling is a recipe for poor treatment outcomes and increased health risks.

There are many potential causes for hearing loss including aging, blockages, ear infections, fistulas, head injury, medication, Ménière's disease, noise damage, otosclerosis, and tumors. Many cannot be treated with a hearing aid and may require a cochlear implant instead. Several require immediate medical intervention. If they buy via a catalog, how will consumers know when to get a hearing instrument and when to seek medical attention? They won't. What's more, hearing loss can result from the improper fitting or

programming of instruments.

Most hearing aid manufacturers will not allow their hearing aids to be sold or purchased without a face-to-face consultation with a licensed practitioner. They recognize the risks of buying and using them without the proper counseling and fitting that only a licensed hearing healthcare professional can provide.

Customers value professional input as well. Research by trade group Hearing Industries Association using MarkeTrac data provided by Sergei Kochin, Ph.D., the executive director of the Better Hearing Institute in Virginia, has shown that the top reasons for patient satisfaction with hearing aids are directly attributable to his experience with a trained hearing professional. The technology is successful only when a professional has evaluated the hearing loss and prescribed a customized solution.

There are four important components in the audiology model that are necessary—and absent—from the direct-to-consumer model:

**1. Proper evaluation.** A battery of audiology tests will evaluate if medical treatment is necessary and if a hearing aid is even needed.

**2. Individualized device setup.** A hearing aid has to have the right hardware and software for the needs of the individual. It has to be physically fit correctly. It has to be tuned and configured to the individual's dynamic range of hearing. And finally, it has to be used correctly.

**3. Psychological considerations and counseling.** A hearing aid is not a normal consumer product. It is a medical device. On average, people know they have a hearing problem for seven years before they do something about it. They wonder: "What will other people think about me if they know I have a hearing aid?" There are communication issues to be addressed, and there is often a fear of having to rely on an artificial device.

From the perspective of someone who has never gone through the process of getting hearing aids, getting hearing aids through a catalog may seem simpler. They can try it in their own time and see if it works. In theory this sounds attractive, especially for new users who aren't ready to confront their own perceptions of wearing hearing aids or for those who want to keep costs low. But does this work?

It's like putting a Band-Aid on a broken arm. Although on the surface it may seem as if better hearing can be more accessible if provided in a direct-to-consumer way, in reality it is not practical or effective, and in many cases, not safe. Fitting hearing aids is an art that is guided by science and delivered by the experience of a hearing healthcare professional. 

*Ross Cushing, Au.D., is the director of A&A Hearing Group, which has four offices in Maryland. Call 301.977.6317 or visit [www.hearinmd.com](http://www.hearinmd.com) for more information.*

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Two advances in technology could soon make movie-going an easier experience for people with hearing loss.



## Coming Soon to a Theater Near You

For people with any degree of hearing loss, going to the movies can be a frustrating experience. Assistive listening devices, when available, may be outdated and difficult to obtain. Worse, many theaters offer no auditory aids, forcing potential patrons to wait to watch the movie at home.

Even on the small screen, there are often issues. For example, a class-action lawsuit was filed against Netflix in March 2011, claiming that the entertainment service failed to offer captions for streaming video in violation of state and federal laws.

Sony is currently working on a solution for the big screen: a

special pair of “subtitle glasses.” Development work on the breakthrough glasses is taking place in the United Kingdom.

“What we do is put the closed captions or the subtitles onto the screen of the glasses so it’s superimposed on the cinema screen,” Sony representative Tim Potter explained to the BBC. He said the goal is to make it look like the subtitles are actually on the cinema screen so that movie-goers don’t have to adjust their eyes to focus on two fields at once. Sony aims to test the glasses in theaters this year.

A second theater solution is also in the works. Salix is a wireless audio distribution system designed

by Cambridge Consultants. Salix has been licensed by California-based Doremi Cinema to develop lower-cost technology to improve its services for hearing and visually impaired patrons.

The small, relatively inexpensive system runs on several channels and can be configured in a single transmitter at the theater. Because it eliminates the need for multiple transmitters that must each have a clear line of sight to receivers in order to work properly, the system, which will be marketed under the brand name Fidelio, may have widespread appeal for reducing cost and complexity.

—Andrea Delbanco, Senior Editor



### Struck by a Wonderful Read

In “Wonderstruck,” bestselling American author Brian Selznick spins two stories of 12-year-olds using two distinct artistic mediums, prose and pictures. Rose is deaf, and Ben loses his hearing when he is struck by lightning. Ben’s story is set in 1977 and told traditionally, with words. Rose’s story, set 50 years earlier, is told entirely in pictures. The stories weave together in unexpected ways, requiring the reader to move back and forth in time as each story unfolds. Selznick, who won the 2008 Caldecott Medal for “The Invention of Hugo Cabret” (recently released as a movie), illustrates his books himself. Selznick’s brother was born deaf in one ear, which the author says was part of his inspiration for this story. —A.D.

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**NAME:**

**Hsiao-Huei (Juli) Wu, Ph.D.**  
 Keck School of Medicine,  
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**BIO:**

**Wu received her Ph.D.** in biological sciences from City of Hope's Beckman Research Institute in Duarte, Calif. She obtained her postdoctoral training in neural development at the University of California, Irvine, and at Vanderbilt University in Nashville, Tenn. She is an assistant professor of research at the Keck School of Medicine, at the University of Southern California, in Los Angeles, and a 2011 Hearing Health Foundation grant recipient.

**IN HER WORDS:**

**I am currently focusing on** understanding the molecular bases of hearing abnormalities in autism spectrum disorders (ASD). The prevalence of ASD diagnoses among deaf children is twice that of the general population. Others report an even higher prevalence of ASD patients who have an abnormal brainstem response or who have abnormal sensitivities to sounds. A hearing abnormality may further impair the communication ability of people with ASD. However, the clinical symptoms and the molecular bases of hearing abnormalities in ASD are unknown.

**ASD is a developmental neuropsychiatric** disorder with a strong genetic link. It is a spectrum disorder meaning that different people with autism can have very different symptoms, and thus is a very complex disorder. From a researcher's point of view, this complexity of ASD intrigued me.

**I am using both human genetics** and animal models to better understand the link between a hearing abnormality and other disorders related to ASD. I am also collaborating with clinical investigators at House Research Institute to better characterize the hearing abnormality among pediatric ASD patients.

**Right now I am focusing on** the hepatocyte growth factor (HGF) gene and its receptor, MET receptor tyrosine

kinase, both important for normal hearing. It is not known yet what the function of HGF and MET are in the development and formation of a region called the stria vascularis in the cochlea. My aim is to study this in detail.

**I have been working on this project** for about a year. I hope this work will provide further insight into inner ear development, and also a better understanding of the molecular and functional link between ASD and a hearing abnormality in some ASD patients. I hope this will assist in designing personalized treatment strategies for ASD patients with hearing abnormalities.

**I was born in Taipei, Taiwan,** in 1965. I have always loved solving mysteries and puzzles. However, when growing up in Taiwan, girls were not particularly encouraged to go into science, and no one else in my family is a scientist.

**I have spent most of my adult life** in the U.S., particularly in southern California. I consider it my second home, especially since my parents moved here too. I don't really like to travel. But my family is scattered across several continents, so I try to make a long trip to see them at least once a year.

**I was diagnosed with thyroid cancer** five years ago. Going through treatments and following up annually has changed my thinking as a sensory neuroscience researcher. I now focus on questions important to patients, and I try to encourage more collaboration and interaction between researchers and clinicians who see patients.

—Andrea Delbanco, Senior Editor

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