



Fan-Gang Zeng

Cochlear implants: Why don't more people use them?

By Fan-Gang Zeng

At the age of 3, Hua, the only son in a family living in a small city along the Yangtze River in China, developed a fever. A dosage of cheap ototoxic antibiotic took away his hearing.

The doctor told Hua's family that the only way he could hear again was to get a miracle device called a "cochlear implant." His family quickly discovered that this "miracle device" came with a hefty price of US\$30,000, which was 10 times his parents' combined annual income. But with their son's future at stake, Hua's parents pooled their life's savings and borrowed from grandparents, friends, and employers to get him this miracle device.

Today, at 10 years old, except for having an "atonal" accent, Hua is doing well as a fourth grader in a mainstream school. Hua often asks "why other families have a big TV and we don't,"

since he is too young to fully appreciate the fact that his family still owes half of the money for his implant.

A MIRACLE THAT FEW CAN HOPE FOR

Consider Hua a lucky one because 99% of the deaf people in the world like Hua have no hope of getting a cochlear implant.

According to a 2005 report by the World Health Organization, 278 million people in the world have moderate to profound hearing loss in both ears; 80% of them live in low-income countries. An estimated 5% of the hearing-impaired population, or 14 million people, are potential implant users. Yet, while the technology has been on the market since the 1980s, only slightly more than 100,000 deaf people worldwide have

received a cochlear implant. That represents a pathetic 0.7% market penetration rate.

Given the obvious need and proven benefit of cochlear implants, price appears to be the main barrier preventing more widespread use of this technology. With an average annual household income in developing countries of less than \$1000, most deaf people simply cannot afford a cochlear implant. Moreover, medical insurance in these countries is scarce and, even when available, it does not typically cover interventions as expensive as cochlear implantation.

In developed countries with national health programs, such as Canada, the United Kingdom, and most of Western Europe, the total budget for implants is fixed. For example, a 1995 UK study reported that the implant budget was £12 million, which, at an average cost of £40,000 per device, could cover only 300 people. Yet, there are 650,000 people in the UK with severe or profound hearing loss.

In the United States, the device and surgery together cost from \$50,000 to \$100,000. However, Medicare covers only \$20,000 for both device and surgery, making implants inaccessible to millions who don't have a first-rate health insurance plan. Clearly there is an urgent need to lower the price of cochlear implantation without compromising its performance.

What are the solutions to this grand challenge?

TACKLING THE PRICE PROBLEM

One solution is exemplified by Yung-ching Wang, the founder and chairman of Taiwan's Formosa Plastics Corporation. Mr. Wang has begun a donation of 15,000 devices from Cochlear Corporation for deaf children in China and Cochlear is establishing clinics in that country. This type of philanthropic work is certainly welcome as it increases awareness and builds infrastructure. However, it represents only a short-term solution, considering that 30,000 to 50,000 babies are born deaf every year in China alone.

A more lasting solution would be a

differential pricing system. Cochlear Corporation has introduced a body-worn device in China that costs about half as much as the full-fledged behind-the-ear device. Med-El has also significantly lowered the price of its implants in China. However, a more widely spaced differential pricing system needs to be developed, in which the lowest price roughly matches the annual household income in the targeted country.

Another possibility rests on the hope that present and future cochlear implant manufacturers will broaden their services, thus increasing their volume of business. Companies may also be able to reduce their prices by adopting common technologies used in the hearing aid, medical device, and telecom industries. For example, instead of using custom chips for cochlear implants, manufacturers may be able to use the same chips that are

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used in hearing aids or cell phones. A common chip that costs only \$10 might substitute for a custom chip costing \$1000.

Finally, the implant business needs competition, particularly from local companies in emerging markets. At one time in the 1990s, there were eight cochlear implant manufacturers. Today, only three are left, and one, Cochlear Corporation, controls 70%-80% of the world market.

However, Korea and China have developed a prototype cochlear implant, while India, with the strong personal support of its president, A.P.J. Abdul Kalam, is developing one. Although the shortage of relevant technology and know-how still presents a significant hurdle for these endeavors, competition represents the best chance for a long-term solution to meet this challenge.

WHAT CAN WE DO?

What does all this mean to us in the hear-

ing healthcare field? Certainly the number of cochlear implant users will continue to grow. Increased use of this technology will have a direct impact on audiologists, hearing instrument specialists, and speech pathologists. For one thing, it will increase demand for professionals to look after cochlear implantees.

In addition, expanded use of implants will bring with it increased technological sophistication that requires advanced professional training. An example of this is optimally combining a cochlear implant with a hearing aid, which will likely become the treatment of choice for many cases of presbycusis in the near future. Cochlear implants also provide abundant research opportunities for both basic and clinical investigators with interests ranging from auditory physiology to language development.

In addition to reducing the price of implants, we need to bring down other technical, social, and cultural barriers to widespread adoption of this technology. On the one hand, a certified program is needed to ensure quality of service. On the other hand, it will be necessary to diversify and broaden the training base that

provides support for the growing number of cochlear implant users, particularly in developing countries where formal and advanced education infrastructure does not yet exist.

For example, Dalhousie University helped China launch its first audiology program, which has graduated more than 20 students. With their financial resources, hearing device manufacturers could provide intensive and specialized training as well as use their marketing capability to increase public awareness of advanced technologies. On an individual basis, hearing professionals can participate in and contribute to these educational and training activities.

If all of us work together, we can help transform the lives of millions of deaf persons like Hua.

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