



Advancing the
*m*Health
ecosystem

**Mobile technology to address
patient, provider and payer needs**

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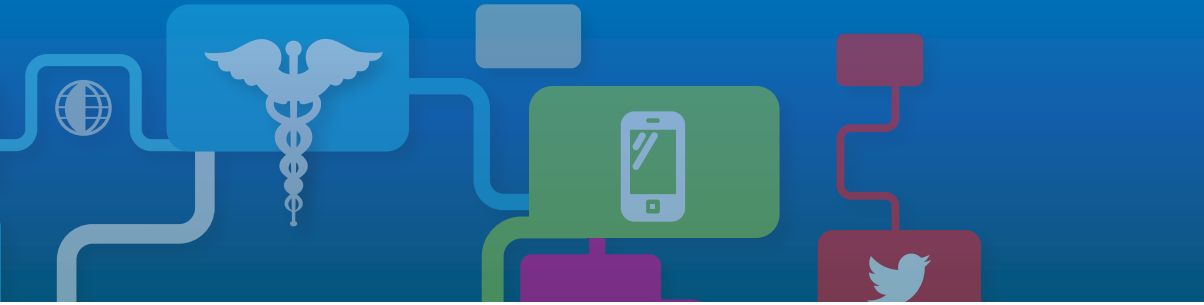
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"The concept of humanizing healthcare is at the heart of what we—providers, patients, payers, developers and designers—are striving to achieve."

— NICK VAN TERHEYDEN, MD
CMIO, NUANCE



NICK VAN TERHEYDEN, MD, CMIO

INTRODUCTION

mHealth's role in humanizing healthcare

Nick van Terheyden, MD
CMIO, Nuance

This guide aims to kick-off a conversation about how we can all work together to humanize healthcare by, first and foremost, listening to each other. Inside, you'll find a collection of insight from industry experts and thought leaders who share their impressions on how each of us, in our own unique way, can help improve healthcare by adopting and leveraging mobile technology. Now is the time to take a new look at how, as intricate parts of the healthcare ecosystem, we can collaborate and connect healthcare through a more personalized, mobile driven approach.

On a recent work trip, I was reading the latest edition of *Bloomberg Businessweek*. This edition's focus was on design, and one particular quote from a company called IDEO struck me, this concept of "humanizing healthcare." I began to think about my own work as a CMIO with Nuance and how this played into the concept of humanizing healthcare by easing physician frustration and struggles associated with electronic health records.

Capturing the complete patient note and the discrete details needed to get paid for the care provided is no easy feat—all while educating and engaging the patient in the care process and actual creation of a shared digital record. I also thought about the work we're doing in the mobile space through advancing "virtual assistants" (VA's) for clinicians and consumers alike; VA's that know you and, in turn, can more readily and intuitively provide the assistance you need, when and where you need it most.

And the role this next generation personalized VA will play for doctors who are facing nothing short of a "tornado of change" that threatens their ability to provide quality, human-to-human

patient care. Then I put on my MD hat and took a trip back in time, revisiting patient encounters when I too was hard pressed for time and may have sacrificed the humanity of personalized care in order to be able to address the sheer number of patients who needed my guidance. What I realized is this—*for far too long, we've left humanity out of healthcare.*

As I look at where the healthcare industry stands today, I think the concept of humanizing healthcare is at the heart of what we—providers, patients, payers, developers and designers—are striving to achieve. And I think technology, particularly advances in mobility, can and will play a critical role in this overarching effort. For providers, mobile technology remains a sacred cow of sorts. Some organizations remain fearful of initiating a mobile workforce because of privacy and security concerns, and instead remain anchored to their old ways and methodologies.

The tradition of the physician as dictator and the patient as (an innocent) bystander seems to be hard to let go of. Conversely, many patients today have simply accepted this model; seeing

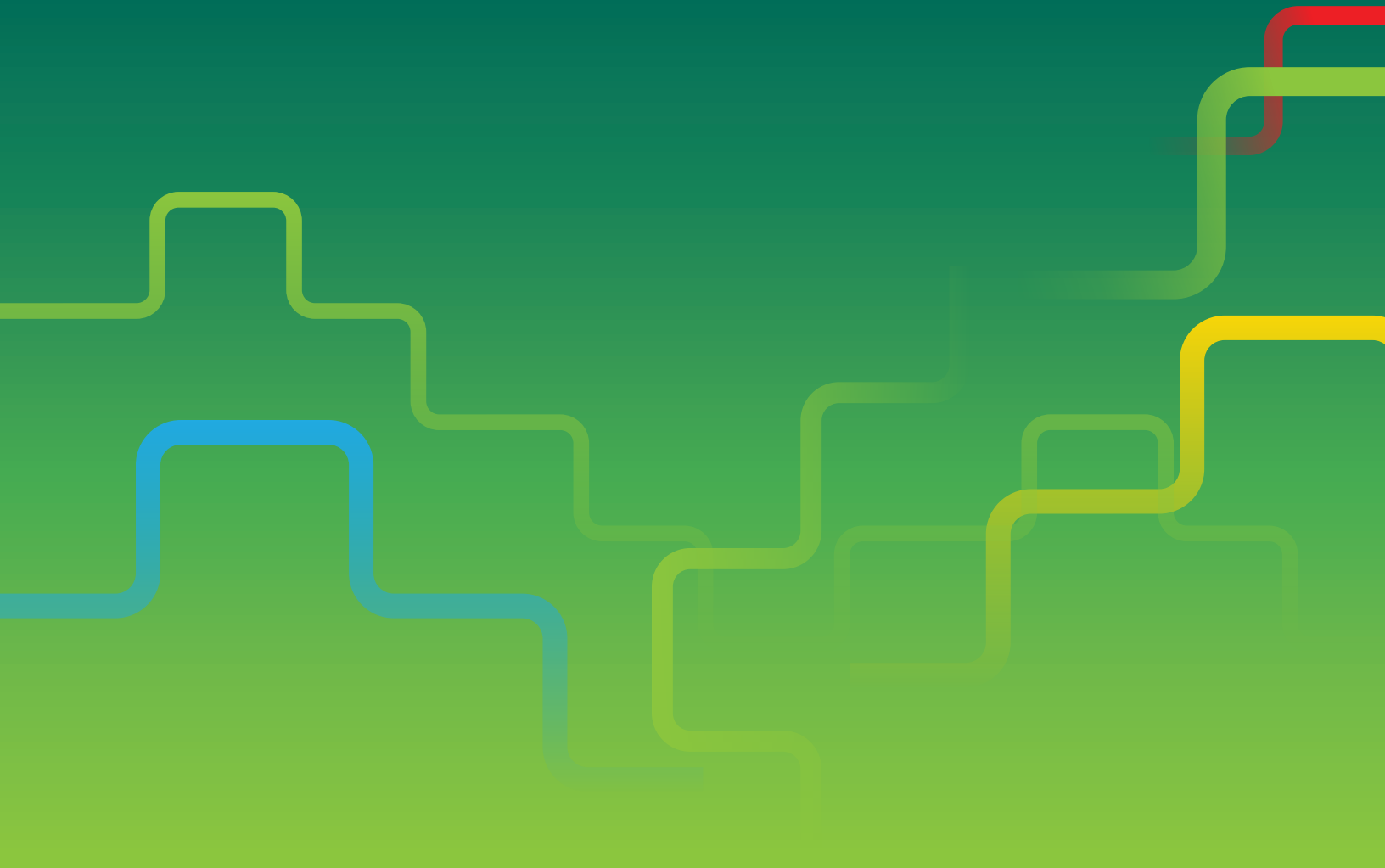
themselves as passenger vs. pilot when it comes to their own health and well-being, not truly considering that everyday innovations like smartphones and tablets could enable them to become healthier, and in turn, happier.

Well, this model is surely shifting because of mobile adoption and the widespread access to information and data that this type of technology provides. As this change gains momentum, we're seeing more of our doctors carrying iPad mini's; more patients tuning into self-improvement through a movement called the "Quantified Self" (admit it, either you or someone you know owns a Nike Fuel Band or FitBit...I do); and payers looking for new ways to engage and motivate patients to inject humanity back into healthcare's outdated model. We stand on the precipice of something awesome, if in collaboration, we're able to leverage burgeoning innovations to advance our mHealth ecosystem.

I hope you enjoy this digital guide and that the remarkable contributions from some of today's great leaders and innovators help spur new ideas as to how mHealth can impact the next generation of healthcare.

Mobility in Action

Clinicians weigh in on how their healthcare organizations are leveraging mobile technology today, and how they plan to leverage mobile advancements in the coming year



Breakthroughs in workflow efficiency for the physician

On-the-Go

By Reid Conant, MD, FACEP

***Emergency Physician and CMIO, Tri-City Emergency Medical Group
President and CEO, Conant and Associates, Inc.***

Medical practice today requires a broad array of information to be readily accessible at a moment's notice. Our practice patterns demand it, and our patients expect it. We are moving from one patient room to another, and even one hospital to another more rapidly than ever, and we need to have easy access to information and reference sources while on-the-go. Our patients are often attended by family and friends using their own mobile devices to check reference sources, and they expect the same of their physicians.

Practically speaking, we have found smartphones to be helpful devices for storage and retrieval of reference information from a variety of sources. Particularly helpful are applications and reference materials geared toward guidelines of established practices, as well as clinical calculators. Also helpful are applications that allow physicians to reference specific algorithms that are critical to patient care but either cumbersome or complex, such as HIV Needle Stick Risk Stratification or Advanced Cardiac Life Support (ACLS) algorithms.

Moving forward, as a provider champion for physician documentation solutions that improve efficiency, I anticipate my practice will incorporate our EMR vendor's (Cerner) mobility application that is in later stages of development.

As a member of Cerner's EDIS Strategic Board, I have also been involved in development feedback loops for this technology and it appears very promising. With integration of cloud-based speech recognition technology, and natural language processing tools to aid providers with ICD-10 conversion efforts, PC Touch as a mobility application has the potential to increase efficiency and further enhance the availability of data to busy physicians and healthcare teams.

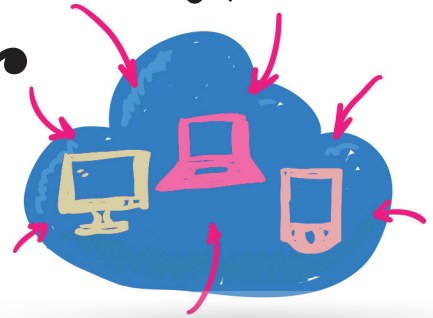
As many of us have found in the non-clinical moments of our lives, or learned from our children, texting can be completed much more efficiently by leveraging cloud-based voice recognition technologies. I have actually found that leveraging my voice and the microphone for searches, navigation apps, and many other purposes has increased my mobility productivity significantly. This same technology can be leveraged in our medical practice, and then some. One key to this will be the linkage of the mobile workflow with the desktop-based workflow that is not likely to become extinct anytime soon. It is the easy entry of text via speech that makes texting so much more efficient on mobile devices. And it is that, in addition to the critical linkage of that information to the EMR, that will provide the breakthrough in workflow efficiency for the physician on-the-go.

“As many of us have found in the non-clinical moments of our lives, or learned from our children, texting can be completed much more efficiently by leveraging cloud-based voice recognition technologies.”



REID CONANT, MD, FACEP

Mobile health accessibility, *trial & error*



By Tracy “Bud” Lawrence, MD
Henry Mayo Newhall Memorial Hospital

“The future is coming, and coming quickly. An integral part of that future will be mobile health accessibility.”

Since 2007, Henry Mayo Newhall Memorial Hospital (238-bed, not-for-profit community hospital and trauma center) has been transforming patient care with technology through its digital hospital initiative called iCare.

We believe the achievement of a digital hospital is critical to the implementation of patient safety initiatives that will improve the quality of patient care delivery. And we are excited about what the future holds for mobile technology both in the workplace and from the patient perspective.

We currently use MEDITECH’s electronic health record for our inpatient physicians. Our doctors can easily and efficiently monitor laboratory results, vital signs, radiology and consultation reports, as well as other important items of clinical relevance. Our IT department has done an excellent job of supporting this tool by supplying physicians with iPads and budgeting for smartphones.

CPOE and voice-enabled physician documentation

We are also live with Computerized Physician Order Entry (CPOE) and voice-enabled physician documentation in our Emergency Department and Women’s Unit, and will be going

live throughout the entire hospital in summer 2013. With this transition, mobile devices will likely be heavily integrated into the daily physician workflow. We anticipate a very high utilization rate as adoption gathers momentum.

Tablets: lesson learned

We have had difficulty integrating a mobile platform into the ED setting as most physicians still prefer a desktop environment. We did, however, make the institutional error of purchasing many tablets that were felt to add to the efficiency of the ED physicians. The end result was a product that was difficult to log on to, hard to navigate and only had a battery life of nearly four hours. These qualities were enough to doom the tablets to an eternity of non-use. We will use this lesson learned in mobile technology deployment by increasing the engagement of our clinicians in mobile device selection.

Patient portals

Part of our MEDITECH upgrade (as well as an integral part of our push for Meaningful Use Stage 2 attestation) will be the MEDITECH patient portal. We hope to integrate this portal into the current mobile-driven lifestyle of our patients. This portal will allow patients to view and manage their health information and medications, make and cancel appointments, and pay their bills. Patients will be able to enter this secure site from their mobile device, allowing for “anytime, anywhere access” of their personal health data.

Speech recognition and smartphones

Future iterations of MEDITECH will certainly be mobile-friendly with attention paid to functionality, ease of use and improved user interfaces. I see a time in the not-so-distant future where clinicians at Henry Mayo Newhall Memorial Hospital are performing CPOE and creating narrative documents using speech recognition on their smartphones.

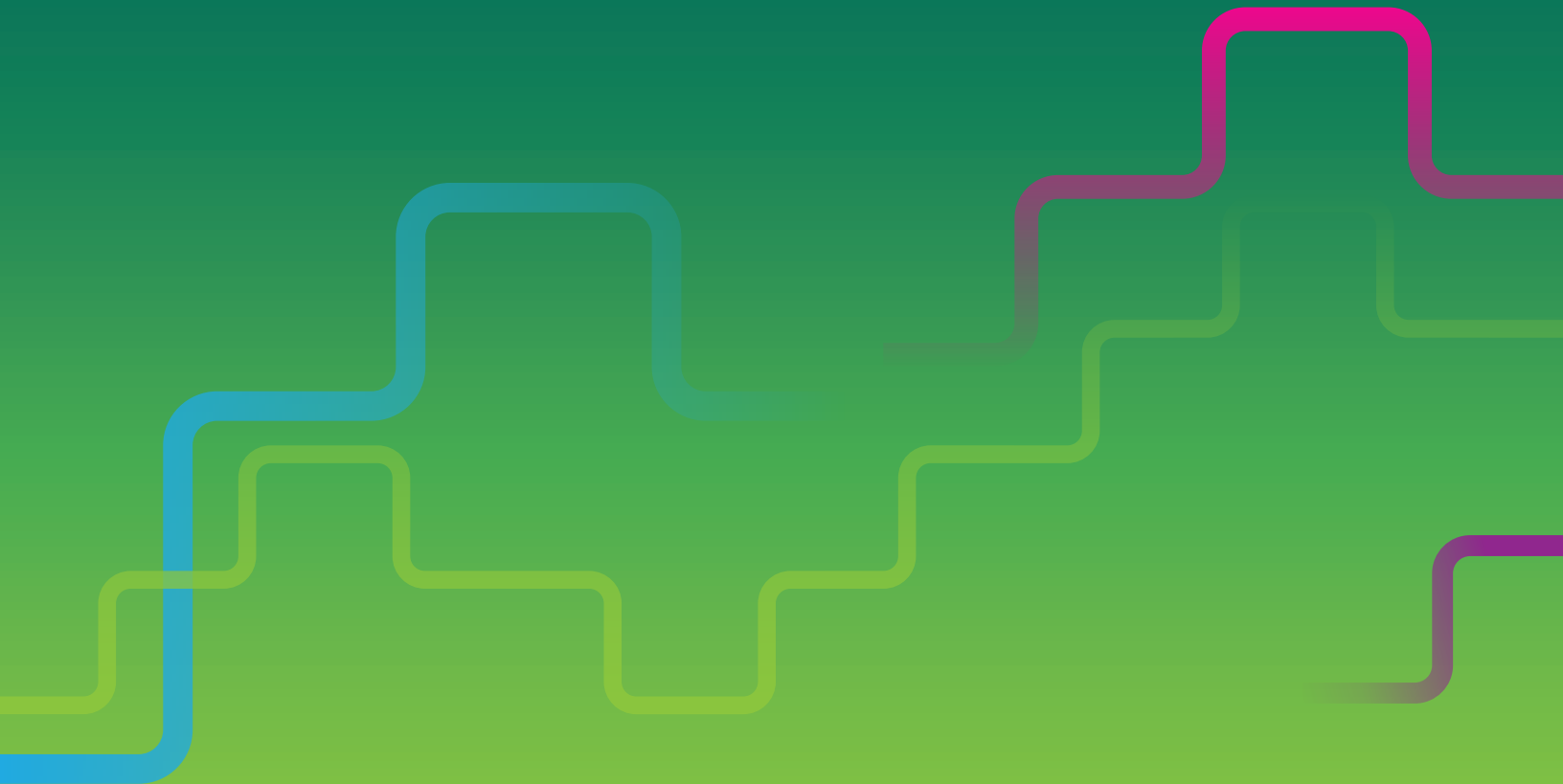
Fortunately, at our facility, we have an extremely supportive IT department and a CIO who is ready to take our medium-sized community hospital to the next level with technology. The future is coming, and coming quickly. An integral part of that future will be mobile health accessibility. We plan to be ready for this movement, as should any hospital that is looking to stay competitive.



TRACY “BUD” LAWRENCE, MD

Keys to Mobile Success

Industry thought leaders discuss which provider organizations have successfully adopted mobile technology and how mobile is positively impacting patients and providers alike



mHealth: A great many small victories

By *Eric Wickland*
Editor, *mHIMSS*

The true power of mHealth lies in its malleability. A healthcare provider can develop and foster an mHealth project or program that works well, and another provider might well take that concept and tweak it because it would otherwise not work for him or her. In its ideal state, it's not a one-size-fits-all solution or something that a provider should struggle to adopt – or adapt to. After all, at a time when providers are struggling with so many mandates, crises and concerns, they won't flock to something that requires a lot of work on their end.

So What IS Working Out There?

At this time, in this environment, the field of mHealth is seeing a great many small victories, from the father in Maryland whose brain-damaged son gets his physical therapy through an online program that connects his TV to a rehab center an hour away and specialists half a world away,



ERIC WICKLAND

“The more personal the connection between the data and the recipient, the better.”

to the community health center in Alaska that's monitoring patients via home-based telehealth networks, saving the time and expanse of a long drive, helicopter or dogsled ride.

It's all subjective. Diabetics are using mobile devices that track their blood sugar and other vital signs and automatically transmit them to their doctors, enabling those doctors to spot warning signs and intervene before a crisis develops. Doctors and public health advocates, meanwhile, are using text-messaging programs to reach out to mothers-to-be, smokers, people dealing with different addictions, encouraging them and directing them to resources and pertinent information. The more personal the connection between the data and the recipient, the better.

In other instances, mHealth's chief benefactor is the clinician. Smartphones and mobile devices are being used in hospitals from New Hampshire to Hawaii to help the nurse or doctor conduct rounds, view data and make quicker and better decisions. Telehealth technology is being

adopted by physicians who have certain specialties and want to help people beyond easy-driving distance. They're putting their talents out there, available to anyone with a smartphone or tablet, and finding a new way to conduct business.

It's important to remember that the healthcare industry as a whole has to view mHealth not through the time-honored lens of the “best practice,” but with an eye toward individuality. We can talk all we want about the success of the telemedicine network in Georgia or Ontario, or the BYOD platform in San Diego, or the text messaging program in New Orleans, but that doesn't guarantee that the same project or platform will work everywhere. There are so many variables.

It All Comes Down to MD Workflow

A doctor who finds the time during his day to communicate online with patients, dispensing a few prescriptions and diagnoses, will be successful. However, if he or she loses track of other patients in the process, or can't find the revenue stream to support that platform, then success is short-lived. Finding a balance is therefore critical.

So where are the successes? Everywhere, in all sorts of environments, and measured individually. Eventually, they'll become commonplace, and we'll stop celebrating them, or at the very least regarding them as unusual or above the norm. And in time, we may not even notice the little “m” in front of “Health” anymore.



Meet the poster child for successful *m*Health adoption



KENNETH A. KLEINBERG, FHIMSS

*By Kenneth A. Kleinberg, FHIMSS
Managing Director of Research and Insights
The Advisory Board Company*

ALTHOUGH the health care industry is about delivering care to patients, most consumers are only in the presence of a care giver a small percentage of the time. As such, the ability of a care giver to treat them, educate/influence them and monitor them has at least historically, been quite limited. But that is changing. The changes are being driven by a number of major forces.

First, the health care industry itself is being transformed to a system based on outcomes, not volume. Providers are going to be paid on managing the health of their patients, not just on how many procedures they perform. Providers are therefore more motivated to have patients become more educated about their health and conditions, follow treatment recommendations and make healthier choices. Additionally, providers are looking to “touch” their patients more often, but in a way that keeps costs, time and resources in check.

Second, patients themselves are becoming more motivated to be engaged with improving their own health. While they might be making poor choices when it comes to eating too much or not exercising enough, they are taking an increased interest in seeking out health care information, particularly over the internet, including information about medical conditions, medications, the best doctors and hospitals, etc.

“The majority of Kaiser Permanente’s members (millions) access the patient portal, and increasingly are able to do so with mobile technologies such as smartphones and tablets.”

—Kenneth A. Kleinberg,
The Advisory Board Company

Third, the modern world (and even parts of the underdeveloped world) is rapidly adopting mobile technology. Advances in smartphones, wireless networks, GPS-based locationing technology, etc., are providing consumers with the kind of information access that would have been hard to imagine even 10 years ago.

Taken together, these three forces are driving health care in the direction of *m*Health—the use of mobile technologies to connect providers and patients and to enable and engage consumers and their families. Examples of *m*Health include provider/patient messaging, lab report viewing, patient education, appointment scheduling, and tele-health.

A great example of a hugely successful health care organization is [Kaiser Permanente](#). Their comprehensive approach to patient care and their use of modern electronic medical records, portals and mobile technology has led to a system with high loyalty of providers and patients. The majority of KP’s members (millions) access the patient portal, and increasingly are able to do so with mobile technologies such as smartphones and tablets.

Some would argue that because KP’s providers are employed, they can be “forced” to use such technologies to interact with patients. However, there are many health systems in the country and providers are in higher demand than ever before. KP’s physicians choose to stay with the system, as do KP’s members. Such high adoption of health information technology to this degree is still rare.

As to the future, the increased use of remote-home monitoring equipment—and in particular mobile equipment that travels with the patient, that can provide information to providers and their patients to detect problems and recognize progress will strengthen the bonds between providers and patients even further, leading to higher loyalty and healthier patients.

Patient On-the-Go

*Experts speak out on how patient-friendly
mobile technology will revolutionize our
healthcare system*



“We are striving toward a future of better healthcare for all with assistive tech in every back pocket in America.”

The voice of patients

By Regina Holliday, Artist, Speaker & Blogger at [Regina Holliday's Medical Advocacy Blog](#)

In the school year 2007-2008, my son was struggling and had recently been diagnosed with an Autism Spectrum Disorder. He underwent tests, including an assistive tech assessment, to determine which accommodations would be needed. Based on the findings of the assistive tech team, he would need many costly interventions. He would need access to a laptop or computer. He would need a larger default font. He would benefit from some type of speech recognition software, as his keyboarding skills were very slow.

As the team listed item after item, I knew the school system would struggle to provide even a quarter of the devices my son would need. Appropriate accommodations were almost unattainable then, but today virtually all my son's requirements can be provided by the iPhone in my back pocket.

2013 is a very different landscape in both education and health. While some institutions, organizations and individuals still lumber about using tools and technology more appropriate for yesteryear, quite a few patients have embraced the possibilities of mobile health via tablet

or smartphone. If a patient logs on to their patient portal and does not understand a word or term, it takes only seconds to copy and paste that text into a search field. If a patient is searching for the best path to reach the closest hospital there is an app for that. And why settle for closest? Services such as Yelp provide insight that a hospital five more miles away may have much better care.

The voice of patients is becoming louder as the tools of mobile technology become omnipresent. No longer must the hospitalized patient endlessly press a call button waiting for someone to come to his or her aid. After a few tries, the e-patient can call the front desk for help, email customer service to complain and tweet their displeasure. Meanwhile, patients are accessing their information more rapidly as facilities and insurers are offering patient portals. Here the data is pushed out to the patient and the patient has the ability to respond via email but not amend. Some organizations are embracing the Blue Button concept and allowing patients to download some or all of their available data.

This is a great step forward for data access, because now patients can utilize that data set with the filtering resources of third-party apps.

Do you see what this means? Now any health citizen with access to a smartphone has the ability to monitor their health and guide their care like no other generation in history. Even someone like my son, who struggles daily, can dictate a

note to himself. He has an endless library of definitions to understand his condition with a device that allows him to magnify the text with a swipe of his fingertip. Can you imagine what a great equalizer this is? We are striving toward a future of better healthcare for all with assistive tech in every back pocket in America.



REGINA HOLLIDAY



Rules of engagement

By Joseph Kim, MD, MPH

President, MCM Education

Founder, MedicalSmartPhones.com



Healthcare providers (HCPs) are becoming so busy that it is more difficult than ever to truly connect with the patient. Primary care providers only have 10 minutes for each patient encounter. Medical

“...a patient may get ‘prescribed’ a mobile health app to learn more about diabetes care, proper eating, and the importance of exercise.”

specialists may take more time with each patient discussing very complex issues, but patients have a very difficult time retaining some of the key pieces of information that are often communicated during these encounters. Therefore, there are several key ways that HCPs can use mobile technology and portals to engage with their patients:

Health education

Even though patients may be combing the Internet to find answers to health questions, they want to learn from their HCPs. Nurses are often the front-line clinicians who are answering clinical questions, but they cannot be the ones to provide medical advice. Physicians are often too busy to answer the myriad of questions that get asked by patients. Mobile devices and health apps can be highly instrumental in educating patients about broad health promotion topics or focused disease-specific topics. For example, as patients check in for their visit, they may get handed a tablet that has an interactive health education app that produces tailored multimedia content based on how

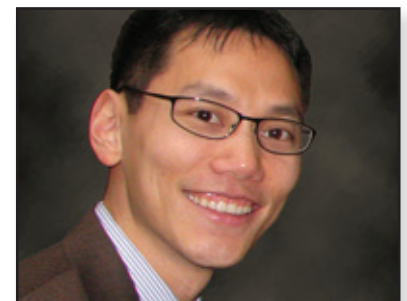
the patient may answer three simple screening questions related to diet, exercise, and sleep. Or, a patient may get “prescribed” a mobile health app to learn more about diabetes care, proper eating, and the importance of exercise. As patients interact with such apps and web portals, they may log their progress, enter specific data points, and receive tailored feedback from their HCPs during their next visit. Mobile apps are making it easier than ever to educate patients and to keep them engaged about their ongoing disease management.

Medication adherence

Patients often have difficulty with medication adherence. This is especially true among patients who take multiple medications or in the older adult population. Mobile technology, health apps, and web portals can be used effectively to improve adherence to complex drug regimens. We now have reminder apps that can be built into mobile devices. Family members and friends can also track whether their loved ones are taking their pills and reinforce proper behavior by calling, emailing, or texting with a “don’t forget your pill” message or with a “good job taking your medications today” compliment. HCPs can also track patient behavior and reinforce or remind patients to maximize adherence. Without proper adherence, diseases can worsen and lead to a variety of burdensome complications. Therefore, it is in the best interest of patients, family members, and providers to improve adherence to medications treating chronic conditions.

Sustainable behavior modifications

Patients often need ongoing motivation to manage their health conditions. Whether they are trying to lose weight or quit smoking, these constant reminders are critical to sustainable behavior changes. Mobile apps and web portals that leverage an online social community can provide the necessary social support to keep patients motivated. In some cases, adding a few basic elements of gamification—such as incentive points, ranking order, or other types of positive feedback—can significantly boost levels of motivation. This is one of the reasons why we see increasing momentum in the quantified self (QS) movement where patients are using wearable tracking devices to monitor their steps, their fitness, their sleep, or any other type of physical activity. They are sharing these stats on social platforms and participating in contests to earn bragging rights and to improve their health. HCPs can encourage the use of these types of technologies to keep their patients motivated to live a better and healthier lifestyle.



JOSEPH KIM, MD, MPH

Patient-centric mobile EMR

By *gravitytank*



Patients are currently lacking a clear form of communication when it comes to their total health picture. We have many resources to interpret and consider when it comes to medical advice: recommendations from our doctors, lab results and support on medical forums from others with similar conditions. Putting all those channels together is nearly impossible — it's on the patient to decide what pieces of the puzzle to connect, interpret its meaning, and how to act.

It all feels impersonal and daunting, especially considering that actively monitoring your health might happen to coincide with a serious health state.

A monotype electronic medical record stands in stark contrast to the personal and emotional quality of a concerning health condition. By contrast, while in good health, the presentation of the EMR does nothing to motivate a patient to maintain or improve their lifestyle.

For something as complex as our ongoing health, patients need a robust, understandable view of the interconnected aspects of their health. The data in these EMRs is incredibly valuable, but patients overwhelmingly don't have the health literacy to interpret them. By creating a meaningful, personal view of this data, patients can be empowered to take control of their health.

Medical records technically do their job fine as a discrete piece of information — the problem is that

“The problem isn't to create a mobile version of a medical record, it's to have critical information at hand in an emergency, or to improve patient compliance, or to help people improve their health.”

they're designed for doctors and they're almost never presented in context to each other. They quickly scan histories of medications, conditions, and lab results to make sure they're treating their current patient appropriately. Regular people, patients, get no value from their medical records. They're full of jargon, dry, non-intuitive, and just a snapshot of historical information. Unfortunately, this is where a trove of rich medical data lies.

This can become the North Star—designing a health record that actually empowers people to take control of their health.

If we were to design a solution around this, we should start with identifying the problem and the goal. The problem isn't to create a mobile version of a medical record, it's to have critical information at hand in an emergency, or to improve patient compliance, or to help people improve their health.

For patients, a tablet can provide a much more interactive experience than mobile phone, because the format supports rich, exploratory interaction and presentation. Beautiful visualizations, diagrams and

interactive models can give patients a picture of their health as it relates to their body over time, and with relation to all aspects including recent lab results, current and past medications, a history of medical events, and other important drivers like diet and exercise.

A mobile app is a means to an end, not an answer in and of itself. Mobile devices, for example, are the perfect platform for here-and-now information, quick reminders, things that communicate at a glance. While you may be able to access your entire medical history on a mobile device, there really isn't a situation when you'd want to do that.

On the other hand, mobile devices provide the opportunity to make EMRs more a part of our day to day lives.

Mobile interaction is likely to be focused around the immediate moment. What medication do I need to take now? Where's my doctor's appointment? It may be less important to access full lab results on a mobile device, and more beneficial to have an app communicating with a patient-facing portal with centralized information.

Team that was Awarded “Best Overall Design” in the 2013 Health Design Challenge, sponsored by the Office of the National Coordinator for Health IT. The team formed as a result of their day job connections at [gravitytank](http://gravitytank.com).

Top Row, left to right: Defne Civelekoglu, Stephen Menton, Amy Seng

Bottom Row: Justin Rheinfrank, Amy Guterman, Kunal Bhat



Payers See Potential in mHealth

*A look at some of the most successful
mHealth apps on the market, and how payers
are working with patients and providers to
drive better outcomes*



Empowering consumers with quality healthcare apps

By Martha Wofford,
Vice President, Head of CarePass, Aetna

More and more people, across all demographic segments, are turning to mobile devices to find health information and make health care decisions. A 2012 Pew Internet study found that 19 percent of smartphone users have at least one health-related app on their phone—a number that is sure to increase in the coming years.

In this new health care environment, consumers are defining quality in terms of convenience. Our research shows that more Aetna members are looking to manage their health using their smartphone—tracking their exercise and eating, getting health insurance information on the go, and finding a nearby doctor or pharmacy. We are striving to meet our members where they are with resources and information that help simplify and improve their health care experience.

The Aetna Mobile app puts our most popular online features at our member's fingertips. With the app, Aetna members can find a local doctor, view their Personal Health Record, learn about their coverage and benefits, and more. They can even use their smartphone as their Aetna ID card.

Better Apps. Better Decisions

Unique, innovative apps can also help consumers and health care providers make better, smarter and safer decisions. One example is iTriage®, one of the most popular health and fitness apps with more than 8 million downloads. iTriage allows users to research their symptoms, find a medical provider that best serves their needs, and book appointments all from their smartphone. iTriage is one of several resources that we are using to help connect health care providers and patients with powerful, personal technology.

We will continue to create new apps that meet consumer needs. However, we are also focused on helping people manage their health by making the

“We strongly believe that making valuable public and private health data available to talented developers increases the chances of developing apps that can truly change the health care experience.”

apps they already use work together more effectively. In 2012, we launched the CarePass® platform, which allows consumers to keep using their favorite health and wellness apps and seamlessly integrate their data and insights to one location.

Access to Personal Data

An important component of empowering consumers is to make it easy for them to access their data. Now featuring 19 market-leading partners—including iTriage, FitBit® and MapMyFitness®—the CarePass platform is creating a personalized experience for consumers to manage their whole health, from getting care, to staying well.

Building upon the CarePass platform, we recently launched an app called “Passage,” one of the first health and wellness apps in the new Microsoft® Windows® 8 store. Developed in collaboration with Microsoft, the Passage app transforms a dull workout routine into something visually exciting by transporting users to places like London, San Francisco and Paris. A person using the Passage app can unlock real-time pictures posted to Instagram; hidden gem restaurants with reviews from Yelp; street view images; insider travel tips; and interesting facts from these locations based on their progress on the virtual route.

Unleashing Creativity

Aetna is also engaging developers to drive better outcomes from mHealth. Last year, CarePass launched a Developer Portal that offers unique data services, encouraging developers to unleash their creativity and build innovative solutions that drive con-

venience for consumers. Consistent with the U.S. Department of Health and Human Services' (HHS) open data initiative, we strongly believe that making valuable public and private health data available to talented developers increases the chances of developing apps that can truly change the health care experience.

We will continue to work with consumers, health care providers and developers to create mobile health solutions that meet their diverse and unique needs. We are committed to making it as simple as possible for individuals to pick up a mobile device and manage the complexities associated with seeking, getting and managing their health. We believe empowering consumers can improve the entire health care system and result in health care delivery that is more convenient, connected and cost effective.

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FitBit is a trademark of FitBit, Inc.
Microsoft and Windows are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.



MARTHA WOFFORD



The mobile, personal health intersection



NICK MARTIN

By Nick Martin

Vice President, Innovation Research & Development, UnitedHealth Group

Mobile technologies are changing the way health care is consumed and delivered in America, paving the way for greater consumer engagement, reduced costs and better patient outcomes. The trend is being driven by the growing prevalence of smart phones and tablets, which have empowered consumers to take charge of their health like never before.



Many Americans, 53 percent, don't currently use consumer electronics to access important health care information, options and services. However, more than 60 percent of respondents anticipate increasing their use of consumer technology for just these purposes during the next year, according to a survey conducted by ORC International on behalf of UnitedHealthcare. The survey's results suggest the public is starting to realize how technology and consumer electronics can help them learn more about health, empower them to take better control of their individual health, and even simplify the entire health care system.

So what mobile technologies are starting to change the health care system? Here are a few examples of how mobile technologies are currently intersecting with personal health:

Health achievement

Smart phones are also allowing consumers to more easily track, evaluate and compare their efforts to exercise more, improve their diets and promote overall wellness. These mobile health apps feature coaching, relevant and personalized content, and connection to social networks. Some tools even let people create their own health challenges—with friends, co-workers and others—to help achieve health and fitness goals.

These tools can also incorporate wireless trackers that include accelerometers to more accurately count how many steps a user takes and an altimeter to track stairs climbed. The devices also calculate how many calories are burned. The information can even be uploaded wirelessly to the individual's Personal Health Record, enabling people to track their progress and share the results with their physician.

60% of respondents anticipate increasing their use of consumer technology for health care information, options and services.

Other new tools are also helping people more effectively track and monitor their chronic conditions. For instance, new technologies now enable diabetics to use their mobile phones to monitor their blood glucose levels. By automatically uploading these readings to an online portal and to healthcare providers, diabetics can accurately and conveniently manage their condition.

Health system navigation

Some of the most useful mobile applications related to health enable people to more effectively navigate the health care system. For instance, UnitedHealthcare offers Health4Me, an iPhone

"These new tools now enable consumers to create side-by-side quality comparisons for specific treatments at specific facilities..."

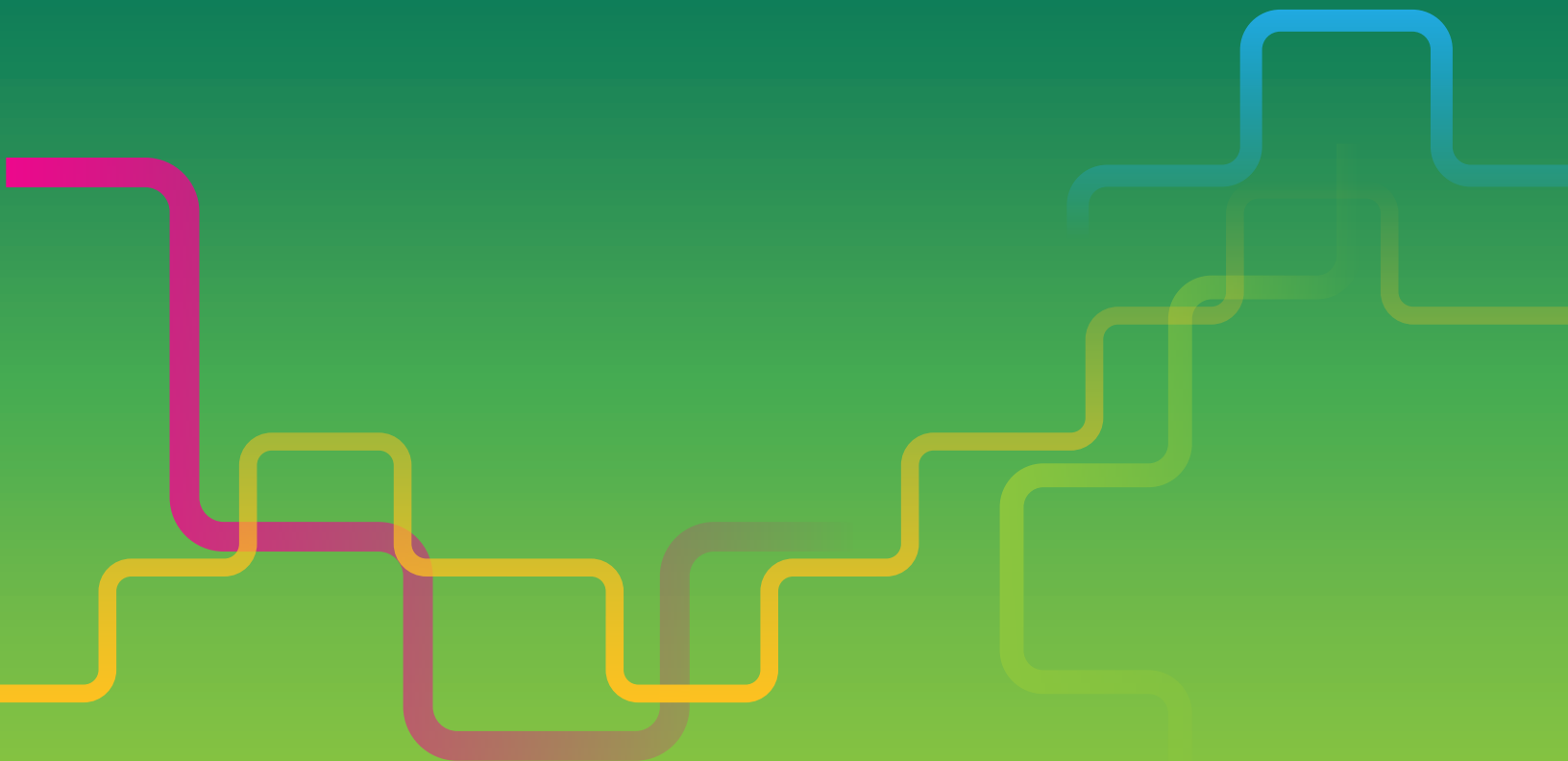
and Android app that enables people to do everything from check claims and account balances, locate nearby urgent care facilities and ERs, and quickly connect to the health plan. The app also enables people to access an experienced registered nurse 24 hours per day/seven days per week for advice regarding any kind of medical question.

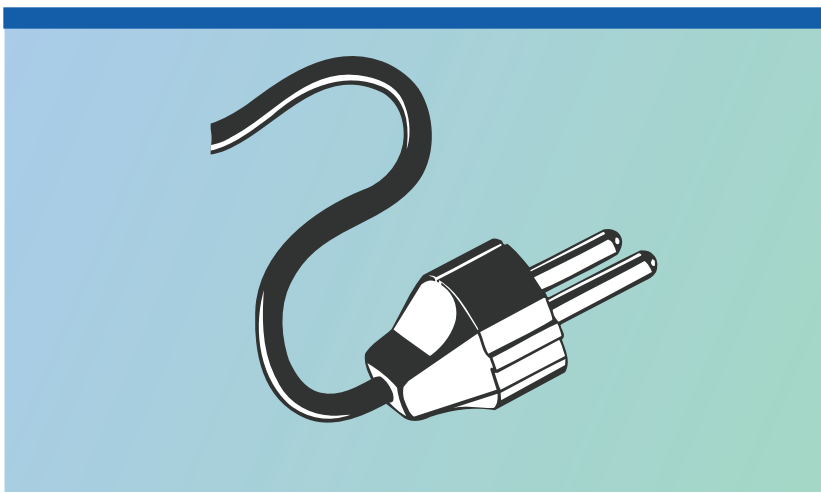
This tool, along with other new online systems, enable people to comparison shop for health care services, based on both cost and quality. Historically, patients often didn't know how much their medical care actually cost, with the bill arriving months after treatment. These new tools now enable consumers to create side-by-side quality comparisons for specific treatments at specific facilities, allowing people to place just as much emphasis on quality as they do price.

As consumers continue to take a more active role in their health and well-being, mobile applications have nearly limitless potential. These innovations are enhancing the health system and helping people take more control of their personal health—trends that will help create a happier and healthier America.

Future of mHealth

*Explore the not so distant future of mHealth
with some of the brightest minds in healthcare*





New era of medicine unplugged

By Eric Topol, MD

Chief Academic Officer, Scripps Health,

Professor of Genomics, Scripps Research Institute

Author, "Creative Destruction of Medicine"

Within the next 5 years, there will be a fundamental shift for who accesses and "owns" medical data and information. Although this is presently in the doctor's domain, and has been for medicine's long history, the biggest single advance will be the about-face to true consumer empowerment. The "empowerment" term related to health has been tossed around for many years dating back to the 1990's, especially since the internet provided considerable medical information for consumers to access. But what is different now is that an individual will not just be reading about population level data, but will be seeing real-time smartphone display of his or her own data and information—data that in many cases was not even obtainable until quite recently.

We are just beginning to see the signs of this in 2013 with new smartphone adds and apps that capture data on physiologic metrics such as blood pressure, blood glucose, and heart rhythm, along with imaging for such conditions as skin cancer and middle ear infections. Sensors for lung func-

tion, mood, eye pressure, movement disorders, brain waves and hundreds of medical metrics are in clinical use or testing. The technological progress that has been made in innovating and developing such hardware is remarkable, having only started in the past few years. Now all vital signs, including blood pressure, heart rhythm and rate, blood oxygen saturation, respiratory rate and body temperature can be continuously monitored non-invasively. In my own practice of cardiology, I am seeing patients who I would never have been predicted to be "data-driven" but who are clearly excited about having their own medical data on their own smartphone. This has enabled many patients to self-diagnose not only that their hypertension is inadequately controlled, but the precise link to their activities as returning to work on Monday morning, or an evening phenomenon due to a medication wearing off. And that's just with intermittent blood pressure measurements that require the individual to tap "start" on the phone screen.

How about when such measurements are being captured seamlessly

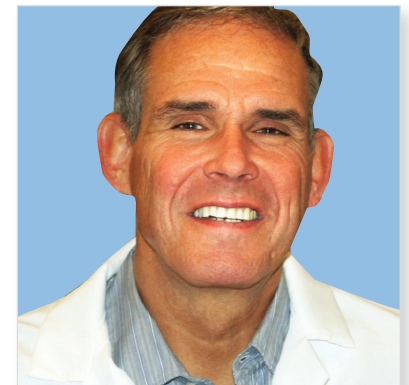
during sleep and stressful situations? But this is just one example of smartphone-DIY medicine. It is not truly "do-it-yourself." Yet having one's information can be integrated with the unique insights of the individual for a different and refreshing model of partnering with one's physician. That's a whole new look.

This is not just about sensors but also about DNA sequence. While it is possible to obtain one's whole genome sequence today, it still costs \$4,000-5,000 but that is widely anticipated to drop to ~\$1,000 by the end of this year. But like sensor physiologic data, imaging data, and sequence data, it's all about the algorithms and transforming it to useful information and knowledge—to be eminently understandable, enlightening and actionable. It means taking

"We have reached a new plateau of healthcare, a new dimension of "know thyself" that might not have been imaginable a few years back."

large data sets for any given individual and extracting all the meaningful information. Like developing the hardware, this, too, is moving along at an extraordinary velocity.

Once all relevant medical data for any individual can be obtained and fully processed, displayed and archived on one's mobile device, we have reached a new plateau of healthcare, a new dimension of "know thyself" that might not have been imaginable a few years back. Reflecting newfound and well-deserved power and authority, the individual will be driving if and when, and with whom, the information will be shared. That's what we're in store for in the era of unplugged medicine.



ERIC TOPOI, MD

The Internet of things

Convergence of mobile technologies, web-based software, low-power, low-cost hardware and connectivity will usher in a new era of healthcare

By Peter Ragusa, MD, MPH

CEO and Co-Founder, VoiceHIT

Developer of the Better Day™ Health Platform



PETER RAGUSA, MD, MPH

As the healthcare industry and governments around the world struggle with the rising cost of healthcare, many are looking to the future to address today's problems. As they do, what they are finding is that, in the next five-10 years, mobile devices, connectivity and the convergence of currently-emerging technologies will spur the growth of patient-centered treatment plans, collaborative care and population management.

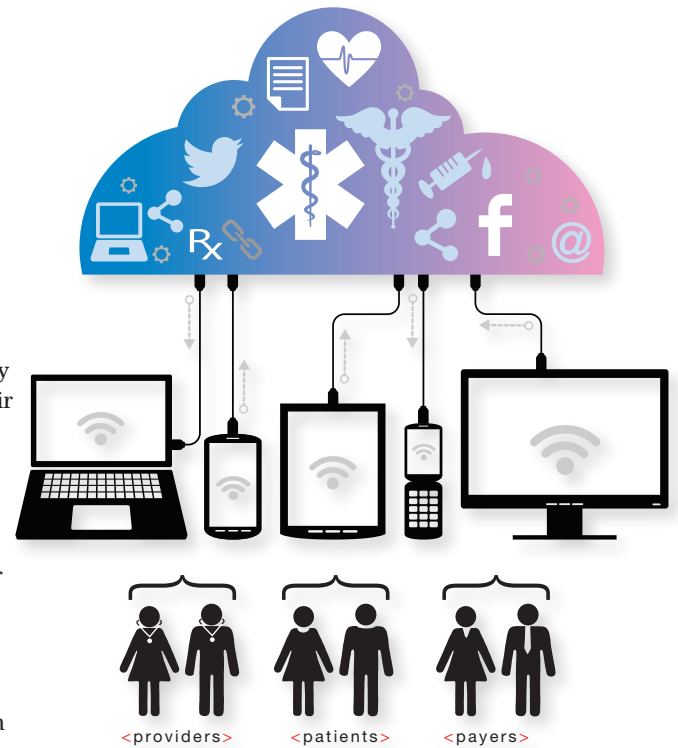
These trends in innovation will be the primary drivers in decentralizing patient care away from the clinic and hospital while improving quality and lowering overall costs. They also will enable us all to realize the long sought-after benefits of technology in healthcare. Advancements in this direction are already underway. As patients begin to engage with providers over the internet, mobile devices and connectivity are transforming the way people view and manage their health.

Today, patients are using smartphones and online tools to stay connected and informed. Over 80 percent of U.S. consumers search for health information online, and one-third of all smartphone users track their diet or exercise activities. Additionally, patients and providers are using social media in new, creative ways. PwC reports that a third of Americans now use social media sites, such as Facebook and Twitter, to seek medical information

and to track and share symptoms. Providers are increasingly using social media to reach their patients and interact with their patient communities.

As social media matures, we're likely to see smaller, customized social communities emerge—organized by provider organization, disease, geography or a mix of these factors and others. These will connect patients to patients, patients to providers and providers to each other. Accordingly, payment models will also emerge that incentivize collaboration and help to ensure patient engagement, as well as continuity of care, improving health and lowering costs.

Convergence of mobile technologies, web-based software, low-power, low-cost hardware and connectivity will usher in a new era of healthcare. This convergence will occur as the so-called "Internet of Things" becomes a reality. Consumers are increasingly using self-tracking mobile health devices and smartphones paired with health apps to monitor key indicators. These unobtrusive devices and apps collect powerful data and provide rolling evaluations—alerting patients to changes in their health based on biometric and self-initiated assessments that can monitor everything from location to mood to blood glucose to blood pressure, weight, sleep and physical fitness level. For example, Microsoft



and Ford are working on a car that has a ketone detector in the dash and will proactively alert a diabetic driver to pending problems.

Like the Ford example and others, new advancements in connected health technologies will mean that patients no longer have to rely on office visits to assess their health. Rather, these technologies will work in concert to alert them proactively. As consumers take control of their own health and technologies move towards convergence, emerging and growing market forces will spur on the mHealth ecosystem to produce products and services that empower both providers and the patients they serve with tools that will enable proactive care management similar to web-based banking and social networks—online, in the cloud, from any device and anywhere, anytime.

Will mobile virtual assistants propel the future of medicine?



JONATHON DREYER

By Jonathon Dreyer
Director of Mobile Marketing, [Nuance](#)

As noted in the contributions in this guide, the future of a quality, efficient healthcare system rests on our ability to press industry players to embrace collaboration and push for the creation of a connected ecosystem where—from patient to payer—mHealth technology acts as the ember to spark ongoing innovation.

Today, we, as consumers, have grown accustomed to experiencing the power of mobile technology. As technology has evolved, it's begun to take on an increasingly intuitive role in the form of mobile devices, televisions, laptops and cars that listen and understand our requests.

With this evolution in mind, I've been thinking a lot about what a mobile "virtual assistant" could mean for clinicians. In today's healthcare setting, far too much clinician time is spent on administrative tasks that while important, pale in comparison to the significance of their main job

duty – ensuring the health and well-being of actual people. But, what if we could help clinicians tackle administrative and other day-to-day duties by enlisting the power of a fleet of mobile virtual assistants that help clinicians simplify interactions and address data-entry headaches with electronic health records (EHRs); or provide real-time insight on the next patient, including vitals and medications; or even prompt them for more information when the record does not contain the level of detail needed to ensure first-rate care?

Overall, the everyday consumer understands the power of a mobile virtual assistant. In fact, a recent consumer-focused survey found that more than 60 percent of respondents are interested in using a virtual assistant on their phone and of those who are currently using mobile virtual assistants, more than 80 percent found them useful. To simply pick up your smartphone and ask it to move a meeting, present local movie times, call your mother, or set a reminder to send your car payment – all of these actions provided by a mobile virtual assistant – just make life easier.

Building off these consumer findings, Nuance also recently conducted a similar survey with clinicians. [Nuance's 2013 Virtual Assistants in Healthcare Survey](#) found 79 percent of clinicians surveyed spent more than 15 percent of their day on administrative, non-direct care duties. Moreover, one-out-of-three spend 30 percent or more of their day on these duties. Clearly, their time could be better spent.

“Virtual assistants will help strengthen communication between patients and doctors and are a revolutionary step in technology that will pay dividends for medical personal as well as patients...”

– SURVEY RESPONDENT

Survey results
CLICK HERE
>>



8 in 10

Doctors believe that by 2018, virtual assistants, powered by clinical language understanding, will drastically change how physicians interact and use electronic health records.



As the healthcare community looks for ways to modernize healthcare and improve patient care and engagement, mobile technology will increasingly take center stage. While I won't go as far as Vinod Khosla and say that technology will eventually replace 80 percent of doctors, I will say this—the healthcare system and the manner by which we provide patient care today is broken and technology can help reconfigure the pieces back together to create a more efficient, patient-centric system. In order to address deep-seeded issues that continue to infuse complexity into healthcare, I believe we need to do three key things and mHealth will play an important role in each:



Three Key Roles for Addressing Healthcare's Conundrum Through mHealth:

- 1 Identify ways to streamline communication and cooperation across the various involved parties.
- 2 Leverage what we know works from consumer use of mobile devices & apps and adapt these solutions to fit the healthcare realm.
- 3 Create and adopt intelligent technologies that help reinvent outdated, unnecessary processes and approaches to patient care and clinician job duties.

**How do you think mHealth
can help eradicate complexity
and further humanize healthcare?**

**Continue the conversation at
[For the Health of IT.](#)**