

'Talking' medical devices, apps continue to evolve

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Innovations can help people manage their conditions, function in emergencies, keep doctors informed.

(HealthDay)—They remind you when it's time to take your medicine, coach you through emergency medical procedures and text you their approval when you eat your veggies.

No, they're not mothers or nurses or family doctors—they're "talking" medical devices and apps, among other techy health-focused inventions, that help people manage everyday wellness routines, such as taking pills and checking blood sugar levels, as well as dire medical circumstances.

Talking medical device technology isn't new, but more and more device makers are using the technology now to create more patient-friendly products, said Benjamin Arcand, an engineer and product innovator in

the medical devices field, and associate director of the innovation fellows program at the University of Minnesota's Medical Devices Center.

Talking portable defibrillators have been around for years, guiding users through the steps of saving a cardiac arrest victim. A new epinephrine pen follows suit—it calmly instructs a nervous parent or teacher through the injection process to help stop an allergic child from going into anaphylactic shock.

Other high-tech health tools help teach operating room staffers how to assemble the complicated set-ups of rarely used surgical devices. In homes, chatty thermometers tell parents a child's fever reading and an innovative new app lets an expectant mom hear a baby's heartbeat.

"People have been thinking about talking devices for a long time. The technology has been trying to rise up above the surface for a long time," Arcand said. Finally, he said, the technology is sophisticated enough and affordable enough.

"What I think you'll see is user-friendliness is going to go up over time," Arcand said. "About 10 or 20 years ago, we saw this huge bloom of all these medical devices. Now that the industry is maturing and there's more regulation and less funding capital, new device development is slowing down."

He said while the pace of new products entering the market has slowed, better, more updated versions of older ideas are appearing: voice-prompting and voice-activated devices, and better electronic interfaces for patients, and devices talking to other devices.

"More incremental improvements, not so much breakthrough devices," Arcand added.

He said some inventors of talking medical devices, including himself, employ "ethnographic" research so their inventions will be more likely to succeed right out of the starting blocks, and avoid expensive redesigns or worse, injuring patients.

With ethnographic research, "an inventor might go into the operating room and see how staff uses a device and talk to them about it," Arcand explained. "There will be observation and interviewing. It's about careful observation and watching what happens over time and throughout the patient's care and recovery."

Bernard Fuemmeler, an associate professor of community and family medicine at Duke University Medical Center, said a glut of health apps "talk" back, too.

He and colleagues at Duke developed a health app geared towards adolescents—cancer survivors who tend to struggle with obesity as they age.

"We developed the app as part of an intervention. Another one we are working on is for obesity in adolescents," said Fuemmeler, who is also co-director of mHealth@Duke. He explained that while the apps don't talk out loud, they communicate verbally using push notifications and chat features, reminding users to eat their one new vegetable a day, or giving users kudos if a nutrition goal is achieved.

He said there are some great app concepts in the "talking" health app world, but they fall short because they are not backed by solid evidence, or they're technically mediocre.

Fuemmeler said he and colleagues conducted a review of obesity apps and found that many were not built on solid medical research. "Many versions that first came on market were not very evidence-based in terms

of their recommendations for how to lose weight, the evidence-based advice we'd adhere to if we were counseling patients on weight loss," he said.

One example of a new talk-back app doesn't involve being told what to do by a computerized voice, but instead, hearing the sounds inside your own body—in this case, a pregnant woman's body. The makers of the Bellabeat app say on their website that it lets a woman listen to her unborn baby's heartbeat, record it, and share the rhythm with loved ones—for \$129. The app also helps a woman plan and track weight gain during her pregnancy on her smartphone or other devices.

Another [medical device](#) with promise is the Scanadu Scout, said Dr. Christopher Scorzelli, chief medical officer at Kablooe Design, a Minneapolis company that invents, designs and engineers medical and other devices. His company is not involved with the scanner, made by California-based Scanadu. The product is still in development.

The website for the new scanner says that it will "enable anyone to conduct sophisticated physical exams" on themselves, or as their promotional video suggests, on their sick child. The new scanning devices will be able to keep an ongoing record of daily vital signs—heart rate, respiration, temperature and oxygen saturation. The scanners will be able to "talk" with patients and doctors via text or other messaging system. Physicians will be able to get a much richer picture of a patient's recent health status, Scorzelli said.

"Think about the snapshot your doctor gets—they see you maybe once a year and then maybe your insurance changes and you switch health care providers," he said. "There's no continuity of care. What we're hoping is that if we attach a device to your body it will give you an idea of where you are day to day and month to month."

Health devices that talk to each other, not just to the patient or doctor, are another big growth area right now, Scorzelli noted.

"There's a lot more now about smart devices able to talk to other devices—being able to get updates from different neuromodulation devices and implantable defibrillators about what the activity has been," he said.

But Scorzelli said for talking devices to move forward successfully, inventors and designers need to think broadly.

"Anyone designing a talking [device](#) now needs to think about things like will it work in multiple languages? If so, are there slang terms that mean something completely different in another land?" he said. "And to think about how it functions in its environment. There are a lot of devices recalled because the creators don't think through the human issues. The human factor is much more critical, much more important than people give it credit for."

More information: For more on medical devices, visit the [U.S. Food and Drug Administration](#).

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