Hearing Aids Are Getting Smarter

The new devices are part medical device, part consumer electronics. And they may be more socially acceptable as well.

Medical devices and consumer electronics are converging to create a new generation of hearing aids.

The latest devices—using wireless technology, smartphone apps, miniature digital components and rechargeable batteries—not only amplify human voices and reduce background noise, but also take phone calls, stream music, track physical activity and social interactions, and will even turn on a Bluetooth-connected coffee pot.

HEARING LOSS—AND HELP

These audio samples give an idea of what hearing impairment is like and how hearing aids have improved.

Source: National Acoustic Laboratories, Australia

The innovations are being spurred by advances in electronics, as well as changes in the way hearing devices are marketed and sold. And they are happening in both the premium hearing aids that licensed hearing-care professionals sell for an average of $4,000 a pair, and in the moderately priced devices sold by online sellers and retailers such as Walmart and Best Buy. The latter includes FDA-approved hearing aids as well as personal sound amplification products, or PSAPs, that sell for about $30 to $400 and haven’t undergone the FDA approval process. By law, any device that has not been approved by the Food and Drug Administration can’t be marketed as treating hearing loss.
38% Hearing Impairment, No Hearing Aid
The speaker and other noise are both difficult to hear

38% Hearing Loss, 1992 Hearing Aid
The woman and background noise are both amplified

38% Hearing Loss, 2019 Hearing Aid
The woman’s voice stands out from the background noise

But that restriction is expected to end when the FDA releases new standards for over-the-counter hearing aids, possibly as soon as next year. The industry’s expectation is that better-quality products that are now classified as PSAPs will still be able to be sold as hearing aids and thus differentiate themselves from most other PSAPs, the “vast majority of which are pretty much junk,” says Nicholas Reed, assistant professor of audiology at Johns Hopkins University School of Medicine. “Right now the system is stifling those companies because they can’t call their products hearing aids.”

The hope is that the new over-the-counter path will make hearing aids more accessible and affordable for the 38 million Americans who suffer from clinically significant hearing loss. Only about one in five people who would benefit from a hearing aid uses one, according to the Hearing Loss Association of America. The health impact is significant: Untreated hearing loss is associated with higher risks of dementia, depression and falls.

Most insurers, including traditional Medicare, don’t cover hearing aids—making the devices unaffordable for many people. “With OTC products, people will have to do research, like buying a car,” says Lisa Hamlin, director of public policy at the Hearing Loss Association. “But the generation entering their 40s and 50s and developing hearing loss is perfectly comfortable with technology and ordering products online. And the people who aren’t will still go to their audiologist.”

Here are some of the latest innovations and a look at what’s coming.

Wireless connectivity
Bluetooth technology, the international standard for wireless connectivity, is at the forefront of the revolution allowing hearing-aid users to do more with their devices.

While Bluetooth is one of many wireless protocols found in hearing aids, it is the most common link to the consumer electronics that people use every day. People who use hearing aids equipped with Bluetooth technology can connect to Bluetooth-enabled smartphones, tablets, car stereos, computers, televisions and remote microphones and hear sounds directly in their ears.

“Even when things are loud enough, they are not particularly clear for people with hearing loss,” says Christine Jones, vice president of audiology at the Phonak U.S. division of Swiss hearing-aid maker Phonak AG. “So a clear, rich signal directly into the ear is a big deal.”

Experts say music and television, for example, sound better when the hearing aid connects directly to the player through Bluetooth. Before Bluetooth started to be installed in hearing aids, wearers needed a separate piece of equipment, called a “streamer,” to translate the
Bluetooth signal from the other device or appliance into an FM signal or electromagnetic field that the hearing aid could understand. While Apple introduced a proprietary Bluetooth protocol for linking hearing aids to Apple devices in 2015, it wasn’t until Phonak introduced its Marvel hearing aids in November 2018 that hearing-aid wearers could connect to Android phones and any other Bluetooth-enabled device without the use of a streamer. (Android phone users who don’t have Marvel hearing aids still need to use a streamer.)

Conversation in a noisy environment can be more easily understood as well. In some situations, users have the option to connect their Bluetooth-enabled hearing aids to personal pen-sized microphones—or even use their smartphone as a microphone—to stream the voices they want to hear directly into their ear. In a noisy restaurant, for instance, they might pass their smartphone to a dinner partner to speak into.

"Bluetooth technology is completely taking over the hearing-aid industry, and it is improving the way you can hear in almost any environment," says audiologist Cliff Olson in Anthem, Ariz. Dr. Olson, who has a doctorate of audiology, contributes to the hearing-aid review website HearingTracker.com.

Users of Marvel hearing aids with Bluetooth can answer their smartphones by tapping their hearing aids and have a hands-free conversation, just like an Apple AirPod wearer. They can stream audio and fine-tune the sound through an app on their smartphone.

Such apps are the hearing-aid control centers in this new environment of wireless connectivity. They feature volume controls and sound settings, and connect to hear the audio on personal electronics.

Premium hearing aids from Oticon that use Bluetooth can connect to other electronic devices in the home through the so-called Internet of Things. Follow a few simple programming instructions on the device’s smartphone app, and you could receive an alert in your hearing aid if your home-alarm system goes off, or when the doorbell rings. You could program your lights to turn on when you enter a room, or your phone to text a caregiver when the hearing-aid’s battery is low.

"There is an amazing world of possibilities," says David Copithorne, founder of the Hearingmojo blog and content director at Hearingtracker.com.

Health tracking and AI

Because hearing aids are worn 14 hours a day, and some connect to the internet, they have potential as health-tracking tools, an important benefit given the increased health risks for people with hearing loss.

The Livio AI, from Starkey Hearing Technologies, has gyrosopes and accelerometers that enable tracking of fitness information, like the Fitbit and Apple watch do. When worn on both ears, these devices have keen positional sensitivity that can tell if the wearer has fallen down or when they may have merely dropped one of the two aids. In the case of a fall, the Livio AI, which is linked to the wearer’s cellphone, will send a text message with a map of the wearer’s location to a caregiver. In future models, the company says the device will monitor blood pressure and track the wearer’s gait looking for changes that might indicate fall risk.

Current users of the Livio AI can connect to the app on their smartphone which tracks their exercise and movements throughout the day and compiles that data into a wellness score. The app encourages wearers to keep their bodies and minds active, which may reduce the risks of falls, cardiovascular disease and dementia, all of which are associated with hearing loss.

The AI component to the Livio AI also gives the hearing aid potential as a personal assistant. When paired with the smartphone app, the device can read aloud emails and texts straight into the user’s ear, transcribe conversations onto the smartphone screen in real time and translate conversations spoken in another language. Users can also tap the device, ask a question and get an answer directly in their ear from Amazon’s Alexa.

Remote programming

Being fitted for a hearing aid by a hearing-care professional typically entails multiple office
visits for a hearing test, programming, programming updates and support—both technical and emotional—for the wearer. (It can be difficult for a brain to adapt to hearing sounds it hasn’t heard in years.) Premium hearing aids including those made by Phonak, Widex and Starkey now offer remote programming capabilities that enable a professional to tune a client’s hearing aid through a computer or smartphone connection.

"With the Phonak Marvel, my patients can be sitting in their living room. I can see them. They can see me, and I can read all the data off their hearing aids and make appropriate adjustments," says Dr. Olson, the Arizona audiologist. “It is a big improvement in convenience.”

Direct-to-consumer companies Eargo and iHear Medical both offer remote tuning on their hearing aids, which are shipped with preloaded programs. At Eargo a user can call up an audiologist who can tweak the hearing-aid programs or send a new one when consumers put their devices into their Bluetooth-enabled charging case. Hearing aids from iHear Medical can be remotely adjusted through a special USB cable attached to a computer.

**Self-fitting hearing aids and hearables**

Self-fitting—when individuals set or alter programs on their hearing aids themselves using an app on a smartphone, tablet or computer—is helpful for two things: to amplify only the frequencies that the user has difficulty hearing; and to customize settings for different situations, say in a restaurant, on a city street, or watching television.

Some self-fitting devices help with hearing but aren’t hearing aids. These include Bose Headphones and Nuheara IQ Buds Boost. Bose Headphones are earbuds but have an attached collar that contains the battery and some electronic components. They stream audio, control background noise and amplify speech. Neither the Bose nor the Nuheara products went through the FDA-approval process required to be called hearing aids and are colloquially known as “hearables.” Both are attracting people with mild to moderate hearing loss who aren’t ready for full-fledged hearing aids.

“The average age of our customer is 55,” says David Cannington, co-founder of Nuheara. “The average age of a hearing-aid customer is early 70s.”

Although the Headphones, at close to $500, and the IQ Buds Boost, at $350, cost more than wireless headphones, they cost a lot less than professionally fitted hearing aids and can be easily bought and programmed without an audiologist.

Research by Larry Humes, distinguished professor emeritus of speech and hearing sciences at Indiana University, suggests that more than half of people with hearing loss would be satisfied with the performance of a self-fitting hearing aid. “If half of the 80% of people with hearing loss who don’t use hearing aids adopt self-fitting hearing aids, that would be a good outcome,” says Prof. Humes.

Anything that encourages people with hearing loss to adopt hearing devices earlier and to wear them more often will improve health outcomes. Currently people with hearing loss wait seven years before seeking help, according to the Hearing Loss Association of America.

“Now that hearing aids look and act like highly coveted consumer devices, we hope the benefits of wearing them will help overcome the stigma that has been associated with them,” says Phonak’s Ms. Jones.

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