

Research Highlights

Low Levels of Insurance Reimbursement Impede Access to Cochlear Implants

Cochlear implants enable many severely to profoundly hearing-impaired people who cannot be helped by hearing aids to understand speech and environmental sounds and to communicate better. The treatment, including the cost of a cochlear implant device and required professional services, can cost more than \$40,000. But studies by other organizations show that the benefits of using the technology generally outweigh the treatment costs.

About 3,000 people received cochlear implants in the United States in 1999—a number representing only a small percentage of the estimated 460,000 to 740,000 people who are severely to profoundly hearing impaired.

Why aren't more people getting cochlear implants? A number of possible reasons have been advanced. For example, many primary care physicians may be unaware of the availability and performance of the technology and so don't refer patients to appropriate specialists. Many good candidates for cochlear implants may not know about the technology or may not want this treatment. In addition, some members of the deaf community have argued against cochlear implants, especially for children born deaf.

A recent RAND study focused on another barrier to making implants more widely available: low levels of insurance reimbursement for the device and associated professional services, especially from Medicare and Medicaid.

What Is a Cochlear Implant?

A cochlear implant is a system of internal and external components that provides useful hearing and improved communication for some deaf individuals. Unlike a hearing aid, which picks up sounds and makes them louder, a cochlear implant takes over the job normally done by the ear, particularly the cochlea, or inner ear. This snail-shaped structure converts sound vibrations into electrical impulses that stimulate hearing nerves, which send signals to the brain, where sound is interpreted.

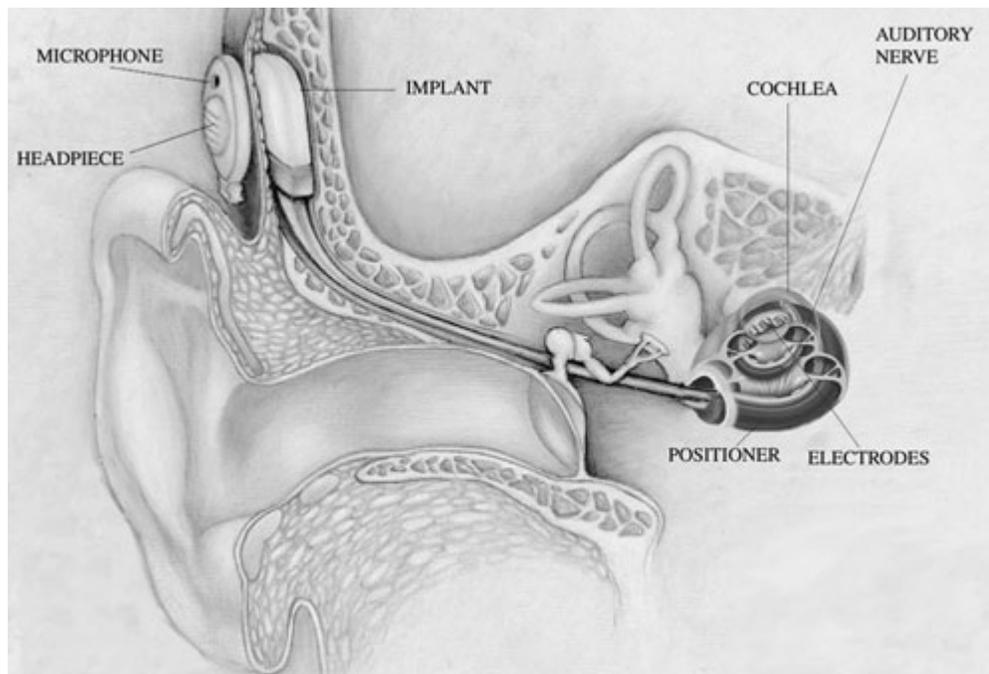
A cochlear implant can process only a fraction of the sound frequencies processed by the human ear, but that is enough to give many people greatly improved hearing and communication ability. It works best in children and adults who were able to hear before they became deaf, although cochlear implants are also being used successfully in children who were born deaf.

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Previous studies by organizations other than RAND have examined the cost-effectiveness of cochlear implants. A cochlear implant can make it possible for deaf children to attend regular classes, thereby decreasing resources needed for special education and improving these children's life-long productivity and quality of life. Indeed, the savings in special-education costs alone have been estimated to exceed the medical treatment costs by at least \$30,000 and as much as \$200,000 per child. The benefits of the technology for adults, such as improved quality of life, compare favorably dollar-for-dollar with many medical interventions that are commonly reimbursed by health insurers.

How a Cochlear Implant Works



With a cochlear implant, sound is picked up by a microphone in a headpiece worn behind the ear. The sound is converted into an electrical signal that is sent to a speech processor, a small unit that can be worn on a belt or behind the ear. A computer chip in the unit converts the signal into an electrical code. The coded signal is then transmitted to a tiny device that has been surgically implanted under the skin. This device decodes the signal and sends it down electrodes (very thin wires) threaded into the cochlea. These signals stimulate the auditory nerve.

Are Reimbursement Rates a Factor?

The RAND team wanted to know if reimbursement rates for cochlear implants could be an important factor in limiting access to the technology. No previous study has presented systematic information bearing on this question. During late 1999 and early 2000, the researchers surveyed physicians, audiologists, hospitals, and state Medicaid agencies nationwide to gather a wide variety of information. The data included the time required for physicians and audiologists to perform different professional services, the reimbursement rates for these services, the prices hospitals pay to purchase cochlear implant systems, and the reimbursement rates for those systems. The researchers also compiled data on Medicare reimbursement rates and on the hourly incomes for otolaryngologists (the surgeons who

typically perform cochlear implant surgery) and for audiologists.

A Troubling Picture Emerged

A troubling picture of reimbursement for cochlear implants emerged from this analysis. Some key findings are summarized in the table. They and their implications are discussed in this section. In the following discussion, the average value is represented by the median, the value that is exceeded half of the time, because medians are not distorted by possibly unrepresentative, extreme values.

Provider	Service	Estimated Avg. Hourly Income	Median Purchase Cost	Median Insurance Reimbursement		
				Private	Medicare	Medicaid
Otolaryngologist	Implantation surgery	\$93 (after expenses); \$207 (before expenses)	–	\$333/hr ^a	\$192/hr ^a	\$156/hr ^a
Audiologist	Aural rehabilitation after surgery	\$20–23 (not including expenses); \$40–46 (including estimated expenses)	–	\$78/hr ^b	\$52/hr ^b	\$38/hr ^b
Hospital	Cochlear implant system	–	\$20,850	\$18,000	\$14,500 ^c	Varies greatly

^aFactors in time spent by physician before and after surgery that is not reimbursed.
^bDoes not factor in time spent by audiologist before and after surgery that is not reimbursed.
^cFor outpatient surgery (Medicare Part B); reimbursement is substantially less for inpatient surgery (Medicare Part A).

The RAND surveys found that levels of insurance reimbursement for cochlear implant systems and related professional services pose financial barriers that limit access to the technology. This table summarizes the study's findings for key professional services and for the device itself. Medicare and Medicaid reimbursed professional services at relatively low rates. Even private insurance often failed to cover the cost to hospitals of purchasing the device. The data included survey responses of 131 physicians who perform cochlear implant surgery (otolaryngologists), 111 audiologists who evaluate and train implant recipients, 60 hospitals that purchase the device for the surgery, and 44 state Medicaid agencies.

Average time required for the implantation surgery and average insurance reimbursement to physicians

On average, otolaryngologists (ear, nose, and throat specialists) spend 3 hours performing each implant surgery. In addition, these surgeons spend an average of 4 hours before and after each surgical procedure in activities that are not reimbursed by insurance. The average hourly income of otolaryngologists, based on data from the American Medical Association, was about \$207 before professional expenses and \$93 after expenses in 1999. When all of the reimbursable and unreimbursable hours physicians spend related to a cochlear implant surgery are taken into account, private insurance reimbursed, on average, \$333 per hour; Medicare, \$192 per hour; and Medicaid, \$156 per hour.

Implications. Private insurance reimbursement, when paid on a fee-for-service basis, appears to have covered physicians' estimated time costs in many cases. Medicare reimbursement is substantially lower than average private reimbursement, but may still be adequate in many cases to cover the cost of a surgeon's time. However, Medicaid reimbursement is lower on average than Medicare, and even the average Medicaid rate may be insufficient to cover the time costs of many, if not most, surgeons. Moreover, Medicaid reimbursement rates for cochlear implant surgery varied widely across the nation. In some states, reimbursement was

so low that it provided a financial disincentive to most, and perhaps almost all, physicians to perform this surgical procedure for Medicaid patients.

Average time required for services and average insurance reimbursement for audiologists

Audiologists perform a variety of procedures to evaluate candidates for cochlear implants before surgery and to try to achieve optimal performance during "aural rehabilitation" after surgery. Aural rehabilitation involves programming the device and teaching the patient how to use it. This is the most time-consuming of the procedures performed by audiologists, and it is crucial for the successful use of the technology. Different estimates indicate that audiologists' average salaries plus practice expenses ranged from \$40 to \$46 per hour in 1999. For aural rehabilitation, private insurance reimbursed, on average, \$78 per hour; Medicare, \$52 per hour; and Medicaid, \$38 per hour. Moreover, on average, audiologists spend 8 additional hours before and after surgery on behalf of each patient in activities that aren't reimbursed by insurance at all.

Implications. For many audiologists, payment rates for aural rehabilitation offered by public insurance, and especially for several states under Medicaid, were too low to cover the costs of this service. It is very doubtful that reimbursement rates for other services performed by audiologists were high enough to offset this financial disincentive, especially in view of the additional, unreimbursed hours spent on behalf of each patient.

Average cost to hospitals of purchasing cochlear implant systems and average insurance reimbursement

Hospitals reported that during 1999 on average, they paid \$20,850 to purchase cochlear implant systems from manufacturers. Private insurance reimbursed on average \$18,000 for the device. Medicare paid roughly \$14,500 if the surgery was performed on an outpatient basis and less than \$9,000 on average for the device plus other hospital costs if the surgery was performed on an inpatient basis. (During 2002, using a new approach for reimbursing hospitals for outpatient services, Medicare is paying roughly \$18,200 per device for outpatient surgery; this rate is scheduled to fall to roughly \$16,250 at the beginning of 2003.) Medicaid reimbursement for the device cannot be adequately summarized with an average figure because of widely varying approaches to payment; for example, only 8 of 44 state Medicaid agencies reported using a set fee to reimburse hospitals for purchase of a cochlear implant device.

Implications. Even private insurance often failed to cover hospitals' costs for cochlear implant systems. With Medicare reimbursement, hospitals typically lost about \$6,000 for each device purchased for outpatient surgery and more than \$10,000 for each inpatient surgery. Medicaid reimbursement varied widely across the country. However, in 18 states that account for 44 percent of the national Medicaid enrollment, reimbursement was low enough to penalize hospitals financially for allowing access to cochlear implant surgery. For almost all of these 18 states, potential losses to hospitals on the device ranged from approximately \$5,000 to \$20,000 per implant provided to a Medicaid enrollee. Similar conclusions may apply to many of the 25 other states for which information collected from Medicaid agencies was not specific enough to make a judgment.

What the Results Mean

Insurance reimbursements that don't cover costs of physicians, audiologists, and hospitals appear to limit access to cochlear implants. Gaps between costs and reimbursement are particularly striking for Medicare and Medicaid. This is especially noteworthy because approximately 30 percent of severely to profoundly deaf individuals in the United States are covered only by public health insurance.

How might the gap between costs and reimbursement affect providers? At the reimbursement levels documented in the study, hospitals would stand to lose at least an additional \$50 million annually if, for example, 10,000 more publicly insured patients were to receive cochlear implants each year. It appears that many physicians, audiologists, and hospitals are already making financial sacrifices to serve the people now receiving cochlear implants each year. It is doubtful that they would make the further sacrifices necessary to serve the much larger numbers of patients per year who could be good candidates for cochlear implants.

These findings pose complex challenges to policymakers, to professional and institutional providers, and to manufacturers of cochlear implant systems. If policymakers want to make cochlear implants accessible to larger numbers of qualified candidates, they should investigate financial disincentives created by insurance reimbursement levels, as well as other potential barriers to access. The RAND analysis suggests that changes in various aspects of Medicare and Medicaid policies may be needed for access to be expanded substantially, especially in areas such as reimbursement for the implant surgery, for aural rehabilitation after surgery, and for purchase of the device.

However, financial barriers to expanding access are not limited to publicly insured patients. Although in most cases physicians and audiologists may be adequately reimbursed from private insurance, hospitals often are not. As the analysts note: "For patients to benefit from cochlear implants, audiologists, physicians, and hospitals must all be willing to provide services; the access chain is only as strong as its weakest link."

This research brief summarizes RAND Health research reported in Steven Garber, M. Susan Ridgely, Melissa Bradley, and Kenley W. Chin, "Payment Under Public and Private Insurance and Access to Cochlear Implants," *Archives of Otolaryngology, Head and Neck Surgery*, Vol. 128, October 2002, pp. 1145-1152. Additional details are reported in DRU-2282-ABC, RAND, May 2000. The research was sponsored by Advanced Bionics Corporation, a manufacturer of cochlear implant systems. RAND conducted the analysis independently, and RAND retains all rights to publish data, interpretations, and conclusions.

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