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Still a Nestling

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For The Record

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As mHealth technology matures, concerns surrounding regulation, interoperability, and security will need a resolution.

Never underestimate the power of staying connected. The new generation of mobile health (mHealth) technology solutions allows patients and health professionals to communicate with each other in ways never before imagined. By combining the best features of voice and data communications, it's possible to access clinical and community health data, monitor real-time vital signs, and even perform elements of direct care. Toss in the use of Internet-enabled cell phones by medical professionals in developing countries and you've got an mHealth technology industry that's increasing access to healthcare and health information in myriad ways.

At Its Core

According to Hussam Mahgoub, senior vice president of corporate development and research at Diversinet Corp, the 2009 market for mobile medical applications was worth about \$41 million, or approximately 1.5% of the total mobile app market. 2010 revenues are estimated to have more than doubled to \$84.1 million, according to Kalorama Information.

“Smartphones and other mobile devices are becoming increasingly popular among physicians,” Mahgoub says. “Manhattan Research, in its annual ‘Taking the Pulse’ study of physicians and healthcare technology, reported in April 2010 that 72% of physicians use smartphones and projected that percentage will increase to 81% by next year.”

Among consumers, mobile phones have become the primary means of communication. Ninety percent of Americans have a mobile phone, according to the 2010 CTIA Semi-Annual Wireless Industry Survey.

And in a recent report by the MIT Enterprise Forum Northwest, nearly 56% of baby boomers “show a willingness to use in-home monitoring devices in tandem with the care of their primary physician.” These boomers “view tech-enabled health products as a way to foster control and ongoing independence for themselves.”

Despite those numbers, David Aylward, executive director of the mHealth Alliance, says mHealth technology is still in its infancy.

“We are right at the beginning of the market, so I don’t think it [mHealth] is having much impact now,” he says. “Everyone is carrying a cell phone in the U.S. and all over the world, but it has yet to really impact beyond voice communications. The real issue is determining what is the vision, what are the possibilities, and what are the challenges as it relates to mHealth technology.”

According to Aylward, the developed world operates a centralized system in which consumers travel to facilities.

“In the developing world, where I focus, there are a lot fewer places to go [for care], so people who are trying to find high-quality ways of delivering healthcare are looking at the delivery system that wireless represents,” he says. “If you completely turn around the current paradigm of going to someone for healthcare and instead have distributed health to where you are, not where they are, the only way to do that is with modern communications.”

At its most fundamental level, mHealth technology takes medical professionals per se out of the equation—at least to a small degree.

“Let’s say I am a diabetic. There are a set of devices that exist today where, sitting in the comfort of my home, I can take my blood pressure and check my insulin level,” Aylward says. “I can communicate those measurements through my Bluetooth in my phone or through my wireless system into my EHR. Specified software will read those results and say, ‘Oops, there’s a problem here. These numbers are out of whack.’ Then a message is sent to whoever has been designated, saying, ‘David is not eating properly.’ In turn, I get a call from my wife or my doctor who says, ‘What’s going on? ... What are you eating on this trip?’”

Aylward points out that such an alert is not human generated. Rather, it’s a machine reading the results of an insulin test and comparing it with a patient’s health record.

“That’s really different than me showing up at my doctor’s office saying, ‘You know, three weeks ago, I felt terrible.’ And the doctor asks, ‘What did you eat?’ ‘Well, I don’t really remember,’” Aylward says. “The absence of a human being means that you can deliver a diagnosis and guidance, and the doctor is reserved for the exceptional cases. That’s radically different than today where the doctor is the first person you see.”

Far-Reaching Apps

Much of the interest in mHealth technology thus far has focused on chronic illnesses (heart disease, diabetes, etc), where patients must be monitored and treated over time, and in the wellness arena, where the focus is on behavior change and modification. As a result, the market has been inundated with apps designed around these functions. Aylward views these apps as superfluous.

“People go out and write a lot of medical apps, but frankly I think that is irrelevant,” he says. “What is relevant is connecting that device to a health system. It may be useful to track my weight on my phone, but what is much more useful is linking what is on my phone to my health system so that my doctors can track and share information over time. What is relevant is a health record that is mine, that is connected to me and to my medical providers.”

For example, the U.S. Army is using Diversinet’s MobiSecure Health platform to speed recovery and better monitor the progress of wounded soldiers. Based on the success of a one-year pilot, the Army recently awarded Diversinet a five-year contract to expand the program to serve as many as 10,000 soldiers. The pilot involved members of the military recuperating from mild traumatic brain injuries and other wounds.

“Currently serving more than 600 individuals, mCare features a downloadable, HIPAA-compliant mobile app that works on more than 270 mobile device brands and models, including smartphones and feature phones,” Mahgoub says. “The app enables daily two-way secure communication between servicemen and women and the Army’s healthcare team. Users can store all their essential healthcare information on their mobile phones and securely send and receive healthcare-related messages.”

The system can schedule medical appointments, send reminders, provide health and wellness tips, set recovery goals, and allow soldiers to fill out health questionnaires in real time. Health information such as body weight, mood, energy level, sleep patterns, physical pain, and overall sense of well-being is shared and tracked.

“An evaluation of mCare results in June 2010 showed significant progress, including improved patient and provider satisfaction with case management services, as well as enhanced patient compliance, for example, in keeping appointments,” Mahgoub says. “Nearly 75% of users surveyed said they preferred to be contacted via mCare more than once a week, and 65% reported that mCare improved their communications with their unit.”

Regulation and Monitoring

According to Mike Kirkwood, CEO of Polka, a company that’s developed a personal health platform, basic applications (eg, medication apps, first aid apps, visualization apps) within the mHealth arena are widely deployed through consumer channels. “Enterprise-sponsored applications are building momentum but are not fully realized yet,” he says.

These basic apps are improving healthcare in various ways, including coordinating nursing activities such as shift changes and monitoring, as well as connecting patients and doctors through medication reminders and previsit data sharing. In addition, there are apps that can be used as a reference tool. And that’s just the tip of the iceberg.

As the number of medical apps on the market continues to expand, some are questioning whether they need to be monitored more carefully for accuracy and usability. At present,

there is a lack of clearly defined standards governing healthcare applications. “The only standards for the exchange of medical information and its privacy are HIPAA regulations,” Mahgoub says.

HIPAA, while providing immense benefits to the entire health system, introduces many privacy, security, and overall regulatory implications to the mHealth concept. “For example, real-time mobile messaging to allow patients to receive text messages informing them of lab results or other health information is difficult when HIPAA compliance must be maintained,” Mahgoub says. “At present time, there is no specific set of standards or guidelines that governs mHealth applications or how they communicate with other applications and systems.”

Interoperability

Besides communicating with physician practices, mHealth technology can work in a hospital setting as well. “In fact, an emergency scenario, with new patient intake, is a great example,” Kirkwood says. “It also can be used in payment authorization and other practical hospital services and in meaningful use scenarios such as e-prescribing.” According to Kirkwood, there are various barriers to information exchange within the confines of mHealth technology.

“For example, the competitive landscape is an issue as the standards and exchange are not currently working in healthcare systems,” he says, adding that there’s a question of whether consumers can be trusted to enter accurate data. “Also, information quantity and context is important as people evaluate if the system is smart enough to provide the right info rather than just lots of it.”

Mahgoub believes there are three barriers to information exchange: a lack of industry standards, interoperability, and security.

“Standards pose a problem because there are so many of them, and it’s difficult to keep up with them all,” he says. “Nothing is plug-and-play, so it’s almost like starting over with a new development each time you have to work in this space, whether it’s networking or the other things that require standards.”

The lack of standards also leads to issues regarding interoperability between devices, systems, and applications. “A lack of standards between how medical devices communicate with wireless devices creates a fragmented user experience,” Mahgoub says. The lack of interoperability between EHR systems also creates issues and leads to inefficiencies and errors, he adds.

Finally, the inherent lack of security among many healthcare applications can pose serious problems.

“Many mHealth applications use only a simple username/password authentication credential to protect patient health data,” Mahgoub says. “This is simply not sufficient to protect patient health records and ensure that strict HIPAA guidelines are met.

Remember, healthcare applications require more sophisticated techniques to safeguard health information, such as bilateral authentication and multilayered encryption technology.”

Health Disparities

The expanded use of smartphones could mean significant gains in the quality of care delivered to poor communities.

According to Barry Chaiken, MD, former HIMSS board chairman and chief medical officer at Imprivata, although almost 25% of Americans lack access to broadband Internet services, more than 91% use mobile phones, and 38% have Internet access through their mobile phones.

“Therefore, mobile phones are the common denominator for interacting with patients, irrespective of income level, and are increasingly being used by providers to manage care,” Chaiken says. “As the cost of smartphones and mobile data plans drop, these devices, with their greater capabilities, will have a significant impact on how care is delivered and patients are managed, particularly those with chronic diseases. For the poor, smartphones will offer a way to more easily interact with physicians and other providers, research information about their illness, and access innovative technology phone apps that can help them self-manage their illness.”

Because smartphones are relatively inexpensive, their impact could be felt worldwide.

“In the developing world, there aren’t any doctors, so it is really important to be able to use machines and train people to perform a lot of tests,” Aylward says. “The use of smartphones and mHealth technology among the poor means access to quality medicine in a lot of instances.”

For example, a nonprofessional can administer a set of tests and have the results sent to a patient’s PHR to be analyzed by a machine. “This can include pricking your finger and doing a microscope slide of your blood and having it interpreted by a machine to determine whether you have malaria, HIV/AIDS, or other illnesses,” Aylward says. “This could also include listening to your breathing with a remote stethoscope and having a computer interpret it. That poor woman can now get a level of primary care from a nonprofessional.”

mHealth technology can also be employed within poorer communities in the United States. “Many people believe we need to focus on areas such as Native American reservations and rural Alabama and other poor areas of the country. Give those people access to their records and provide inexpensive but effective wireless diagnostic devices in the little community clinics. Then they can have access to first-class diagnostic and primary care medicine at a distance,” Aylward says.

What the Future Holds

Mahgoub believes this is the year mHealth will take off. “The largest driver of mobile

phone growth in emerging markets will be ultra-affordable smartphones,” he says. “Two indicators include the NIH [National Institutes of Health] just announcing a major grant program for smartphone-based mHealth applications, and AT&T has formally launched a mobile health division.”

Mahgoub says there are also several key items that will shape mHealth advancements in the near future, such as the following:

- The launch of 4G networks will allow for faster, more robust communication via mobile devices. This will also enable more information to be transmitted wirelessly in a faster and more efficient manner, allowing acceptance of more sophisticated mHealth applications.
- The cost of mobile devices and smartphones in particular are trending downward, making them affordable to more people and increasing the possibility of having sophisticated applications available to a larger subset of the population.
- In many countries, wireless infrastructure is more affordable than landline and traditional broadband services. Thus, more people rely on mobile devices as their primary source of communication.

Security, accessibility, and interoperability issues aside, as healthcare costs continue to skyrocket, the economic efficiencies of mHealth technology are causing many to take notice.

“Access to care does not just mean the ability to be seen by a physician,” Chaiken says. “Access to care is access to the various interventions that are required to return a person to good health, manage a chronic disease, or keep someone from becoming ill. Mobile phones and smartphones in particular offer a vehicle to deliver apps that can help providers deliver care better.”

With healthcare spending approaching 18% of the gross domestic product, Chaiken says we need to be smarter about how care is delivered, focusing on achieving better outcomes with fewer resources.

“mHealth technology is one of several information technology tools that offer us a way to leverage existing resources to achieve these goals,” he says. “Organizations that want to leverage mHealth technology must focus on their goals and objectives rather than the technology itself. Workflow and process redesign is critical to properly leverage these new technologies. Only by thinking creatively and having a willingness to discard old ineffective ways of doing things will organizations reap the potential benefits inherent in mHealth technology.”

— *Maura Keller is a Minneapolis-based writer and editor.*