The mobile revolution in healthcare

A number of new mobile healthcare solutions promise to revolutionize how healthcare is administered, particularly when it comes to outpatients. But having the technology to monitor how patients respond to treatment and ensuring that they actually use it are two different things. Siegfried Mortkowitz reports.

Perhaps as early as next year, an outpatient on medication will be able to swallow a smart pill that notifies everyone involved in her treatment that the med has been taken. If he continues to take the medication as prescribed for a certain period of time, her health plan, insurer or employer may then reward her financially.

Scott Snyder, president and chief strategy officer at Mobiquity, a U.S. mobile engagement provider, says the smart pill includes an ingestible sensor that signals to a wearable patch that the outpatient has swallowed the pill. The patch then transmits that information to the outpatient's smartphone, which sends the data to the Cloud, where the caregiver can access it, analyze it and, if necessary, intervene with a phone call, SMS or some other way.

Manufactured by the California-based digital health company Proteus Digital Health, the smart pill is currently in trial and, Snyder says, will be on the market soon.

But the smart pill is just one of many, many new mobile healthcare solutions that are revolutionizing the field. There are carmakers experimenting with allergen sensors and blood glucose monitors to help ensure driver safety and well-being. There is the U.S. Department of Veteran Affairs trialing the tracking of medication adherence of war veterans suffering from the post-traumatic stress disorder. And, on a more casual side, there are hundreds, if not thousands, of health and fitness companies using wearables and smartphone apps to help people get and stay in shape.

"There are so many new tools available for engaging the patient," Snyder says. "We are in the early stages of a real renaissance of healthcare."

David Haddad, executive director of Open mHealth, a non-profit start-up building open software architecture to enable the integration among mHealth solutions, agrees. "Every week there is a new wearable on the market," he says. "There are also a lot of different mobile devices and apps. They are all creating enormous amounts of data, and we have the potential to harness the data together to answer questions about our bodies and our health."

For example, already on the market is Telcare's MyTelcare Diabetes Pal, an iPhone application that allows diabetes patients to share their glucose meter readings with their physician.

"Every time you're pricking your finger, your glucose is being recorded," says Jack Young, director of Qualcomm Life Fund North America, a company that invests in digital healthcare startups. This enables caregivers, such as hospital nurses, to track both the glucose levels of their diabetes patients and how often they actually take glucose readings. Based on this data, the nurse can make what Young describes as "an educated call" to the patient. "The patient will listen," Young says, "because somebody is really paying attention."

Tracking behavior

The ability to monitor patients outside the clinic is where mobile is at its most innovative at the moment. "Health happens in-between clinical visits," Haddad says. "A lot of health is about daily behavior."

This behavior includes maintaining the prescribed medication schedule, physical activity, diet and other lifestyle aspects. "The great advantage of mobile devices is that they capture the behavior of individuals," Snyder says. "We can fill in the gaps in data now."

He cites the example of someone being treated for depression whose wearable has not recorded any substantial walking activity for a number of days. "The doctor can then call the patient at home and say, 'Hey, you haven't left the house for a week. What's going on?'"

Another example is that of someone suffering from Parkinson's disease, who is wearing a bracelet equipped with an accelerometer. "This can track the Parkinson's patient and register if he's having a tremor, and if this tremor is major or minor," Snyder says.

This is very helpful because patients don't often give an accurate picture of what is happening to them, he explains. "Now we have the ability to capture what actually happened via a smartphone," Snyder adds.

The data travels from a wearable to the smartphone to the Cloud, where the doctor can view what is happening in real-time. If the patient had three tremors, the doctor is able to intervene. "But it has to happen on the Cloud to make it real-time," Snyder says.

Qualcomm Life Fund's Young cites a portable ECG device manufactured by AliveCor that you "slap on the back of your smartphone, and you can take your electrocardiogram (ECG) measurements anywhere." The device also provides real-time analysis of the results, he adds.

There are also ways to track a patient's diet, with a Weight Watchers' app where the user logs in his daily food intake, and a wearable enriches this data with the user's mood, determined by such variables as sweat and heart rate, Snyder says. It is also possible to track stress, as, for example, that experienced by war veterans suffering from post-traumatic stress disorder (PTSD). In this case, a map is used in conjunction with a calendar, Snyder explains, allowing caregivers to track the PTSD patient at various points in a day, and then to ask him why he avoided certain places.

And, again, the Cloud is vital to the data's utility. "All the data sources are put together in the Cloud," Snyder says. "That's the most exciting thing in healthcare today: assembling traditional medical records with non-traditional methods." Getting the patient engaged

However, digital healthcare can only work with the full complicity of the patient, and this is not as self-evident as it one might expect. "Many people just don't care about their health; they just can't be bothered," says Sonny Vu, founder and CEO of Misfit Wearables.

His solution to the general indifference of patients to actively participate in their own healthcare lies in the production of well-made, beautiful devices, such as his company's Shine, a popular digital step counter in the form of a small, smooth metal disc resembling a macaroon, which can be worn on almost any part of the body.

Since much of digital healthcare begins with wearables, it is essential that patients wear the devices. "The goal is to get it on people's bodies because they want to have it there or because they just forget that they are wearing it," Vu says. To make a wearable such a natural part of a person's daily life, Vu says, producers need to fulfill three criteria, or pillars, as he calls them.

"First you have to make them wearable," he says. "There is nothing more useless than a highly accurate device that people don't want to wear. There are popular devices out there that people stop wearing after a few months because they just don't want to put them on their bodies."

The second issue is battery power. "People don't want to keep charging something they wear on their bodies," Vu says. His company's Shine is able to run for six months on a single coin battery because, he says, "we've made it incredibly power-efficient."

Vu's last pillar is utility. "It has to have some really compelling use case," he says. "It has to pass what I call the turnaround test – if you forgot it at home and were halfway to work, would you turn around and get it?"

Paying to keep the patient engaged

A smartphone would pass that test, Vu says, but probably not an activity tracker or similar device – unless the patient was actually paid for wearing it. "That could certainly help move the needle," Vu says.

Giving financial rewards to patients for wearing a mobile healthcare device, taking their medication as prescribed or following a healthy lifestyle is becoming an increasingly common strategy for what is termed engaging the patient. One company that uses this strategy as a key to its aim of reducing the cost of healthcare is SeeChange Health, a healthcare technology company and insurer that works with health plans and enterprises. "Keeping people engaged is important to us," says Sean Penwell, SeeChange Health's chief medical officer. "That's how we improve their quality of life and reduce the overall cost of care."

The incentives we pay keep our members actively interested in their healthcare and help change their behavior for the better. To illustrate his point, Penwell cites the example of a patient suffering from diabetes. "If you have diabetes, you should have a hemoglobin A1c test (HbA1c) and a retinal eye exam twice a year," he explains. "We reward people who take these steps with $50."

SeeChange Health delivers this reward by funding a gift card. Rewards for other healthy actions include a deposit into a health incentive account, which reduces the member's out-of-pocket expenses for medical care. "Funding the gift card is effective because the reward is delivered shortly after the member's actions," Pennwell says.

SeeChange Health can afford to provide these financial rewards because the company anticipates substantially larger savings through reduced healthcare costs. "We've saved $107 million over three years," Penwell says. "That's with about 100,000 folks on our platform. Those are significant savings we can pass along through lower premiums."

SeeChange Health recently launched an application for mobile phones and tablets that includes all the functions of the company's website: It allows patients to check their health actions, look at current rewards and potential rewards, and browse for other information related to their policy, such as the deductible. "The app makes it easier for members to stay on top of their progress," Penwell says.

The company is also building the capacity to send texts, such as motivating messages to members. "We'll be able to tell a diabetes patient: 'You need a retinal eye exam. Here's a hundred dollars; you have three months to do it,'" Pennwell says. Finally, SeeChange Health incentivizes healthy people on its insurance plans to take steps (literally) to remain healthy. "For example, we give them ten bucks each week if they log 5,000 steps a day for five days," Penwell says. "We also reward weight loss through measurement of the individual's body mass index."

Patient engagement through games

The importance of lifestyle changes cannot be overestimated. Mobiquity's Snyder says that an unhealthy lifestyle is the cause of some 40% of premature deaths.

According to him, gamification is another method increasingly used to engage patients in their own healthcare process. "There is motivation by competition, for example," he says. "The use of leader boards on which you are compared to other people in your age group in weight loss, for example."

In addition to keeping patients engaged, games are also used to monitor them. "For people suffering from Alzheimer's, you can track their mental cognition by offering, say, a puzzle every day," Snyder says.

For Penwell, the aim of this incentive system is to ensure positive healthcare outcomes – that is, that ill people get well and healthy people remain healthy. "I'm a firm believer in rewarding outcomes," he says. "My interest is how do you increase health? The only way you can do that is through positive outcomes."

As an example, Penwell uses the case of an individual who needs to lose 25 pounds in a year. "There are a lot of cool devices, but are they leading to better outcomes?" he asks. "The real outcome is that weight loss. If you're not tracking outcomes, then you cannot say you are creating healthcare value. And if you're not creating value, then it's a waste of time."

Making the most of the data

Digital healthcare, as Open mHealth's Haddad says, is creating unprecedented amounts of data. In fact, digital healthcare could be defined as the constant generation and real-time analysis of health-related data. But data is useless unless it is transformed into value.

The question is, then, how to best create healthcare value from all this data. Haddad's answer is unequivocal. "We must have a common way to access all the data sources, not only to integrate the data, but also to make sense of it," he says. "Unless we have a common way to access all the data sources at our disposal, we cannot really say we are making the optimum use of it."

Open mHealth has created software to integrate data from different sources. In a trial with the U.S. Department of Veteran Affairs (VA), Open mHealth integrated data from four different applications, including the VA's PTSD Coach, to track the medication adherence and moods of a veteran suffering from the stress disorder, he says.
"We saw his moods change from green to red," Haddad says. "We saw if the patient was not taking his medication. And we were able to intervene via text messages."

The point of the trial was, he says, "to demonstrate the power of bringing all this data together. Through it, we were able to provide a much more complex picture of this man's moods."

As a result, Julia Hoffman, national director, mobile health, mental health services at Department of Veterans Affairs, and her team were able to intervene in real-time. This is crucial, Haddad says, because "when PTSD patients go unnoticed, they often get violent."

Unfortunately, he notes, many data sources – he names as examples the activity trackers Fitbit and Jawbone – "create walled gardens," making access to their data difficult. Open mHealth is building its own connections to all these data sources, Haddad says. "We now have to figure out how to fit [our architecture] in [these companies'] development cycles. But we are building tools to help them with that."

He says that the Open mHealth architecture has attracted interest from health systems in the United States as well as South Africa, Singapore and Dubai. "Imagine you are such a healthcare system," Haddad says. "You have to have a way to talk to all the sources contributing to the care of your patients. We provide the means to access all the data."

One of the benefits of open access to digital healthcare data is that it will be available to the patient as well, he says. "It provides the context necessary to give the patient a voice in his or her own healthcare. We can improve the quality of care by giving the patient a voice. We do that by making data available to the patient."

Qualcomm Life Fund's Young puts forward another company that is working on making it easier to access data from different sources. "Human API provides a single normalized API to access the different APIs of various sensors, devices and other sources," he says.

This makes it possible, for example, to get blood pressure readings from 10 different brands of blood pressure monitors. But the data must also be available to those who pay for the healthcare process, such as insurance companies or enterprises with health plans.

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