Smartphones are revolutionizing medicine

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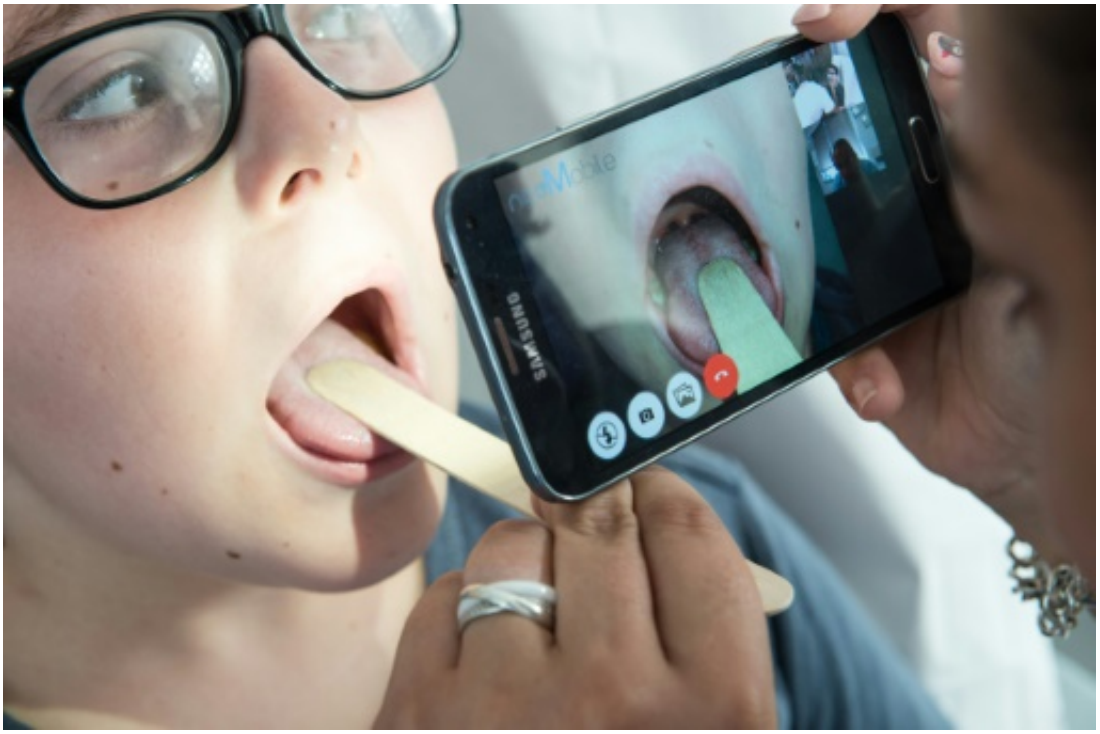

Researchers are finding new benefits to smartphone features such as camera and flash, which can help examine and diagnose patients

Smartphones are revolutionizing the diagnosis and treatment of illnesses, thanks to add-ons and apps that make their ubiquitous small screens into medical devices, researchers say.

"If you look at the camera, the flash, the microphone... they all are getting better and better," said Shwetak Patel, engineering professor at the University of Washington.

"In fact the capabilities on those phones are as great as some of the specialized devices," he told the American Association for the Advancement of Science (AAAS) annual meeting this week.

Smartphones can already act as pedometers, count calories and measure heartbeats.

But mobile devices and tablets can also become tools for diagnosing illness.

"You can use the microphone to diagnose asthma, COPD (chronic obstructive pulmonary disorder)," Patel said.

"With these enabling technologies you can manage chronic diseases outside of the clinic and with a non-invasive clinical tool."

It is also possible to use the camera and flash on a mobile phone to diagnose blood disorders, including iron and hemoglobin deficiency.

"You put your finger over the camera flash and it gives you a result that shows the level of hemoglobin in the blood," Patel said.

An app called HemaApp was shown to perform comparably well as a non-smartphone device for measuring hemoglobin without a needle. Researchers are seeking approval from the US Food and Drug Administration for its wider use.

Smartphones can also be used to diagnose osteoporosis, a bone disorder common in the elderly.

Just hold a smartphone, turn on the right app in hand and tap on your elbow.

"Your phone's motion picture sensor picks up the resonances that are generated," Patel said.

"If there is a reduction in density of the bone, the frequency changes, which is the same as you will have in an osteoporosis bone."

Such advances can empower patients to better manage their own care, Patel said.

"You can imagine the broader impact of this in developing countries where screening tools like this in the primary care offices are non-existent," he told reporters.

"So it really changes the way we diagnose, treat and manage chronic diseases."

Lower costs

Mobile smartphone devices are already helping patients manage cancer and diabetes, says Elizabeth Mynatt, professor at the Georgia Institute of Technology.

"Someone who is newly diagnosed with diabetes really needs to become their own detectives," she said.

"They need to learn the changes they need to make in their daily lifestyle."

For women newly diagnosed with breast cancer, researchers provided a tablet that allows them real-time access to information on the diagnosis, management of their treatment and side effects.

The technique also helps patients who may not be able to travel to a

medical office for regular care, reducing their costs.

"Our tool becomes a personal support system," Mynatt said. "They can interact to get day-to-day advice."

Research has shown this approach "changes dramatically their behavior," she added.

"The pervasiveness of the adoption of mobile platform is quite encouraging for grappling with pervasive socio-economic determinants in terms of healthcare disparities."

A growing number of doctors and researchers are turning to smartphones for use in their daily work, seeing them as a useful tool for managing electronic health data and figuring out the most effective clinical trials, said Gregory Hager, professor of computer science at Johns Hopkins University.

Clinical trials currently cost around $12 million to run from start to finish, he said.

"The new idea is micro-randomized trials, which should be far more effective, with more natural data," he said.

Although the costs could be dramatically lower, too, the field is still new and more work needs to be done to figure out how to fully assess the quality and the effectiveness of such trials.