The Promise of Mobile Technology:

Enabling Collaborative Care, Fulfilling Healthcare Reform

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Unlike information technology preceding it, mobile technology's adoption in healthcare has been rapid and broad. According to CompTIA, 81 percent of U.S. physicians use a smartphone in their work environment. A May 2012 study by Manhattan Research highlighted that physician tablet adoption reached 62 percent in 2012, with half of those physicians using their device at the point of care. While the phenomenon is largely a spillover from widespread consumer adoption, its promise and value for improving care are tangible. In the October 2012 report Advances in mHealth Technologies, Frost & Sullivan concluded that mobile health tools will become more ubiquitous across healthcare settings when they are leveraged to manage chronic and acute conditions.

As provisions of the Affordable Care Act – hospital re-admission penalties and accountable care participation – take effect, now more than ever mobile technology is poised to help all stakeholders benefit from improved and safer care, better outcomes and a more efficient, accessible healthcare system. Intel convened three industry leaders for a panel discussion on mobile technology's impact on collaborative care and workflow in their renowned healthcare organizations. In the Intel Innovation Summit's Collaborative Care: How Mobile Tools Help You Thrive in Healthcare Reform, moderated by Mark Blatt, MD, Worldwide Medical Director for Intel, the thought leaders offered their best practices and vision for connected care.

Empowerment through Mobile Technology

For early adopters, efficiency has been the initial impact of deployment. Visiting Nurse Service of NY (VNSNY), a not-for-profit organization that provides in-home nursing care, therapy and hospice, and palliative services to all New Yorkers, considers mobile technology "the glue that holds our whole service system together," according to Former President and CEO Carol Raphael. All VNSNY nurses have a mobile system that lets them conduct assessments and input progress notes and summaries, among other functions. "It is hard to conceive of providing care to more than 30,000 patients every day in 30,000 or more locations without mobile technology," said Raphael, now a Fellow at Harvard University and Chair of the New York eHealth Collaborative (NYeC).

The Johns Hopkins University believes its healthcare providers should have all the information available to them "when they need it and where they need it," said Stephanie Reel, CIO and Vice Provost for IT. The university also believes in empowering patients and developing a real-time partnership between provider and patient. Its mHealth Global Initiative, a community of excellence in mHealth research, innovation and leadership, has leveraged mobile technology for numerous projects, including distance learning tools for training and clinical care support of healthcare workers in resource-limited areas.

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John Peabody, MD
Associate Professor of Health Services, UCLA
Associate Professor of Epidemiology, Biostatistics and Medicine, UCSF

The University of California leverages mobile technology in two areas, according to John Peabody, MD, Associate Professor of Health Services at UCLA and Associate Professor of Epidemiology, Biostatistics and Medicine at UCSF. Mobile tools help make services accessible and encourage behavioral changes for population health improvements, and deliver data and data opportunities for research purposes. "Having that ability to connect patients, data and providers together is grounds for everybody having a mobile device," Peabody said.

Beyond Data Lookup: Mobility's Multiple Functionalities

According to the HIMSS Mobile Technology Survey, which was released in February 2012, improved access to view patient information, ability to view/interact with patient data from remote locations and improved access to reference information, ranked 80 percent, 71 percent and 69 percent, respectively, were the top three benefits of mobile technology use for clinicians. Intel's Blatt noted that other uses may succeed data lookup, especially with collaborative care becoming more important with healthcare reform.

NYeC, which oversees New York's statewide health information exchange, is conducting a pilot in which clinicians can look up information such as medication lists in electronic records when patients present to the emergency department (ED). As an added value, VNSNY receives an alert when one of its patients presents, which results in a follow-up to determine if the patient was admitted or sent home. VNSNY can track patients more efficiently and reschedule visits when patients are in the hospital. "We're getting very positive feedback," Raphael reported.

Mobile devices help VNSNY nurses manage medication lists of their patients, who take on average between 10 to 14 different medications and another three or four upon discharge from the hospital. The mobile systems help nurses, who then educate their patients, to determine which medications adversely interact with one another and put together a regimen for patients to follow. VNSNY is also leveraging mobile devices as educators. Teenaged diabetics monitor their condition by tracking metrics such as blood sugar levels on their devices and use gaming applications to help educate themselves. The program is successful because it aligns with their lifestyle.

Reel is an advocate of just-in-time education, but notes that the IT industry still needs to figure out how to relay specific information, such as the side effects of a new drug, when a patient needs it. Just-in-time education can also serve overwhelmed medical students. Mobile devices, for example, can bring up images of a complex condition that a resident can present to the patient and care team. Bringing technology into the decision-making process allows for the review of treatment plans for genitourinary cancers, which is a project the Moffitt Hospital in Florida has been working on, and lets colleagues participate in virtual tumor boards, which is an initiative Peabody has worked on with the University of Utah. Mobile devices enable conference calls, but just as critical, they bring data into the calls. "That's particularly important when you're talking about complex treatment options," Peabody said.

Overcoming Barriers

Although adoption continues to rise, mobile technology must still address barriers. According to the HIMSS Mobile Technology Survey, inadequate privacy and security (60 percent) and lack of funding/budget tolls (48 percent) were the top two barriers to mobile technology use. Both healthcare organizations and IT innovators are developing solutions to overcome these historical issues. The Johns Hopkins University educates its workforce on the sensitivity and protection of patient information. Clinicians undergo rigorous training and follow strict guiding principles about how information can and should be stored and shared. The university has also invested in virtualization, which allows data to be stored virtually rather than on the device itself and enables the IT department to provide better support.

"Technical solutions around security will continue to evolve," Peabody said. As technology tackles this issue, one approach may be to distinguish sensitive information about a person's health from clinically relevant information for decision making. That decision may increase patient safety and result in a better outcome, which may convince patients to support data transparency. Also, as patients and providers begin to share information, patients are in a better position to interpret and manage their own health, which highlights the value of electronic records and therefore may mitigate privacy fears, he said.

Policies inevitably must address clinicians bringing their own devices to work. The Johns Hopkins University tolerates and in many cases promotes the use of whatever devices work, Reel said. "We must be incredibly supportive of innovative discoveries and that extends itself all the way to the device space," she said. Conversely, VNSNY supplies its nurses with mobile devices and has implemented a "very rigorous" policy, Raphael said. The downside is that the not-for-profit organization foots the bill. The University of California employs a hybrid approach, which gives it a combination of flexibility and control, according to Peabody. The University makes an allocation and sets rules for individuals to purchase their devices, and then subsidizes the cost of monthly services. Reel points out that technology investments trump the overall cost of healthcare. When the entire workforce is empowered and engaged in the care delivery, including areas not traditionally considered part of the care delivery model such as nutritional and environmental services, patient safety, effectiveness and efficiencies are gained through mobile technology use, she said.

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Stephanie Reel
Vice Provost for IT and CIO
The Johns Hopkins University

Mobile Technology's Critical Role in Healthcare Reform

With ACA provisions in full swing this year – contracting for accountable care organizations under the Medicare Shared Savings Program has been open since January and the Hospital Readmission Reduction Program has been in effect since October 1 – healthcare organizations wanting to participate and comply, respectively, can look to existing apps. Text4baby, an mHealth initiative at The Johns Hopkins University, is "just one example of mobile devices providing connectivity between the patient [pregnant mother] and the provider that promotes more effective care, predicts care that really needs to take place, predicts outcomes that could be anticipated and prevents unnecessary readmissions," Reel said.

VNSNY deployed analytics to its database of approximately a million patients and now has an algorithm that predicts the likelihood of rehospitalization. Patients who are in the 10 percent to 15 percent range of higher likelihood receive nurse visits for the first four days following discharge to ensure stabilization. VNSNY brings home thousands of patients from the hospital each month, many of whom are discharged after business hours. Therefore, it's critical for nurses to get immediate access to after-care instructions. Mobile devices can easily deliver the information and also facilitate follow-up visits in a timely manner, which can help reduce readmissions. "I cannot imagine new organizational arrangements or situations where entities are responsible for a population and have to work with many partners across settings and time being effective without the use of mobile devices," Raphael said. "Communicating in real time is going to be very important in facilitating all of these different parts of the system."

While real-time data is critical for collaborative communication among care teams and clinical decision support for patient safety, better outcomes and reduced risk of readmissions, real-time assessment of clinical performance is also important, Peabody said. At the Cure Autism Now Foundation, he and his colleagues discovered that what appeared to be a repetitive test was actually a problem with information flow. Once the

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Carol Raphael
Former President and CEO
Visiting Nurse Service of NY

problem was resolved, the unnecessary test was eliminated and costs were reduced, which is important for shared-risk models.

The Future of Mobility is in Innovation

As the marketplace evolves, mobile technology consumers have ambitious but attainable visions. Raphael is looking to IT innovators to consolidate functionality to one mobile device. VNSNY nurses use multiple devices for different purposes – laptop for charting, cellular phone for ordering and smartphones for sending e-mails. "This is unworkable for people out in the field," she said. The goal of consolidation to a single device speaks to the need for simplification in a complex industry that is overwhelmed with data, Reel said. "We need to communicate much more effectively," she said. "It's a challenge for IT companies to help us achieve the goal of consolidation and convergence."

One challenge for ICU clinicians is trying to manage multiple smartphones and smart monitors that are intervening and monitoring physiological activities of patients. "The promise of mobile technology that we have not yet achieved is to ensure that there's a closed-loop process associated with these activities," Reel said. While alerts can be sent via mobile devices, they would be even more powerful and assist care providers if they also triggered smart monitors to adjust, for example, volume or dose, in order to stabilize a patient's condition.

For Peabody, one of the derivatives of mobile technology is the increasing interest of patients to own their own data. "Your data and your participation ultimately is the determinant of your own health, and health status is the reason to do that," he explained. All stakeholders, including IT innovators, need to apply consumer apps to the 40 percent of patients whose chronic diseases are rooted in lifestyle choices and leverage "gamification" to help patients quit smoking, lose weight and exercise, Peabody said.

Reel referenced her two grandsons when imagining mobile technology's potential. For her grandson who has food allergies, Reel hopes one day an app will be developed that tests whether a food has ingredients that cause allergic reactions to the end-user. For her other grandson, who has juvenile diabetes, Reel challenges IT innovators to fulfill her desire to have her grandson "realize that treating his disease is not so difficult, that it is something he is fully empowered to do using mobile technology to help him manage his disease and to manage his life." Reel acknowledged that the IT industry is already making inroads in this area. The challenges have been presented, and if mobile technology's short existence is any indication, its future impact will continue to transform care.

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