Cochlear Implants—

How to Help Your Patients Who Struggle with Well-Fit Hearing Aids to Hear Better

Cochlear implants (CIs) are widely considered to be one of the most successful medical interventions in history, given that it marked the first time medical science has restored a sense for appropriate individuals of all ages. More older adults than ever are now candidates given the 2022 expansion in Medicare candidacy levels. Age is no longer a contraindication for CI. Despite these outcomes, US adult utilization rates in 2023 remain below 10% with the main reason being a lack of awareness among the general population and healthcare professionals, including those involved in hearing health. A lack of understanding of candidacy, outcomes, and care delivery has hampered referrals by professionals for those individuals who could benefit from a cochlear implant.¹,² This article provides background, suggested actions, and a summary of relevant research for hearing aid specialists so that they can more fully support their patients who may benefit from cochlear implantation.

Do you have patients who perform poorly, even with well fit hearing aids?
The majority of your patients are likely to be delighted with the benefits that they derive from their hearing aids and with the services you provide as a hearing care specialist. For the majority of individuals with mild to severe hearing loss, traditional amplification that is tailored to an individual’s hearing profile and life needs provides notable hearing improvements and quality of life benefits.³,⁴ If the hearing loss moves into the profound range, some individuals have difficulty understanding speech—even using appropriately fit hearing aids. Hearing aids take the sound in the environment and make it louder. If the individual has little (typically high frequency) hearing to amplify, speech perception outcomes with hearing aids can be poor. The amplified speech may not sound clear. Patients may note that they hear sound but that the signal is “noisy” or garbled, and they have difficulty comprehending speech. This outcome is sometimes compared to a “broken speaker.” No amount of amplification of the signal is going to provide satisfactory speech understanding for patients in this situation.

How might a cochlear implant help such patients?
Cochlear implants bypass the damaged areas of the cochlea and directly stimulate the auditory nerve by transmitting speech sounds via electronic impulses to a receiver that was placed during surgery. As someone becomes accustomed to the new signal and new way of hearing, an appropriate adult CI candidate typically
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experiences a 35% or better improvement in speech understanding.

A 2020 study published in *JAMA Otolaryngology* explored outcomes in Medicare beneficiaries 65 years or older, with qualifying best-aided AzBio sentence recognition scores between 41% and 60%. Patient outcomes at 12 months for individuals in the study demonstrated a median change in patient understanding of speech in the best-aided condition (hearing aid on the contralateral ear) and CI alone of 36% and 53%, respectively.⁵ These significant patient improvements led to the decision by the Centers for Medicare and Medicaid Services (CMS) to broaden Medicare candidacy to closely align with FDA labeling for adults.

What is a cochlear implant?

A cochlear implant is an electronic device for patients with moderate to profound hearing loss who are not sufficiently helped by hearing aids. There are external and internal components to the cochlear implant system.

The external components include:

- a microphone that collects the sound in the environment (or from a sound source such as a telephone),
- a sound processor (a tiny computer) analyzes and digitizes the sound signals and then sends the signals to
- a transmitter that is worn on the head and includes
- a magnet to hold it in position.

The external transmitter sends the signal to a surgically implanted internal receiver/stimulator. The sound processor is powered by rechargeable or disposable batteries. Different styles of processors are offered including a device that can be worn on the ear much like a behind-the-ear hearing aid or other styles that sit directly on the head. All CI devices connect to the internal receiver through the skin.

The internal components include:

- a receiver and
- an electrode array that receives the signal from the transmitter and stimulates the auditory nerve.

The transmitted information includes the components of speech and other sounds (including music)—pitch, volume, and timbre. The electronic information is interpreted by the brain. Over time, the CI recipient learns to interpret the CI signal as meaningful information.

Unlike a hearing aid, which delivers amplified sound acoustically, a cochlear implant bypasses damaged hair cells in the cochlea and stimulates the remaining nerve fibers directly through the application of electrical current. The internal device is designed to last a lifetime and work with future (external) processors. Hence, one surgery allows patients to continue to benefit from future improvements in the external sound processor technology. These have included improved listening in noise, direct connection to Bluetooth, and smaller sound processors.

There are three cochlear implant manufacturers approved for use in the United States: Cochlear, Advanced Bionics, and MED-EL. Each CI company provides devices, accessories, resources, and support for patients and their families. A patient’s cochlear implant team can assist them in making the selection but typically the patient can choose which device they wish to have.

Cochlear implant surgery is typically performed as an outpatient procedure under general anesthesia. The surgery takes approximately 1 to 3 hours and is considered a routine surgery with low risk. Two to four weeks after surgery, when the incision site has healed, the sound processor is mapped (or programmed) and the implant is activated by the patient’s audiologist. At that appointment, the patient may be able to experience improved hearing through the device. Patients work with their audiologist the first year after activation at several appointments to optimize sound quality.
through the implant. Recipients then return periodically to check their program.

Who is a candidate for a cochlear implant? When should the CI discussion be initiated?

It is beneficial for a discussion of cochlear implants to start early in someone’s hearing journey so that an individual patient is aware of possible future options available should their hearing loss decline. Many patients note that the process of gradually losing hearing would have been less frightening had they known that there was another option should their hearing aids no longer work effectively for them. Most patients use a hearing aid on the contralateral ear from the cochlear implant enhancing their hearing experience with “the best of both.”

Understanding cochlear implant candidacy, including when and where to refer for an evaluation, allows the hearing healthcare professional to begin the CI conversation early—before a patient is a candidate. Increasingly hearing healthcare emphasizes a continuum of care approach. An early discussion will serve to create a positive perspective among those who may become a CI candidate at some point and help avoid approaching cochlear implantation as a last resort.

Research demonstrates that the earlier an eligible individual pursues a CI, the better the person’s outcomes will be. Additionally, providing improved access to sound allows adults to stay connected and enjoy important quality of life benefits. Research conducted by Frank Lin and others found that individuals with untreated mild, moderate, and severe hearing loss had, respectively, a twofold, threefold, and fivefold increased risk of dementia compared with individuals with normal hearing.

PREOPERATIVE CI HEARING AND SPEECH ASSESSMENT

- Comprehensive hearing, speech/language, and rehabilitation history
- Comprehensive diagnostic audiological evaluation
- Comprehensive speech/language evaluation (children)
- Optimization of hearing aids (Hearing aid trial as indicated)
- Aided speech perception evaluation
- Referral to other professionals if indicated (neuropsychologist, social work, etc.)
- Counseling
  - CI candidacy or continuation with amplification
  - Expectations

It is not uncommon for an individual to undergo a CI evaluation more than once. While a patient may not qualify the first time they are evaluated, it’s beneficial for someone to understand more about the CI technology and the process early on. People often share that the experience of being evaluated was helpful to them, even if they were not considered a candidate. The CI evaluation is typically covered by health insurance.

During a CI evaluation, a candidacy determination is made by a CI surgeon (to address medical issues) and by a specially trained audiologist to determine audiological readiness. The audiological evaluation is conducted in best-aided condition. Current Food and Drug Administration (FDA) labeling (sometimes called a “guideline”) for adults considers individuals with moderate to profound hearing loss as CI candidates if they have up to 50% sentence discrimination (i.e., words in sentences) in the ear to be implanted and 60% bilaterally.

A candidacy tool that may be of help to hearing aid specialists in knowing when to refer patients is the 60/60 Guideline. This guideline suggests that patients be referred if they demonstrate a best ear unaided monosyllabic word score less than or equal to 60% correct and an unaided pure-tone average in the better ear that is greater than or equal to 60 dB HL. The guideline was developed with results of a study of 529 patients who participated in a cochlear implant candidacy evaluation. There was a 96% detection rate when applying the 60/60 referral criteria to identify CI patients.

Are cochlear implants appropriate for older adults?

Until recently, older adults utilizing Medicare as a source of health insurance needed to demonstrate much poorer hearing outcomes to be eligible for a cochlear implant.

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than younger adults. This discrepancy has now been largely eliminated with the September 2022 decision by the Centers for Medicare and Medicaid Services (CMS) to expand coverage under Medicare as part of a formal evaluation process called a National Coverage Determination. This action by CMS broadens eligibility for individuals aged 65-years and older to more closely resemble the candidacy utilized under the FDA. This CMS action broadens the opportunity for cochlear implant coverage for those who would not have been a candidate in the past. Research noted above has shown that early implantation is associated with better outcomes. This recent policy change is an important opportunity to share with older patients who would benefit from a cochlear implant evaluation.

The 2020 study noted above published in *JAMA Otolaryngology* explored outcomes in Medicare beneficiaries 65 years or older, with qualifying best-aided AzBio® sentence recognition scores between 41% and 60%. Patient outcomes at 12 months for individuals in the study demonstrated a median change in patient understanding of speech in the best-aided condition (hearing aid on the contralateral ear) and CI alone of 36% and 53%, respectively. These significant patient improvements documented in the study were the basis for the submission that led to the decision by CMS to broaden Medicare candidacy to more closely align with FDA labeling for adults.

- AzBio is a a is a speech intelligibility test, originally devised for testing cochlear implant perception.

Supporting this change in Medicare candidacy was a long-term priority of ACI Alliance. The noted study demonstrated that, “intervention with a cochlear implant was associated with improved sentence, word, and telephone recognition in adult Medicare beneficiaries whose preoperative AzBio Sentence Test scores were between 41% and 60%.” Importantly, there is no upper age limit for cochlear implant candidacy, as long as an individual is considered sufficiently healthy to undergo the surgery. Older adult CI outcomes are similar to those of younger adults.

What do older patients say about their cochlear implant?

Patrick Galloway received a cochlear implant the day after he turned 80 in March 2021. He began experiencing hearing loss in his 70s and wore hearing aids for about three years before they provided minimal benefit. Galloway learned about cochlear implants through his own research rather than via a referral from an audiologist, ENT, or hearing aid specialist. Patients like Galloway are an important opportunity to support patients’ hearing journey by letting them know about options when hearing aid benefits have substantially declined. He participated in the above discussed CMS sponsored study and hence his cochlear implant was covered by Medicare with his secondary insurance covering co-pays. Galloway’s wife, Beverly, wrote eloquently on the challenges Patrick’s hearing loss presented for their entire family. She noted that, “The opportunity to have a cochlear implant changes a senior’s life and attitude from my life is ending to my life has a new beginning.”
After two cochlear implant evaluations during which she was told she didn’t qualify for a CI under what was then current Medicare criteria, Ann Liming learned about the Medicare coverage expansion study and decided to participate. Liming was already familiar with the life-changing benefits of a CI after her sister was implanted, which “changed her life.” She notes that her progress and improved outcomes took some time (which is quite typical). She used audiobooks and other rehab tools like computer-based listening programs. Her listening outcomes continued to improve. Like many people, Liming uses a hearing aid in her contralateral ear and is astonished that she can’t hear well at all using just her hearing aid, but when she uses it with her CI “everything is better.” She is considering a second cochlear implant. She has shared her own outcomes and information about cochlear implants with whomever will listen. She considers her CI “a gift to her” and enjoys learning to use all the technology and accessories associated with her cochlear implant.

Lou Ferrigno, The Incredible Hulk, received a cochlear implant at age 69 after a lifetime of hearing loss and hearing aid use. He finally decided to go forward with a cochlear implant after a friend pursued CI and had great outcomes. He has been open about sharing his own stories of struggling with hearing aids and now, with a CI, being able to interact with so much less effort. Like many older adults, one of his special pleasures is being able to hear his grandchildren. (Listen to a video interview with The Incredible Hulk accessible via the Resources at the end of this article.)

**How Cochlear Implants and Hearing Aids Work Together**

For a variety of reasons, from personal preference to differences in the severity of hearing loss in each ear, most patients take advantage of bimodal hearing, or utilizing a cochlear implant in one ear and a hearing aid on the contralateral ear. Using both hearing technologies simultaneously has significant benefits for patients related to improved speech understanding, better ability to localize sound, and often increased enjoyment when listening to or participating in music.

These benefits are important to share with patients so that they know they may continue to use a hearing aid to supplement what they hear with a CI. Understanding how the devices work together, complement each other, and connect to similar technologies (including cell phones) is important for patients to recognize and pursue.

**Insurance Coverage for Cochlear Implants**

Although hearing aids may often not be covered by health insurance, cochlear implantation is covered by an estimated 90% of private health insurance plans as well as public insurers such as Medicare and Medicaid for children and for adults in most states. Cochlear implant coverage is also available through the Department of Veterans Affairs, Tricare, and Affordable Care Act Marketplace Plans. Similar to other health interventions, there are co-pays that apply.

Cochlear implantation includes medical services and procedures that are provided over time by a team of clinicians. All of these services, as well as the CI device and related peripherals, are considered part of the medical intervention and are typically covered by health insurance. These services and procedures include candidacy evaluation, hospitals costs including of supplies and medications used during surgery, physician and surgeon’s fees, the CI device and system kit, and programming and (re)habilitation following the surgery. ACI Alliance website: https://www.acialliance.org/

Once a patient qualifies for a cochlear implant, they may receive support from their CI clinic and from the CI manufacturer they choose to pursue insurance coverage. CI clinics, hospitals, and each of the three manufacturers are familiar with coverage details, so CI candidates won’t be navigating that process by themselves.
patients in beginning their journey. Clinics listed typically include teams of professionals from hearing health and related fields. Patients may be unsure about what happens at a CI evaluation. ACI Alliance provides a range of videos and other resources that support the CI journey. Your involvement as their trusted hearing care professional will support their pursuit of a CI and your continued involvement as their hearing aid professional.

A discussion of expectations after cochlear implantation is part of the cochlear implant evaluation process. The CI team will explore an individual’s current challenges to help set expectation about how a cochlear implant may improve their hearing and quality of life. This discussion includes likely improvements in understanding speech but also the specific challenges the person experiences and how a CI may change their day-to-day life.

How might the CI impact your relationship with patients?
Hearing aid specialists see patients throughout their journey of hearing loss, as their hearing loss changes and their needs change. By building awareness of cochlear implant candidacy guidelines and the reasons many eligible patients don’t move forward with a cochlear implant, you can become an even more trusted partner by effectively addressing your patients’ hearing loss in a comprehensive manner. Since primary care physicians may not prioritize hearing as part of healthcare, patients are more reliant on your information and support.

Many patients with hearing loss wait to be evaluated for CIs based on misconceptions about the technology or the expected benefit. Being aware of these factors and sharing the most accurate and timely information can have a significant, positive benefit and impact on patients.

Two common misconceptions about CIs that hearing aid specialists can help address include:

1. cochlear implant surgery is brain surgery versus a low-risk outpatient procedure and
2. that cochlear implants are not covered by health insurance.

Providing accurate information on both of those concerns would alleviate top concerns frequently reported by patients.

Some CI candidates may say they are doing okay with their hearing aids though they struggle and avoid gatherings with family and friends. We often hear from CI candidates who say that they want to wait until the technology improves. Yet, most of the improvement that has occurred in the CI technology is in the external devices which can be accessed with the same surgically implanted device. Legacy CI users from the 90s have often upgraded six or seven times with important improvements with each new sound processor.

Your patients may feel that they will lose their existing residual hearing. Advances in both the surgery and the internal devices have meant that most patients retain much of their residual hearing. It is highly unusual for someone to lose more than they gain. The 35% improvement in speech perception noted in the *JAMA Oto* study above is typical of the improvement experienced by appropriate CI candidates. Cochlear implants are not a last resort. Rather they represent an opportunity for someone to dramatically improve the hearing benefit they derive from hearing aids.
REFERENCES


RESOURCES

IHS and ACI Alliance are working together to expand awareness of cochlear implant candidacy and outcomes so that hearing instrument specialists can further support patients in their journey. Our resources below are intended for you and for your patients to use and include a link to an IHS hosted webinar with a presentation on this topic. Join our partnership in working together to provide the best possible hearing and quality of life for your patients. They will love you even more for helping them along their hearing journey.


Insurance – Find information on insurance coverage for cochlear implants. https://www.acialliance.org/page/Insurance

Membership – Details on benefits of free ACI Alliance membership for IHS members. https://www.acialliance.org/page/IHS

The Incredible Hulk Gets a Cochlear Implant – Watch an interview with Lou Ferrigno on his experience with hearing loss and getting a cochlear implant. https://www.acialliance.org/page/IncredibleHulkCI

Find a Clinic Map – National directory of CI clinics and hospitals to refer for CI evaluation. https://www.acialliance.org/search/custom.asp?id=2365

Resources to Share with Patients – Share printable patient-focused resources on CI. https://www.acialliance.org/page/resourcestoshare

Tuesday Talks Library – Share recorded webinars with your patients on CI evaluation, surgery, activation, and rehabilitation. https://www.acialliance.org/page/TuesdayTalksArchived

The authors are staff at the American Cochlear Implant Alliance (ACI Alliance), a not-for-profit membership organization that works to expand access to cochlear implantation by expanding awareness regarding candidacy and outcomes. The organization collaborates with hearing care professionals, individuals with hearing loss and their families, and the general public to improve knowledge about who may benefit. We are pleased to continue our partnership with the International Hearing Society.

Donna L. Sorkin, MA, is the Executive Director of the American Cochlear Implant Alliance. She has had a long career in advocacy for people with hearing loss at for-profit and non-profit entities. She has served on federal, corporate and university boards including the U.S. Access Board (as a Presidential appointee), the National Institute on Deafness (National Institutes of Health) Advisory Board, the Gallaudet University Advisory Board.

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