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mHealth and Data Integration

How to keep data flowing without overwhelming patients and providers

By Annette M. Boyle and Brenda L. Mooney

Integrating data from mobile health applications and other sources with a patient’s electronic health record (EHR) offers more data and greater patient engagement, but industry leaders encourage providers to carefully consider what—and how much—information to collect to ensure the information is useful to both providers and their patients.

Northwestern’s offering gives patients access to portions of their medical record, including medication lists, information about allergies and ongoing concerns. They can also access lab results, submit prescription refill requests, make appointments and send secure messages to physicians.

“We’re probably a national leader in terms of participation with more than half of the patients in our primary care group now using MyChart,” says Lyle Berkowitz, M.D., associate chief medical officer of innovation for Northwestern Medicine, which includes Northwestern University’s Feinberg School of Medicine and nearly 1,100 beds in two hospitals.

While MyChart has been a success, Berkowitz, who also serves as medical director of information technology and innovation for Northwestern Memorial Physicians Group, wants other apps to prove their value and popularity before he integrates them with the EMR.

“‘It’s quicker, easier and cheaper to let apps that we are piloting or that apply to small groups stand alone,’” he says.
More isn’t always better

When considering mHealth app data integration, Berkowitz advises that tech leaders keep in mind that more isn’t always better.

“Many apps need some filter before data goes into the EMR,” he says. “You don’t want every bit of data about how many steps someone has taken each day to go in. You need to use analytics and business intelligence to present a summary that is integrated and useful.”

To filter data, Berkowitz recommends setting a filter so that only abnormal results are sent into the office via the EMR. Alternatively, an organization can provide a data visualization tool that allows clinicians to quickly see patterns and problems, or include a rules engine that does more sophisticated analysis to ensure that critical information is not submerged in a sea of data.

Just who will take on the role of making sense of all that data from all the emerging mobile health apps, patient records and other sources remains to be seen.

“This is still a very early space and it is unclear if the ‘after-collection transformation’ will come more from the vendors doing the data collection, from the EMR vendors or from third party” programs, Berkowitz says.

At Kaiser Permanente, that responsibility falls to the Mobile Center of Excellence (MCoE). Executive Director Brian Gardner notes that the fall-out rate—the length of time that users remain active—for new apps can be quite high, but organizations can take steps to simplify data integration of those that offer long-term value.

“We’ve custom built more than 30 apps in the last three years and rolled out a number that we’ve licensed as well. Some have shut down because the audience wasn’t right, we retired a few and merged several into other apps,” he says.

To prepare for future data integration and ensure quality, MCoE reviews all apps that Kaiser licenses or builds so that they meet security standards, behave like other Kaiser apps and meet established expectations for support models, app life-cycle maintenance, terms and policies and current technology.

“We’ve created standards around applications so that they are all built in accordance with platform developments that come out each year and ensure we maintain brand alignment,” Gardner says.
MCoE also built a web service that connects apps to membership information so that developers do not need to create multiple touch points to the same data source.

Establishing standards and a review process from the beginning allows many of Kaiser’s more than 5,000 IT professionals to continue to expand their skills and design mobile apps without requiring a lot of remediation later, says Gardner.

“We’ve created standards around applications so that they are all built in accordance with platform developments that come out each year and ensure we maintain brand alignment.”

BRIAN GARDNER, EXECUTIVE DIRECTOR, MOBILITY CENTER OF EXCELLENCE, KAISER PERMANENTE, OAKLAND, CALIFORNIA

“Establishing the MCoE enabled us to accelerate the work but not run over each other or have 1,000 flowers bloom.”

Functionality is key
More than one million members have downloaded Kaiser’s flagship mobile app, which connects members with their health records, allows them to communicate with physicians and manage refills and appointments. The flagship app is an extension of the My Health Manager patient portal. Kaiser is rolling out new functions this year, including a membership card digitized to the app, directions to hospitals and offices and a physician directory.

“We also have an Every Body Walk! app to support our program to get people moving,” Gardner says. “Should it live on its own or be incorporated in the flagship app? We’re debating that now.” Kaiser also offers three other mass market apps: Mix It Up by HealthWorks, Thrive Across America and KP Preventive Care for Northern California.

At the same time, Kaiser is weighing how much of the functionality from the flagship app should be incorporated into smaller, specialty apps. “If you’re managing diabetes, you need to track weight, blood sugar and other metrics. We could enable the app to email physicians directly [with that data], but we haven’t done that yet.”

Blackstone Valley Community Health Center, which has clinics
in Pawtucket and Central Falls, Rhode Island, has recently released an update to its mobile app, which allows patients with chronic diseases or other ongoing health concerns to upload their data to their EMR. But the data doesn’t come in piecemeal. Instead, the app bundles the results of blood glucose levels, blood pressure readings or other information and inserts the compiled and edited information into the EMR a few days before the patient’s next scheduled visit.

The chronic disease mHealth apps remain in flux at Kaiser.

“We’re not specifically targeting chronic conditions yet, but we do have a number out in the market. We’re still evaluating whether we need to build them ourselves or adapt commercial versions by rebranding them and building connections to our databases,” Gardner says.

Berkowitz notes that Northwestern develops its apps in incremental steps. It gets funding for a pilot, rolls out the app to a small, targeted audience, determines how well it works and then gets additional funding to spread the app to a broader group.

“There’s a lot we still need to learn about these apps as we customize them to the needs of patients and providers. If one really takes off, we will deal with integrating into the EMR,” he says. If it continues to perform well—if patients like it and it and produces favorable outcomes in terms of improved health or decreased costs—then it may be a candidate for data integration.

A number of Northwestern’s mHealth apps, though, will not be integrated even if they work brilliantly, simply because they are limited-time applications.

“For Northwestern’s integrated apps, Berkowitz says “a long-term visual view would be great, perhaps with averages and standard deviations calculated.” In more acute situations, though, he recommends some means to alert physicians more quickly. “If the patient had some major abnormalities at home, I’d want to be notified via my EMR that there was a problem so we can reach out.”
Mobile health. It has almost become more of a buzzword than a strategic objective for healthcare companies. But, its relevancy in the industry has become increasingly apparent as major health systems, providers and hospital innovations groups lead the charge on implementing mHealth initiatives to better engage their populations, improve patient outcomes and reduce per capita costs.

Healthcare companies are in a variety of stages with their mobile health strategy. From those launching massive telehealth initiatives to those just beginning discussions around mobile health to those feeling trapped in an analog system with paper charts and faxes, not knowing where to begin.

Progress in healthcare will continue to revolve around technology, and not just the equipment within the hospital. The world of mobile health devices, wearables, sensors and applications has spread to the general public’s everyday lives. These biometric monitors, fitness trackers, connected scales, blood pressure and glucose readers are being integrated into the rituals of the healthy, the overweight, the chronically-ill and acutely-ill. In fact, twenty-one percent of US adults are now using technology to track and monitor their health. And, eighty-three percent of physicians now use mobile technology to provide patient care. However great this progress, the future of healthcare is not just in technology alone. The future of a successful healthcare system will stem from how these technologies connect and talk to one another.

Many healthcare companies are trying tackle this mobile health connection alone without success. This is because of the Digital Health Divide — the gap that persists between the traditional healthcare system and the mobile health technology. There is a solution to close this gap. The Validic cloud-based platform connects healthcare companies, of all sizes and scopes, to the patient data collected from the most popular and innovative in clinical, fitness, wellness and nutritional technology. With over 150 integrations, Validic allows healthcare clients one connection to a marketplace of mobile health, which includes technologies from FitBit, Omron, iHealth, Garmin, Telcare, MapMyFitness and many more.

Without Validic, healthcare companies would have to build one-off integrations to each of the applications and devices they want to support. They would have to build massively scalable server architecture to support millions of data points. They would have to develop a standardization and normalization process for a variety of data styles and nomenclature. They would have to try to predict which applications and devices will be successful in the market and constantly reallocate technical resources.

However, with Validic, all of the technical and market challenges are handled quickly and efficiently. Healthcare companies are then able to focus solely on utilizing their patient’s health data to accelerate their strategic health and wellness objectives. Today, more and more companies are choosing Validic to help them access and integrate mHealth data. With this key information, these healthcare companies are empowered to deliver more accountable and affordable care. To find out how Validic can help your company, contact us today at validic.com/contact.
mHealth Apps Connect Hospitals With Physicians and Patients

By Annette M. Boyle

Hospitals and healthcare systems have rolled out a wide range of mobile health applications that tackle many different parts of the stream of information that comes from patients, physicians, nurses and health records and one guiding principle underlies them all: Better communication improves patient health.

"For us to be successful, we need to make the hospital an attractive place to practice, with tools no one else has and access to data that everyone needs.”

BENJAMIN KANTER, M.D., FORMER CHIEF MEDICAL INFORMATION OFFICER, PALOMAR HEALTH, ESCONDIDO, CALIFORNIA

“We know that communication problems are often the root cause of many sentinel events,” says Benjamin Kanter, who was chief medical information officer at Palomar Health in Escondido, California, at the time of this interview. The three-hospital public healthcare system serves more than 500,000 people in northern San Diego County. “For physicians to make the right decision at the right time, they need clear communication and context.”

A Physician-Focused Tool

Palomar took the first steps toward designing what became the Medical Information Anytime Anywhere (MIAA) application back in 2007. “Paging is the worst way to communicate. You don’t know who it is and don’t have the information needed to make a decision,” Kanter says.

To give physicians context when they recommend an action, the medical information technology team developed a sophisticated messaging system that can be used on a smartphone or tablet and directly links to a patient’s electronic health record (EHR) at the hospital or at a local practice. “All major vendors have built some kind of mobility client for their own EHR,” Kanter says. “We developed one that pulls information from disparate records into one system.”
While some features and functionalities of the individual EHRs may not be available in the app, physicians can access most information from any system in a standardized and intuitive way. “We don’t expect folks to use their phones for admitting or complex ICU decisions; it’s designed to support the work a mobile physician would be doing rather than to replace the PC and 22-inch screen they use in the hospital,” Kanter says.

“None of our physicians are employed, so for us to be successful, we have to make the hospital an attractive place to practice, with tools no one else has and access to data that everyone needs,” Kanter says. “Offering access to a system that tells physicians that their patient has been admitted and, within the same app, gives them the admitting doctor’s report, the chest x-ray results and an easy way to reach the nurse increases physician engagement, benefits the nurse and improves care for the patient.”

Palomar also offers physicians a way to immediately find and call the nurse attending any patient in the health system’s newest hospital from within the secure messaging application. Palomar’s physicians will soon be able to enter orders through the app, eliminating the need to log into another system or make a phone call.

“These apps aren’t born from the waters fully formed,” he says. “It’s an incremental process.”

Patient-Centric App
Salinas Valley Memorial Healthcare System, which has a 269-bed acute care hospital as well as a network of urgent care, diagnostic and surgery centers in Salinas, California, launched an mHealth app focused on the other end of the healthcare communication continuum—the patient. “The app fits in with our focus on wellness healthcare rather than sick care,” says Adrienne Laurent, chief strategic communications officer at Salinas.

The app, which is available for both Apple and Android platforms, has had more than 1,000 downloads since

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The app, which is available for both Apple and Android platforms, has had more than 1,000 downloads since
the system rolled it out in October 2013. It helps patients find providers, get directions to office and hospital locations, read health-related news, access a trusted health library and track their health goals and progress.

About 85 percent of users employ the health tracker functions. In July, Salinas' app boasted 1,844 views of the health tracker pages, which lets patients record and monitor a variety of conditions and metrics including weight, glucose, cholesterol, mood, blood pressure, pregnancy, headaches and more.

“The mobile app puts your health information in your hand. For people who buy airline tickets, shop and bank online, it puts us where they're going already as a partner in their health,” Laurent says.

Physicians help promote the app by recommending it to patients. For example, one ER doctor suggests that diabetic patients check their glucose and log the results into the app so they can see more easily how they are doing before a crisis arises.

“It’s part of the entire movement toward people taking more responsibility for their own health,” Laurent says. For a large segment of the population Salinas serves, using the app will become easier soon, as Laurent expects to roll out a Spanish language version in the next few weeks. After that, she’s looking into implementing the apps’ ability to feed patient-entered data into the Salinas EHR, so case managers can follow results.

### A Patient-Centric Integrated App

In Pawtucket, Rhode Island, Blackstone Valley Community Health Care (BVCHC) has already taken that step with its BVCHC-branded mHealth app.

“In 2017, Meaningful Use Stage 3 will require medical homes to include patient-recorded data in the EMR,” says Ray Lavoie, executive director of BVCHC, which operates two medical clinics and one dental clinic serving 20,000 patients in the Pawtucket/Central Falls area. To get ahead of the Stage 3 curve, Blackstone, its mobile app provider and the clinics’ EMR vendor worked together to integrate the two systems and maintain the security of the EMR system. While anybody can download the app for free, uploading data to the EMR requires a secure ID that patients can get in person.

Lavoie recognized that including the patient data had potentially significant advantages to care, but automatically sending that information into a provider’s action queue would be overwhelming. So Blackstone took the middle ground: Patients send the information at their convenience and the system uploads it into their patient record three days before their next appointment. Now, providers can review in advance everything a patient has recorded since the last appointment without being bombarded by alerts and updates, Lavoie says.

The next step is to have providers incorporate the trackers into care plans and goal-setting to see if patients better manage their health if they have some concrete action to take between visits. For an initial evaluation of
the impact the app could have on the health of at-risk patients, Blackstone hopes to enroll 20 to 30 diabetic patients for a pilot and connect them with providers and nurse care managers to see how tracking their glucose with the app affects their health.

“Ultimately, we’d like physicians to prescribe the app to patients and have them stop on their way out of the clinic to get lessons on downloading and using the security features. That would allow us to roll out education programs for different cohorts for various diseases,” Lavoie says.
Thinking about managing the world of mobile health devices, wearables and applications by yourself?

Think again.

Today, more and more healthcare companies are choosing Validic, the industry’s leading cloud-based, digital health platform to conveniently and easily access patient health data from mobile health and in-home devices, wearables, fitness equipment and patient healthcare applications.

Validic connects its growing base of customers - that includes providers, payers, pharmaceutical companies, wellness companies and health IT vendors - to the continuously expanding list of digital health technologies with one easy connection.

To find out how Validic can help your company achieve its strategic mHealth initiatives, please visit www.validic.com/contact today.
5 Ways to Measure mHealth ROI
Focus on soft returns now to reap financial rewards later

By Annette M. Boyle

It’s a little tricky to calculate return on investment for mHealth programs and apps. Of course, healthcare organizations aim for hard ROI from increased revenues and cost savings. But there are other, non-financial metrics that you can measure now—and they may hold the key to financial success later.

Here are five of the mHealth benefits the experts we interviewed for this eBook measure at their organizations:

1. **Competitive advantage:**
   At Palomar Health in Escondido, California, competitive advantage motivated implementation of a mobile app that lets physicians receive a message and see a patient’s electronic health record from the hospital or area practices, regardless of EHR vendor, without logging into another system.

   “If we can make a mobile EHR that is easier for physicians, better for patients and more efficient for nurses … the need to calculate ROI in the traditional way disappears,” says Benjamin Kanter, M.D., who was Palomar’s chief medical information officer at the time of this interview.

   **“If we can make a mobile EHR that is easier for physicians, better for patients and more efficient for nurses … the need to calculate ROI in the traditional way disappears.”**

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   Instead, Kanter argues that the ROI of offering better tools to physicians comes in the form of nothing short of survival for Palomar, the largest public healthcare district in California. It’s mission-critical for the health system to create an environment where physicians want to practice.
Physician satisfaction:
Adrienne Laurent, chief strategic communications officer at Salinas Valley Memorial Healthcare System in Salinas, California, sees long-term financial benefit to a mobile app that appeals to physicians.

The organization’s app helps patients track their health, find providers, get directions to office and hospital locations and read health-related news and information. But it’s not just beneficial to patients—it’s also a physician relations tool that could boost referrals.

“We’re not looking for month-to-month or 12-month ROI. Patient engagement is key to our future financial performance. Engaged patients mean lower costs and improved quality of care.”

RAY LAVOIE, EXECUTIVE DIRECTOR, BLACKSTONE VALLEY COMMUNITY HEALTH CENTER, PAWTUCKET, RHODE ISLAND

Shared savings:
Ray Lavoie, executive director of Blackstone Valley Community Health Center in Pawtucket, Rhode Island, says he wants to position his organization as a prime candidate for shared savings.

“Our major payer is a Medicare managed care organization. If we can generate savings by improving health, we can share in savings in the future,” he says.

For Blackstone, mHealth is a step toward perhaps forming an accountable care organization or other structure that benefits from improving care.

Long-term success:
Lavoie sees patient engagement in very practical, if not immediate, terms. “We’re not looking for month-to-month or 12-month ROI,” he says. “Patient engagement is key to our future financial performance. Engaged patients mean lower costs and improved quality of care.”

Community engagement:
Community engagement and branding is important, too, according to Salinas’ Laurent. “We’re not measuring [financial] ROI at all,” she says. “This is about community engagement and being seen as a partner in the health of our community.”

Laurent has a similar view of the long-term ROI of mHealth. It helps establish the Salinas brand and provides a tangible benefit to its community, she says.
An explosion of apps helps take quality healthcare global

By Annette M. Boyle

Johns Hopkins Medicine in Baltimore is solving some of the stickiest healthcare problems with mobile health tools. From sharing medical images across different systems to treating some of the most costly chronic diseases in the U.S. to expanding the reach of quality healthcare across the globe, the system, which operates six academic and community hospitals, four suburban healthcare and surgery centers and more than 30 surgical and primary care clinics and outpatient facilities, has invested heavily in mHealth.

Five years ago, more than 70 percent of JHM physicians had iPhones and 50 percent had iPads, says Paul Nagy, Ph.D., director of informatics for the Armstrong Institute for Patient Safety and Quality at Johns Hopkins Medicine and director of quality at the informatics research laboratory at Johns Hopkins University.

The percentage was even higher among residents, he notes. “We had been waiting for platform technology to reach a tipping point to let us to reach out using novel solutions,” he says.

Since 2008, JHM has developed or launched more than 125 mobile health applications for clinicians and other healthcare workers and for the patient population at large.

To learn more about how mHealth is transforming medicine at JHM and around the world, FierceHealthIT spoke with Nagy, JHM Software Development Manager Gorkem Sevinc and Sebastian Seiguer, CEO of JHM’s mobile health platform, eMocha. Developed at the Johns Hopkins Center for Clinical Global Health Education, it offers a suite of 15 global health and communications apps that are used across four continents and 12 countries.

“We think mobile will eventually replace work stations for nearly everything”
PAUL NAGY, DIRECTOR OF INFORMATICS, ARMSTRONG INSTITUTE FOR PATIENT SAFETY AND QUALITY, JOHNS HOPKINS MEDICINE, BALTIMORE

FierceHealthIT: Johns Hopkins has plunged into mHealth app development in a big way. What’s behind the explosion of mobile applications?

Nagy: Overall, the goal has been to improve collaboration, diagnostic capabilities and care coordination so we can ensure patients are receiving the best care. We know that 80 percent of sentinel events
are caused by a lack of communication between care teams. In the informatics research laboratory and at the Center for Global Health, we are developing tools to address the communication barriers.

**FHIT:** Sharing medical images among providers in different locations has long been a challenge. How do you use mobile radiology apps to solve it?

**Nagy:** Radiologists need to consult with referring physicians who are seeing patients. Ten years ago, they might have rounded together and reviewed cases together. Now, the demands of the work load are such that they don’t have that kind of time, so we’ve made it possible for them to simultaneously look at and discuss images that are integrated into the patient’s electronic medical record. It brings back a valuable component while protecting the productivity of both providers.

Ultimately, we feel it improves the relationships between providers and outcomes for patients. The referring physician receives more complete information relatively quickly and, by working together, the physicians can reduce the length of the patient’s hospital stay and improve quality of care.

**FHIT:** There are plenty of commercial apps and platforms that businesses use for online meetings. Why not just use off-the-shelf products?

**Sevinc:** Commercial applications are not HIPAA compliant. The advantage of developing these internally is that we can ensure the security protocols are in place and protect patient privacy.

**Nagy:** Our providers are really mobile and this app makes them more efficient because they can do the whole review and conference on their iPads instead of sitting down at a work station. While there are some functions, like placing orders, that still require a desktop, we think mobile will eventually replace work stations for nearly everything.

**FHIT:** How did you make the business case for developing apps in the radiology department?

**Nagy:** As we see it, ensuring patient safety and preventing harm create the greatest value by averting significant costs for the patient and the medical system.

Sevinc: Particularly as we move from fee-for-service to value-based payments, it has become easier to make the business case for averting patient safety issues.
and increasing the time value for radiologists. We’re developing apps that do both.

**FHIT:** Can you describe some of your mobile apps that address global health issues?

**Sevinc:** Globally, the main issue is still communication, but the distances are greater. In rural India, for instance, where many people do not have access to dental care, they can take pictures of their mouths and send them to a clinic. The doctor or dentist can say whether they need to come in before they travel miles by foot. In countries that don’t have access to the same technology that we do, but do have smartphones, the apps are becoming an emergency room replacement.

**Seiguer:** We have several high-potential and high-impact applications, including ones that help manage HIV in Uganda, India and Afghanistan, Chagas Disease in Bolivia, Dengue in Colombia and tuberculosis on four continents.

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**FHIT:** What about apps for patients closer to home?

**Seiguer:** Domestically, we’re helping communities address obesity, substance abuse and domestic violence, as well as HIV, hepatitis C treatment and TB. At Johns Hopkins, we have apps that help monitor post-discharge plan adherence to avoid readmissions and enable surgery patients to photograph their wounds at home and have nurses assess whether they need to come back in.

**FHIT:** How does the TB mobile app work?

**Seiguer:** The standard of care for treating TB is directly observed therapy. A clinician must watch the patient take the medications every day for six months. With our app, patients can record themselves taking the medications and then upload the video to the server. The clinician can watch the videos that patients upload and check patients off their roster without the clinician having to go to the patient or the patient having to leave work early to go to the clinic. This is something public health departments urgently need to keep patients on the medications and ease the burden on clinics. Here in the U.S., the app is in use in the counties around Houston and Baltimore.

**FHIT:** What’s the business strategy for JHM’s mHealth apps and programs? How does it generate revenue?

**Seiguer:** Our job is to take these apps from research to commercial product. Johns Hopkins continues to have an ownership stake in eMocha and we work with the system’s clinicians, who get an inventorship stake and increasing the time value for radiologists. We’re developing apps that do both.
earn royalties through the University in a fairly typical technology transfer licensing agreement.

Previously, many of the apps were developed for limited or one-time use. We turn them into subscription revenue. For each application, we need to find a payer. In the global market, other nations’ governments finance them. For tuberculosis, public health agencies pay for the app. For hepatitis C virus, it’s the insurer who wants to make sure the patient takes medications so he doesn’t need a liver transplant in five years. For discharge plan adherence, it’s likely to be the insurer, while for postsurgery wound photos, the department of surgery may find it makes sense to avoid the costs of 100 patient visits when only five patients need to see a clinician.