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Monitoring Your Health With Mobile Devices



A medical camera from Firefly Global shows a child's eardrum on a screen.

By PETER WAYNER

Published: February 22, 2012

Dr. Eric Topol is only half joking when he says the smartphone is the future of medicine — because most of his patients already seem “surgically connected” to one.



A blood glucose monitor from AgaMatrix works with an iPhone app.

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A blood pressure cuff from Withings works with an iPhone or iPad to track.

But he says in all seriousness that the smartphone will be a sensor that will help people take better control of their health by tracking it with increasing precision. His book, “The Creative Destruction of Medicine,” lays out his vision for how people will start running common medical tests, skipping office visits and sharing their data with people other than their physicians.

Dr. Topol, a cardiologist and director of Scripps Translational Science Institute in La Jolla, Calif., seeing signs of this as companies find ways to hook medical devices to the computing power of smartphones. Devices to measure blood pressure, monitor blood sugar, hear heartbeats and chart heart activity are already in the hands of patients. More are coming.

He acknowledges that some doctors are skeptical of these devices. “Of course, the medical profession doesn’t like D.I.Y. anything,” he said. “There are some really progressive digital doctors who are recognizing the opportunities here for better care and prevention, but most are resistant to change.”

Dr. Topol may be right about the caution in the industry, but he is far from the only person with this vision. Apple was promoting the [iPhone as a platform](#) for medical devices in 2009. An entire marketplace is evolving that marries the can-do attitude of hacking devices with the fervor of the wellness movement.

Smartphones make taking care of yourself more of a game,

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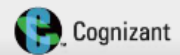


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blood pressure over time and can send the data to a Web site.

Dr. Topol said, “I recommend these devices because it makes it more fun and I get more readings than if I ask them to do it manually.”

The enthusiasm for this vision of do-it-yourself medicine with a smartphone, though, must be balanced with the cold reality that all of the experimenters should consult with their physicians.

Some of the attempts to turn the iPhone into a medical device are little more than toys. The 99-cent [iStethoscope Pro](#) app warns, “This app is intended to be used for entertainment purposes.” Those who have bought it have given it uniformly poor reviews.

The equally poorly reviewed [iStethoscope Expert 2012](#), also 99 cents, offers a \$24 bell to enhance the sound.

I experimented with a homemade otoscope, the device doctors use to look into the ears, connected to a smartphone so I could take pictures of a family member’s eardrums. My son has had infections in his Eustachian tube and the doctor likes to take a look. I figured that if I could take a picture or a video of the eardrum, I could save the trouble of him missing school to visit the doctor.

With the help of a little duct tape, I attached the phone to a small home otoscope from a company called [Dr. Mom Oscopes](#). It is just a lens, a light source and a plastic sleeve and sells for \$27. To improve the image, I inserted a \$20 close-up lens I had bought from [Photojojo.com](#).

The biggest problem was in the software of the smartphone. The Apple camera app balanced the light and dark over the entire image, washing out the center so the eardrum was just a sea of white. The [Android](#) camera app offered the option of using spot metering so the light balance was better.

Despite all this fiddling with the optics and the software, the result was never very good. Better results require more than duct tape.

[Firefly Global](#) in Belmont, Mass., makes a medical camera and sells it directly to doctors who want to share the images with patients and save them for the future. Its line includes cameras for dentists, dermatologists and ophthalmologists. Unfortunately, the \$180 to \$350 cameras connect to a computer, not a smartphone.

The most prevalent diseases and the biggest markets are getting the tools first. Devices to monitor heart disease are already available.

[A French start-up, Withings](#), has created a blood pressure cuff for \$129 that connects to an [iPad](#) or an iPhone. The cuff will automatically inflate, deflate and then record the pulse rate and the blood pressure. The app will graph the pressure over time, making trends easier to see.

Withings also includes a connection to its Web site so users can share their data with their doctors either directly through their password-protected pages or through third-party sites like [digifit.com](#).

The growing incidence of diabetes is by many estimates the biggest public health challenge today, so companies are developing tools to help people with the disease manage their blood sugar.

Tom Xu, the founder of SkyHealth in El Cerrito, Calif., created the Web site [glucosebuddy.com](#) to help people keep track of the sugar in their blood. The numbers must be entered manually. The site works with an app for the iPhone to gather the blood glucose level and some information about when it was taken. “Our main goal of glucosebuddy is not to just record numbers. That’s the boring part,” he said. “Once you know how your diet affects your blood sugar, you take your health more seriously.”

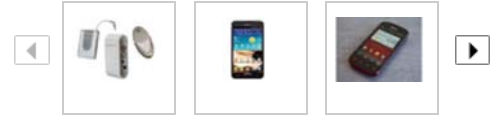
Other companies are beginning to integrate the hardware and software. AgaMatrix, a company that makes a blood glucose monitor, iBGStar, that attaches to the iPhone, worked with Sanofi, the pharmaceutical giant, to develop the tool. In December, the Food and Drug Administration approved the device for sale in the United States.

“When patients are dealing with chronic conditions, you might see a doctor every six weeks or two months,” said Joseph Flaherty, the senior vice president for marketing at

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AgaMatrix. “For people to have real command over these diseases, we need to close the feedback loop and give people the information they need to make smarter decisions in real time.”

Its tool, like many other pocket meters, measures the amount of glucose in the blood, but it also transfers the data to the smartphone, which helps patients to track their glucose levels over time. It is not much different from a piece of paper and a pen, but it is faster and cleaner, and it is easy to share these values with doctors and friends.

Johnson & Johnson has also spoken publicly about developing a similar device. The ultimate goal is replicating the full-body diagnostic “tricorder” from the “Star Trek” TV show, a goal that is being encouraged by a \$10 million prize put up by Qualcomm, the smartphone chip maker, through the [X-Prize Foundation](#).

[Apps that simulate](#) the lights and sound of the TV show prop are available from app stores.

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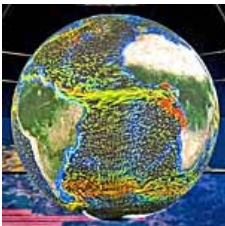
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