

Healthcare delivery of the future: *How digital technology can bridge time and distance between clinicians and consumers*

Health Research Institute

November 2014

At a glance

Industry leaders across health plans, hospitals and the pharmaceutical industry all see major shifts in how care is being delivered. Digital technology bridges the gaps between consumers and clinicians.



Table of contents

The heart of the matter

2

As patients transition from passive healthcare recipients to active value-seeking consumers, it is the health sector's turn to master digital tools.

An in-depth discussion

5

The care models of yesterday are inadequate to satisfy growing industry and consumer expectations. Today, almost everywhere they turn, physicians are feeling pressure to meet these expectations.

Conclusion

16

Healthcare companies should help physicians and other caregivers make effective use of digital tools.

The heart of the matter

As patients transition from passive healthcare recipients to active value-seeking consumers, it is the health sector's turn to master digital tools.

Executive summary

Twenty-five years ago, after doctors and nurses collected patient data, it was more often than not left buried in archaic, paper-based filing systems, only to surface again if memory triggered. Today that's just the beginning for data. One of the biggest developments in healthcare over the last quarter-century has been the remarkable progress made in capturing patient, clinical, research, administrative and cost data.

In short order, entrepreneurs have devised technologies aimed at increasing access, improving quality, and lowering cost—starting with e-prescribing to reduce medical errors and basic standards for sharing data to improve communication among caregivers often located in different settings.

In 2009, the federal government put money behind the drive to go paperless, handing out more than \$25 billion in incentives for adopting electronic health records (EHRs).¹ Now 400,000 eligible providers who have attested to the “meaningful use” of their EHRs are generating reams of clinical and cost data.²

Industry leaders followed, devising new ways to connect patients and caregivers via secure websites,

telehealth, remote monitoring, and mobile health apps—removing the barriers of time and distance, and bringing a traditionally fragmented industry closer together.

A few health systems are using advanced analytics to translate large amounts of data about a patient's condition and behavior to actually anticipate the need for interventions and revise care plans.

Today the health sector faces a daunting new digital challenge: unleashing the power of technology to fundamentally reinvent how care is delivered. Healthcare companies should connect their old systems with new digital technologies and merge the data locked inside them to generate meaningful, actionable insights for caregivers.

In the New Health Economy, digitally-enabled care is no longer a nice-to-have, but rather a fundamental business imperative. Industry leaders across health plans, hospitals and the pharmaceutical industry all see major shifts in how care is being delivered. Digital technology bridges time, distance and the expectation gap between consumers and clinicians.

PwC's Health Research Institute (HRI) surveyed 1,000 physicians and physician “extenders” (e.g.,

nurse practitioners and physician's assistants) and found that caregivers share similar views with consumers on the promise of digital technology to:

- **Help caregivers work more as a team:** Nearly half of consumers and 79% of physicians believe the use of mobile devices can help clinicians better coordinate care.
- **Increase patient-clinician interaction:** Half of physicians said that digital visits, or e-visits, could replace more than 10% of in-office patient visits, while nearly as many consumers said that they would be willing to communicate with their caregivers online.
- **Put diagnostic testing of basic conditions into the hands of patients:** About 42% of physicians are at least somewhat comfortable relying on at-home test results to prescribe medication.³
- **Promote self-management of chronic disease using health apps:** Twenty-eight percent of consumers said they have a healthcare, wellness, or medical app on their mobile device, up from 16% last year. Roughly two-thirds of physicians said they would be willing to prescribe an app to help patients manage a chronic disease such as diabetes.

How healthcare executives envision care delivery in five years

“

We'll still have compassionate healers, but as executives more often establish the construct, this changes the nature of care.”

—Steve J. Stack, president-elect of the American Medical Association

“

One of the two most prominent technologies over the next five years will be using data analytics software to manage large volumes of data to start to predict patterns.”

—John Glaser, CEO, Siemens Healthcare

“

There will be more use of care extenders to deal with patients. This includes nurse practitioners, physician assistants, case managers, pharmacists, and non-licensed community health members.”

—Sam Ho, CMO, UnitedHealthcare

“

In five years, we'll have better population health tools that support anticipatory care.”

—Cris Ross, Mayo Clinic

“

By 2020, we will have a healthcare delivery system that is fully digitized. There will be the emergence of real-time analytics. Everybody wins from a patient care perspective with improved information sharing and interoperability.”

—Joseph Touey, GlaxoSmithKline

“

Patients will expect to see their data and this will drive more standards, which will in turn drive physicians to trust each other.”

—Paul Eddy, Walgreen Co

“

The big challenge for us in five years is going to be the level of acute services we can deliver in the home. This will mean fewer handoffs to home health and extending our acute care abilities.”

—Marc Probst, CIO, Intermountain Health

“

One thing we're focused on is how to leverage technology to take us back to a time when there was a stronger (or maybe closer) physician and patient relationship, but with all the benefits of the modern world.”

—Michael McGarry, Ascension Health



However, barriers in data sharing, privacy and security, workflows and payment fog the path ahead.

“We have a great deal of technology in all aspects of health care right now, but we’re not optimizing or sharing data across sites for transitions of care,” said Susan Turney, M.D., chief executive officer at Marshfield Clinic Health System in Wisconsin. “In my mind, it’s not what it is, it’s how it’s being used.”

Today the health sector faces a daunting new digital challenge: unleashing the power of technology to fundamentally reinvent how care is delivered. In the New Health Economy, digitally-enabled care is no longer a nice-to-have, but rather a fundamental business imperative.

The care models of yesterday are inadequate to satisfy growing industry and consumer expectations. Digital technologies are the underpinnings for creating new care models. But the next five years will be critical in making the leap from using these technologies as add-ons to making them fully integrated tools that will allow for lower cost care alternatives and create data-rich insights into real-time care delivery. Just as the banking and retail sectors use data and technology to improve efficiency, raise quality, and expand services, so too must the healthcare sector.

What this means for your business

After years of dating, it’s time for medicine and technology to marry. Healthcare companies should figure out how to harness mutual interests for mutual gain as they build care delivery models with patients—not patient encounters—at their center. The companies that will emerge as winners in this new marketplace will be those that can articulate how technology can add value, align incentives, strategically share and analyze data, and redeploy, extend and expand their workforce to embrace digital enablers.

- Understanding which digital health technologies both physicians and consumers value should shape digital *strategies*.
- Generating meaningful, actionable insights through analytics will focus *investments* and yield *better, faster results*.
- Figuring out what motivates both caregivers and consumers to adopt and continue to use digital technology is critical for *sustainability*.
- Rethinking the workforce and informing workflows will fuel the digital health *return on investment*.

An in-depth discussion

The care models of yesterday are inadequate to satisfy growing industry and consumer expectations. Today, almost everywhere they turn, physicians are feeling pressure to meet these expectations.

The healthcare delivery model of the future

Physicians today are feeling pressure almost everywhere they turn. How they are paid is increasingly based on how well they perform rather than how much. Face-to-face time with patients is decreasing. Differing state scope-of-practice laws for non-physician caregivers such as nurse practitioners, physician assistants, and pharmacists make it difficult for physicians to fully integrate those employees into their practices.

Electronic health records (EHRs)—while transformative in their own right—have not turned out to be a panacea for coordinating care or engaging patients more fully in their healthcare. Privacy and security concerns often stall efforts to share patient data outside the practice and stymie innovative technologies that can enable more efficient care.

Consumers, who are now paying more of the healthcare tab, are demanding transparency, convenience, and value. They are starting to vote with their feet in record numbers by opting for lower-cost, more convenient retail clinics.⁴

The care models of yesterday are inadequate to satisfy growing industry and consumer expectations.

Tomorrow's successful healthcare delivery models are expected to be:

- **Focused on the patient as a consumer.** Personalized, transparent, convenient, and on-demand, tomorrow's models will focus on customer experience and understanding patients in their everyday lives. Health systems will use customer relationship management technology to generate and manage demand.
- **Predictive and precise.** Analytics will enable caregivers to develop customized care plans for individuals, while also managing care for and improving the health of patient populations. Analytics will help caregivers identify high-risk patients and anticipate problems.
- **Integrated and transparent.** Health systems will migrate away from an environment of incentives built on charges, admissions, patient days and billing codes to one that focuses on consistent delivery of evidence-based care at the right time, in the right environment, using the right people.
- **Team-based.** Health systems will shift care from interaction among the patient and the physician to interaction among patients and a broader clinical team. They will disseminate superior

standards of care through a team-based operating model with clear roles and accountability based on clinical quality, clinical efficiency, patient satisfaction and financial performance.

They will use digital technology as a tool to design work processes and protocols that allow all clinicians to practice at the top of their license.

- **Sustainable.** Health systems will operate on a well-orchestrated system of care rather than one based on siloed clinical and administrative departments, achieving sustainability by integrating processes, technology, and people. They will transform clinical departments into broader business units focused on the consumer.
- **Quality-based and efficient.** Health systems will manage their financial health based on a new healthcare economy that supports different types of risk- and quality-based care models. They will tie quality measures to reimbursement, which will promote clinical expertise throughout the system of care.

Perceptions of digital technologies in healthcare delivery

To understand perceptions about the use of digital technologies in healthcare delivery, HRI conducted a survey of 1,000 primary care physicians, physicians specializing in chronic disease, and physician “extenders” (e.g., nurse practitioners and physician’s assistants). HRI also interviewed more than 25 industry professionals, including board and leadership members of the eHealth Initiative based in Washington, DC.

HRI found that there is room for digital technology to make clinicians more efficient caregivers. EHRs—while transformative in their own right—still face challenges. Only one-third of clinicians agree that EHRs have helped them see more patients. Just 40% agree that EHRs have improved their relationships with patients.

While EHRs have come a long way during the past five years—many now act as central data repositories for clinical and genomics data, information exchanges with other EHRs, and tools for performing basic analytics—industry professionals agree that they cannot stand alone.

A large opportunity exists for integrating EHRs with other databases and devices, such as those used for customer relationship management,

billing, research and development, and mobile health and analytics. Acting in concert, these tools can give caregivers a more complete portrait of patient care.

Access tools

It is a foregone conclusion that within the next five years, patients and clinicians will be connecting digitally for certain types of visits, yet adoption barriers exist. Sixty percent of clinicians surveyed by HRI cited decreasing face-to-face time with patients as an obstacle. Half of physicians and extenders said that digital visits, or e-visits, could free up capacity by replacing more than 10% of in-office patient visits. Another 37% believe that up to one-third of in-person encounters could be up for

grabs. Soon smartphone technology could be the primary means for initial contact with the healthcare system via video consult.

But there's work to be done. Only 15% of clinicians report that they currently offer telehealth services to patients with chronic conditions. While another 28% said they are considering such services, only half of physicians who are conducting e-visits are getting paid for at least some of them.

Even though clinicians are more aware of mobile health options, believe mobile health technologies have become more affordable, and feel that hospital leaders are more supportive of their use, little progress has been made regarding other barriers, as illustrated by the findings of an HRI clinician survey conducted four years ago.⁵ (See Figure 1.)

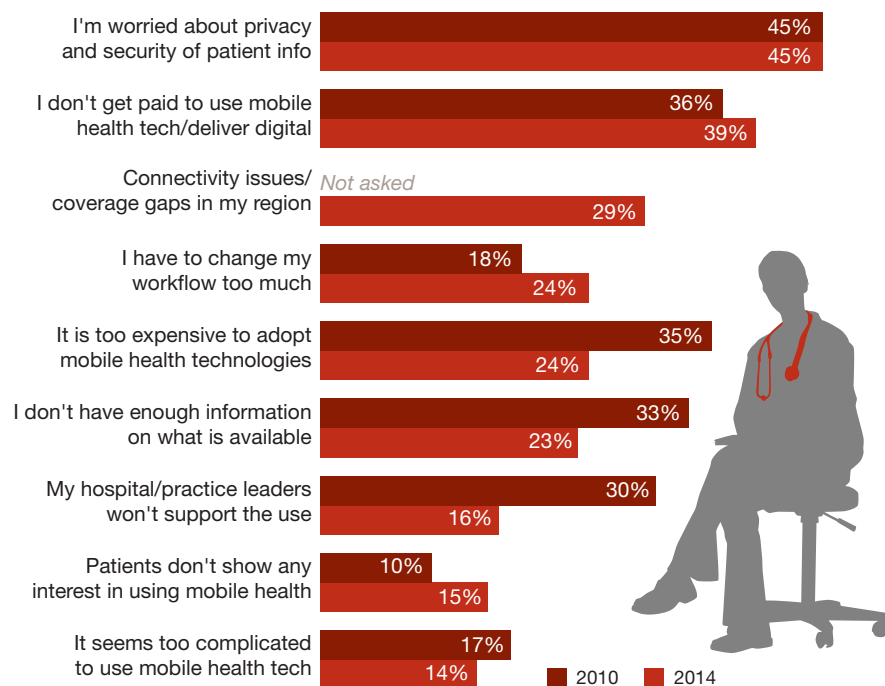
Another barrier to telehealth adoption is the limited ability of physicians to work across state lines. Responding to growing concerns about physician shortages, the Federation of State Medical Boards released an Interstate Physician Licensure Compact in September. The document increases license portability and promotes telehealth.

Workflow facilitators

During the past four years, providers have significantly increased the number of healthcare activities they perform using a smartphone or tablet, signifying a rapid movement to mobile platforms. (See Figure 2 on page 7.)

While physicians perceive EHRs as the most important technology today (and in five years), 81% agree mobile devices help caregivers work together

Figure 1: Privacy and payment concerns remain the top two barriers for provider adoption of mobile health



Source: 2014 HRI Clinician Workforce Survey and 2010 HRI Physician Survey

more effectively to coordinate a patient's care. Yet 35% of physicians still do not perform any activities on a mobile device, and few perform higher-impact activities, such as monitoring hospitalized patients. The potential exists for digital to become a widespread workforce multiplier and connector.⁶

Self-management tools

Industry attitudes regarding the impact of consumer health apps and do-it-yourself (DIY) home diagnostics are mixed, but growing clinician and consumer interest suggests these tools are here to stay.⁷ Today, 28% of consumers say they have a healthcare,

wellness, or medical app on their smartphone or tablet, up from 13% in 2012.⁸ Most consumers (80%) have only one or two apps that they use regularly, at least on a weekly basis.

While few physicians are prescribing them today, most say they are willing to prescribe a variety of apps for sleep monitoring, vitals monitoring, exercise/weight management, and chronic disease management. Roughly two-thirds of physicians and extenders told HRI that they would be willing to prescribe an app that would help patients manage a chronic disease, such as one that monitors blood sugar levels.

In fact, physicians are open to a variety of health apps even if they are not FDA-approved. Only 26% of physicians said that it was very important that mobile health apps have FDA approval. Overall they said it was more important that the app was recommended by a peer or written about in a peer-reviewed journal. A real pain point persists in the ability to identify worthy apps that have reliable clinical or consumer validation.

Health apps may be an effective kick-start to engaging patients in the pursuit of wellness and managing their own care. "Consumer mobile apps are not going to move the needle

Figure 2: Physicians report performing more healthcare activities on a mobile device during the last four years

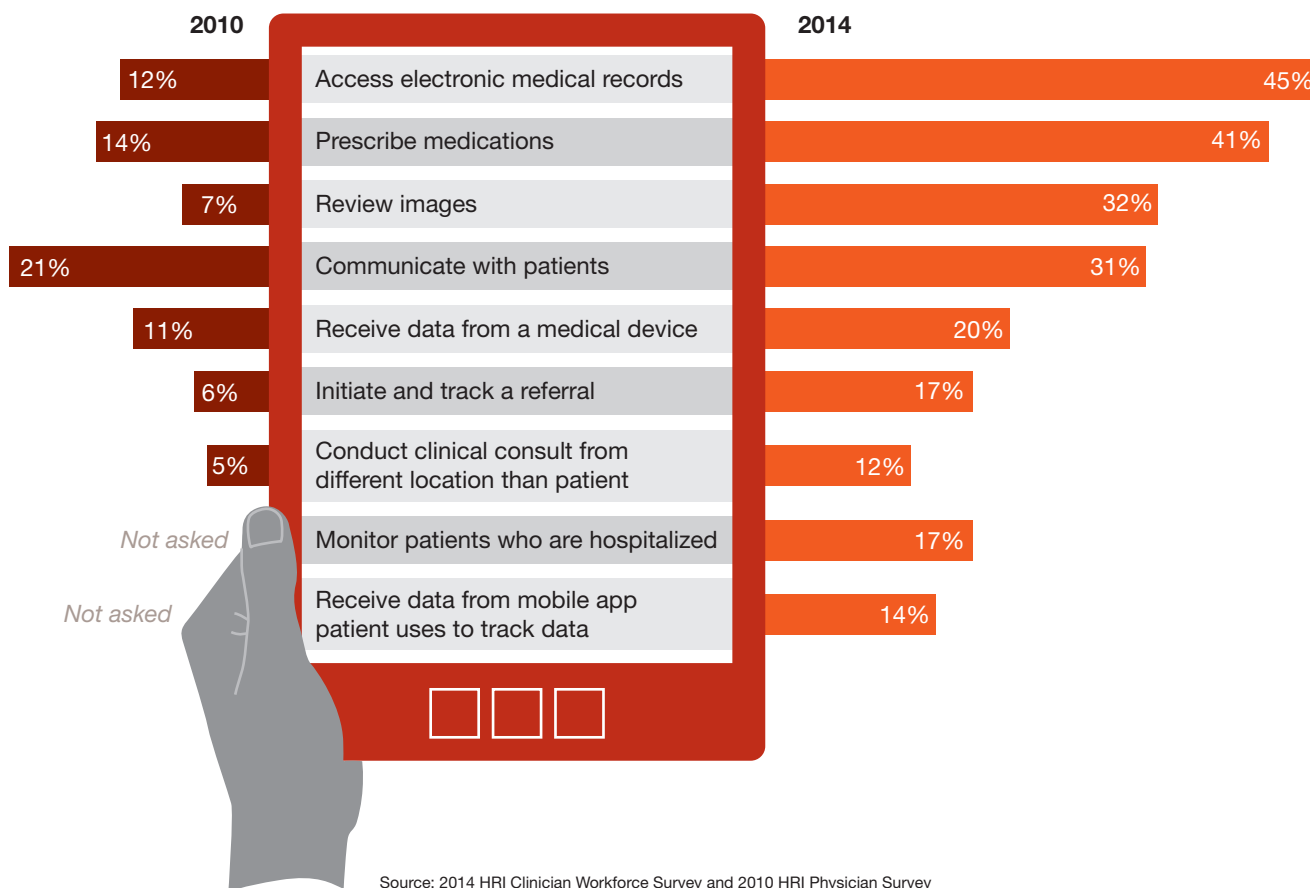
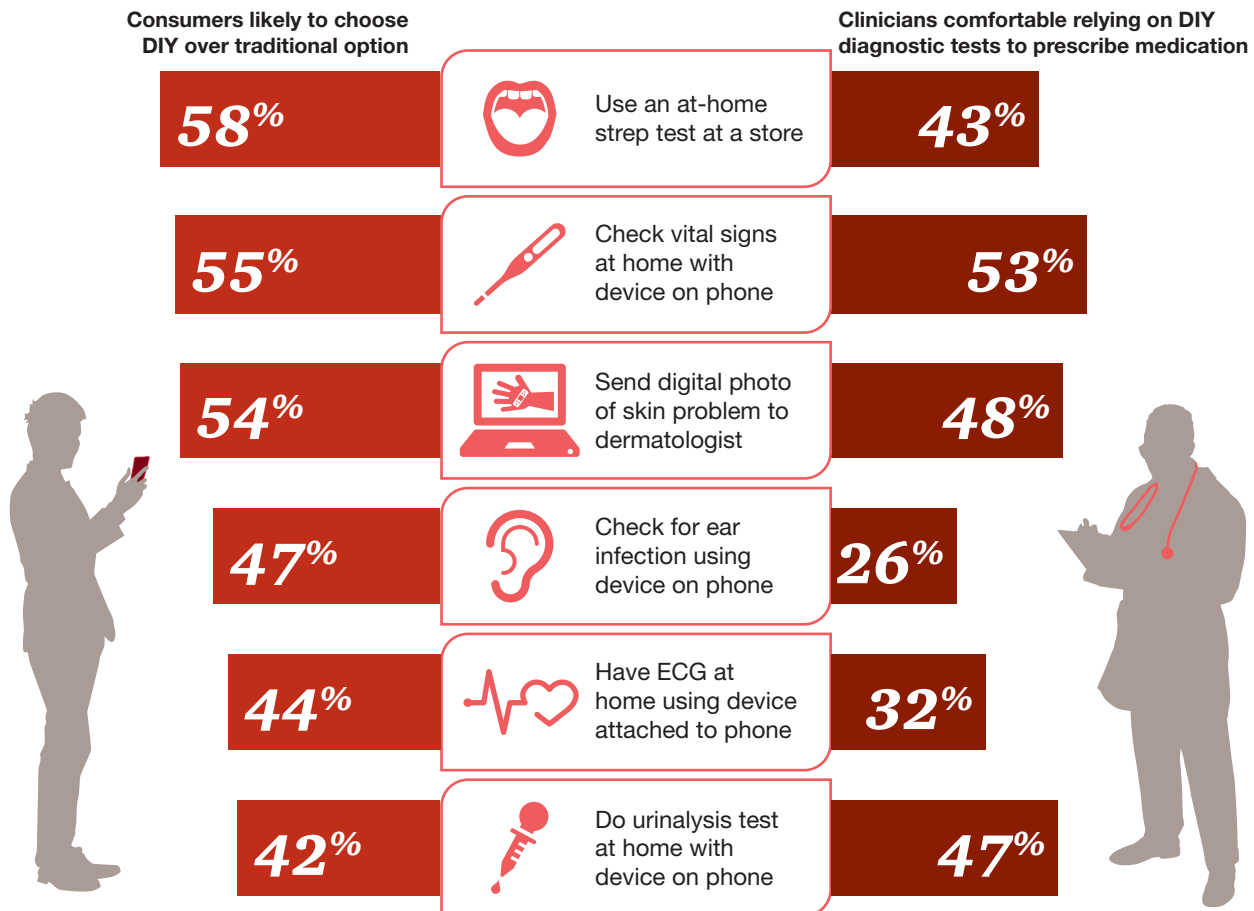


Figure 3: Clinicians and consumers likely to embrace “do-it-yourself” smartphone-enabled technologies



Source: 2014 HRI Clinician Workforce Survey and 2013 HRI Consumers Survey

on medical costs,” said John Glaser, chief executive officer at Siemens Medical Solutions. “But once you start seeing your own data, it might be a boost to how active you are in your care.”

Of the 40% of clinicians who monitor patient data generated by a mobile health app, medical device, or wearable technology, 83% find that doing so is at least somewhat helpful when making treatment decisions.

However, a lack of integration of this data with the patient’s electronic health record remains a bump in the workflow and an impediment to reducing cost. A 2013 West Health Institute study estimated that by connecting medical devices to EHRs the US health system could save \$30 billion per year by reducing clinician time spent manually entering information, adverse events, redundant testing, and length of stay due to information delays.⁹

Patient DIY diagnostic options are grabbing more attention.¹⁰ There is hope that these diagnostics, such as at-home strep tests and skin rash camera apps, could eliminate some traditional office visits. Depending on the type of diagnostic tool, 42% to 58% of consumers are willing to use DIY diagnostics for convenience, and 26% to 53% of clinicians are at least somewhat comfortable relying on data from these devices to prescribe medication without seeing the patient at all. (See Figure 3.)

Key findings and recommendations

1. Understanding which digital health technologies both physicians and consumers value should shape digital strategies.

Figure 4 (page 10) shows that physicians and consumers appear to be on the same page about many things digital. They believe digital technologies help caregivers work more as a team and increase patient-clinician interaction. Both are relatively comfortable with putting diagnostic testing of conditions such as strep throat, skin rashes, and urinary tract infections into the hands of patients at home, and they both recognize the efficacy of using health apps to self-manage chronic diseases.¹¹

Recommendations

- **Speak the same language:** It is important for healthcare companies to use well-defined, consistent terminology about digital health technologies as they start to pursue options with caregivers and patients.
- **Make patients aware of alternatives:** Following the 2013 Boston Marathon bombings, Massachusetts General Hospital (MGH) introduced telehealth to its burn service. The hospital routinely transfers patients to rehabilitation facilities in the area, but when patients need to be seen by a MGH physician for follow-up care, they are transported back to the hospital, which results in a missed day of rehab and a lot of unnecessary hassle. Using “Virtual Visits,” MGH

physicians now monitor patients remotely at Boston’s Spaulding Rehabilitation Hospital with an on-site registered nurse.

The 20-minute Virtual Visit is a favorable alternative to the day-long transport to and from MGH. Patients are very satisfied, especially once they understand the alternative. “Our team learned early on that it was important to set clear expectations with patients,” said Sarah Sossong, director of MGH TeleHealth.

“We learned from one dissatisfied patient that he had expected his MGH providers to commute to the rehab facility for his follow-up visits, not the other way around. Once he understood our Virtual Visit alternative, he was thrilled and called it a fantastic service.”

- **Promote “good” apps:** While many doctors say they would be willing to prescribe apps, a major challenge is knowing which of the 13,600 consumer health apps on the market are worth prescribing.¹² Ochsner Health System in New Orleans has started to integrate health apps into its clinical operation by having physicians write app prescriptions.

Earlier this year, the health system opened its own Apple-inspired “O Bar” to help patients choose from a curated selection of wearables and apps, said Richard Milani, MD, chief clinical transformation officer. Ochsner physicians can “prescribe” apps and wearables using mock prescription pads. So far, patients have downloaded 2,000 apps, mostly focused on

fitness, diet, and women’s health. Several hundred devices have been purchased, mainly blood pressure cuffs, glucose monitors, and fitness trackers. In the United Kingdom, Cambridge Healthcare has created its own apps formulary to guide caregivers.¹³

When evaluating a health app, healthcare companies should consider how well it:¹⁴

- Integrates with devices, electronic medical records, and other digital health tools
 - Gathers disparate sources of data in one place for patients and caregivers
 - Generates automated feedback and personalized health management recommendations for patients and caregivers
 - Reinforces good health behaviors through connections with social networks and communities
 - Measures outcomes and illustrates the effectiveness of treatment programs
 - Encourages patient to continue to participate by engaging them through gamification, incentives, and an easy user interface
- **Determine when digital interventions make the most sense:** Digital interventions should be targeted rather than broad-based. Before developing new clinical protocols, health systems should determine in which cases digital interventions are a better option to a traditional in-office visit based on the patient’s specific complaint or condition.

In a previous role with another health system, MGH’s Sossong set up a TeleDermatology program. A full time dermatologist reviewed

pictures sent from primary care providers and provided an online consult to the patient's local provider, with recommendations for treatment or referral to dermatology. Analysis of patient data over time showed that rashes and acne were particularly well suited for online consults, while suspicious moles were not. The takeaway for the team, Sossong said, was the importance of developing clinical protocols for digital interventions based on the patient's specific complaint or condition.

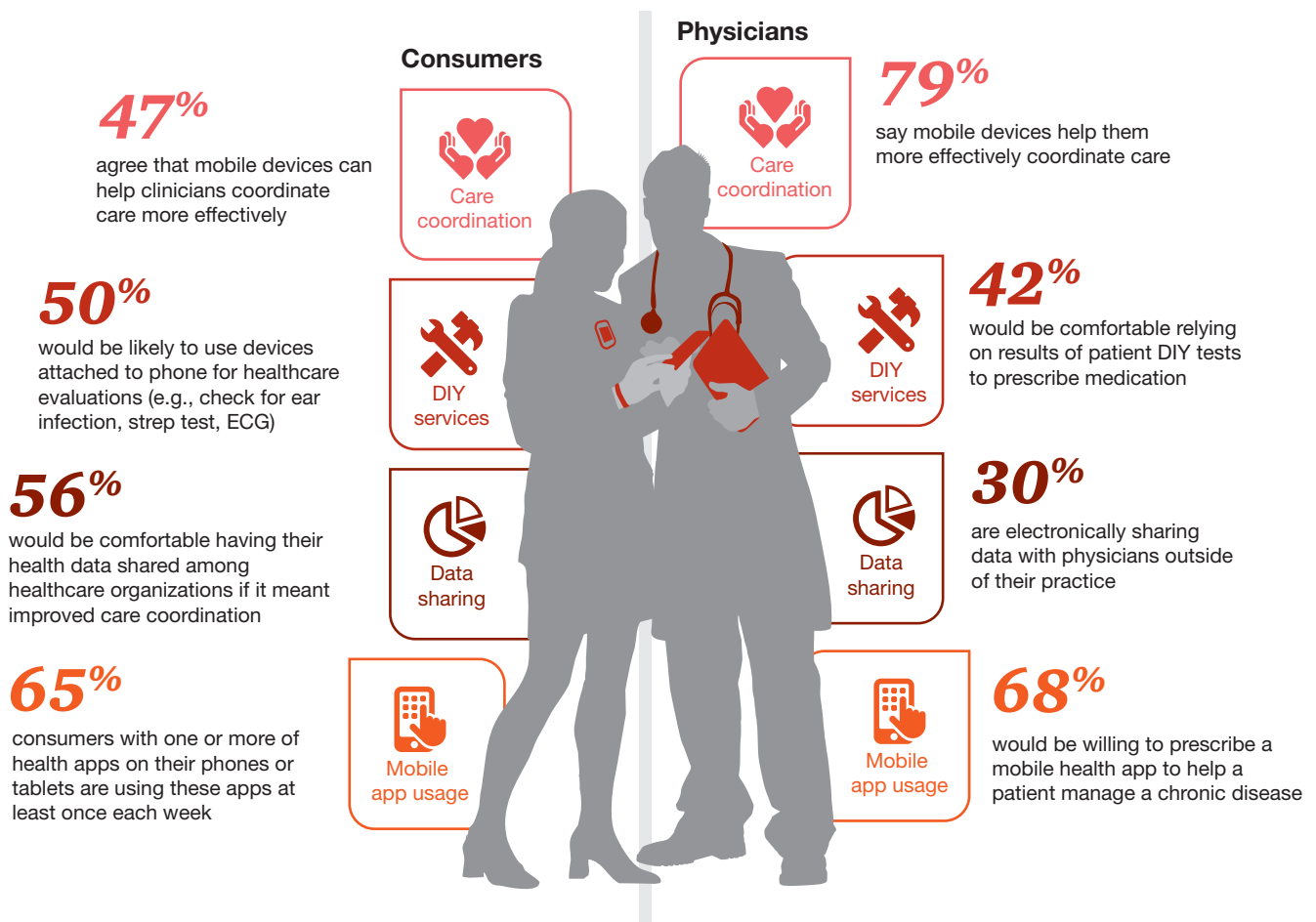
2. Figuring out what motivates both caregivers and consumers to adopt and continue to use digital technology is critical for sustainability.

As millions of Americans gain coverage under the Affordable Care Act, provider reimbursement is beginning to reward improved population health management and individual care management. The Centers for Medicare and Medicaid

Services (CMS) reported that some Medicare accountable care organizations collectively saved the health system \$372 million in 2013.

Beginning in January 2015, Medicare will pay providers \$42 per patient per month for managing individuals with two or more chronic conditions. The care must include remote monitoring and 24/7 patient access to a caregiver.¹⁵ The agency expects to spend \$3 billion on the program in the first year. Some private insurers have begun to follow suit.

Figure 4: Clinicians and consumers appear on the same page about many things digital



Source: 2014 HRI Clinician Workforce Survey and 2013 HRI Consumers Survey

The HRI survey found that providers participating in new payment models are heavier users of digital health technology than providers with more of their revenue based on traditional fee-for-service payments. Physicians who have more quality-of-care incentives or risk-based revenues are more likely to agree that EHRs improve the patient relationship and say that EHRs improve care coordination. These physicians are almost twice as likely to conduct e-visits and are more likely to rely on at-home monitoring.

For now, health systems continue to balance between a new, incentive-based world that rewards innovative, digital methods and the traditional fee-for-service world in which they lose money if they keep patients out of the hospital or clinic. It is in these providers' best interest to determine which financial and non-financial motivators attract patients and caregivers to digital health technologies and lead to their continued use.

Recommendations

- **Forge innovative payment contracts and show evidence that digital health technologies save insurers and employers money:** The goal of some major health systems is to rely less on insurers and contract directly with cities and large employers on innovative care and payment arrangements.¹⁶ One large health system in the Southwest has taken to market a new bundled care initiative in which it guarantees quality and price for certain conditions, including high-risk pregnancy.

The success of the bundled offering relies heavily on the health system's investment in analytics, EHR decision support, patient engagement tools, and mobile health. The health system's business model assumes that 25% of revenue will result from its mobile health approach in which many physicians have been put on salary instead of perverse fee-for-service incentives that reward volume over value.

- **Develop a behavior change program:** Patients and caregivers will never fully adopt promising technology unless healthcare companies have a program that enables, educates, supports, and guides individuals to embrace desired behavior.
- **Create patient incentives:** "Having access to your information is an incentive in itself," said Stan Huff, chief medical informatics officer at Intermountain Health in Salt Lake City. But Intermountain is also emphasizing the importance of patient involvement and embracing a shared accountability philosophy. The health system's 36,000 employees who are covered by SelectHealth—Intermountain's health plan—receive financial incentives for using the company's website to complete wellness surveys, according to Marc Probst, chief information officer. Participants can accumulate points-for-cash for wellness activities such as exercise.
- **Balance financial and non-financial incentives:** Financial incentives alone will not be enough to sustain the use of digital health tools. One healthcare organization is putting resources on the front end to promote patient adoption of digital technologies—like personal

health records. On the back end, they are looking at expanding the specialists' role into discharge planning to potentially support multiple physician practices.

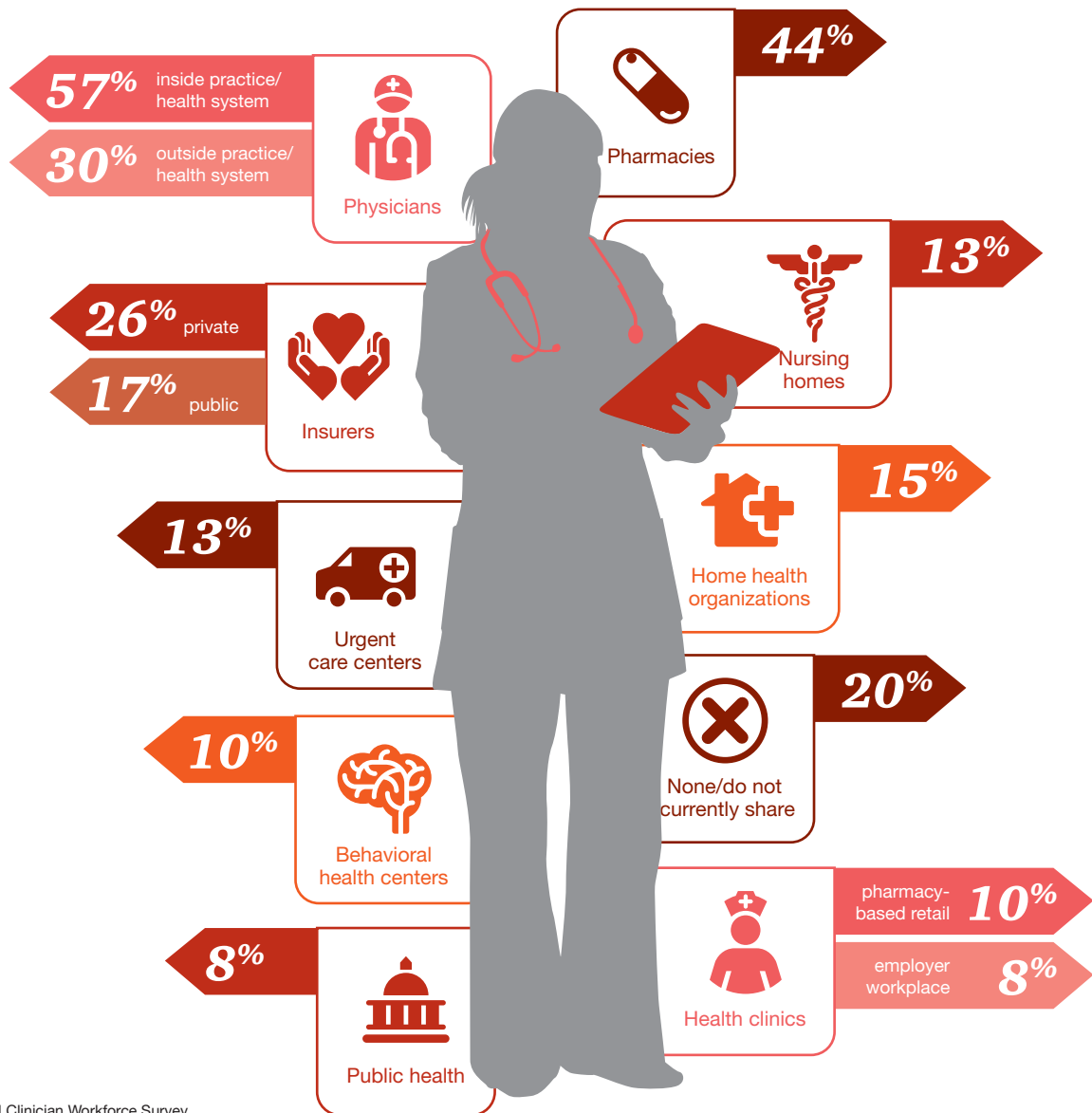
3. Generating meaningful, actionable insights through analytics will focus investments and yield better, faster results.

Healthcare executives view data mining and analysis as having the highest strategic importance during the next five years.¹⁷ Yet analytics do not appear to be top of mind among physicians. Only 17% of clinicians think predictive analytics are very important; 37% believe they will be in five years.

One reason may be that the network of caregivers is still largely disconnected. Health information exchanges (HIEs) that oversee and govern the exchange of electronic health information have yet to establish a sustainable business model. While there are now more than 200 HIEs across the US, the Agency for Healthcare Research and Quality reports that 74% have financial issues, mostly because they use disparate and largely incompatible technical approaches.¹⁸

Seventy percent of physicians and extenders HRI surveyed said they are not sharing information with caregivers outside of their practice—with the exception of pharmacists—to coordinate patient care. (See Figure 5.) Only 57% of clinicians say they currently share data within their own practice. Just 10%-15% are sharing data with community-based settings, such as home care, long-term care, or behavioral health.

Figure 5: Organizations with which providers electronically share data



Source: 2014 HRI Clinician Workforce Survey

“In the future, patients will expect to see their data, and this will drive more data standards, which will in turn drive physicians to exchange more information with each other,” said Paul Eddy, group vice president and chief information officer of business services and solutions at Walgreen Co.

According to HRI interviews, one of the most prominent digital approaches during the next five years will be

using analytics software to manage large volumes of data to predict patterns such as the likelihood of acquiring a disease or being admitted or readmitted to a hospital based on a variety of health, genetic, environmental, and social factors. Being able to merge information about a patient’s financial status, home life, and other social and environmental factors is essential for establishing a personalized care

approach and determining which digital interventions will work most effectively for that individual. By anticipating medical problems, healthcare companies can protect at-risk revenue.¹⁹

But being able to make an accurate prediction is not enough, according to Mark Smith, director of innovation at MedStar Health in Washington, DC. What health systems do with that

prediction, said Smith, will determine how effective they are at lowering cost, enhancing the quality of care, and improving care management.

One major health system in the Southwest has developed a service that combines predictive analytics technology and mobile tools to prevent patient readmissions for congestive heart failure patients—which can cost up to \$50,000. The system’s analytics tool alerts staff of a potential readmission so that they can send the patient home with a Bluetooth-enabled kit to monitor vital signs remotely—an approach that has reduced 30-day readmissions by 40%.²⁰

Recommendations

- **Listen to data signals:** “In five years, we’ll have better population health tools that support anticipatory care,” said Cris Ross, chief information officer at Mayo Clinic. Until then, healthcare companies can use fragmented data to start to build a picture of the patient as the technology improves. Companies such as Optum are capturing and using new but often incomplete data from sources such as EMHRs, clinical studies on specific groups of patients, and disease-specific registries.
- **Combine administrative and clinical data into one view:** “Physicians see huge value in having eligibility and benefits data during the visit because now they can have a frank conversation with the patient about how much it’s going to cost and propose alternatives,” said Russ Thomas, chief executive officer at Availity,

a technology company focused on information exchange between providers and health plans. “It gives them such flexibility to determine care strategy.”

- **Expand the data web with traditional and non-traditional health companies:** Healthcare companies need to expand their data sources and data-sharing relationships. “In the next five years, we’ll see more targeted relationships for specific purposes and diseases, locally-driven,” said Siemens’ Glaser. First, providers will need to define what success looks like and how to measure it. Then they should identify only those partners with whom they share complementary goals and mutually useful data.

This includes partners outside the traditional health system. For example, based on sophisticated mapping the health system did to identify geographic areas with high numbers of members with certain conditions, Kaiser Permanente has proposed to partner directly with the City of San Leandro, Calif., in a public health effort concerning air quality, according to Mike Holland, director of Kaiser Permanente’s Innovation Lab. As part of a proposed project, Kaiser Permanente would rely on information from the city’s environmental sensors and use its patient database to send text notifications to patients with pulmonary issues recommending that they stay indoors when air quality is expected to be poor.²¹

CVS Health is filling data gaps between retail care settings and health systems through its partnerships. For example, if a patient from a partner hospital seeks care at a MinuteClinic anywhere in country, the patient can consent to have his record sent to the health system.

Linking data from outputs in the community is critical—if patient information from a retail clinic data is viewed in context with a patient’s EHR, the primary caregiver may detect trends that require earlier intervention.

- **Own the insights:** Organizations should not be afraid to change course when they believe they are not getting enough value for the money invested. Data-sharing approaches at Intermountain Health have evolved during the past several years, according to Huff. He said that the health system decided it was more comfortable using the point-to-point HIE in Greater Salt Lake City as a conduit for other providers to request patient data from Intermountain rather than for Intermountain to send its patient data to the centralized database, accessible to any of the HIE’s data-sharing partners. This gave Intermountain more control over privacy and security and the ability to use its analytics know-how to serve community caregivers.

4. Rethinking the workforce and informing workflows will fuel the return on digital health investments.

With growing demands to synthesize information and coordinate care for patients, providers must tap technology and the entire workforce to truly reduce costs and improve quality. “Health systems need to get two things right—people and information,” said MedStar’s Smith. “If they do that, all else will follow.”

Industry experts agree that the health sector must completely rethink staffing based on technology. “There will be more use of care extenders to deal with patients,” said Sam Ho, chief medical officer at UnitedHealthcare. “This includes nurse practitioners, physician’s assistants, case managers, pharmacists, and non-licensed community health members.” A major goal of healthcare companies should be to use digital technology as a tool to design work processes and protocols that allow all clinicians to practice at the top of their license.

HRI found that, overall, physicians who hire more nurse practitioners or physician assistants appear to be ahead on digital adoption. (See Figure 6.)

However, these providers might still be missing opportunities to use extenders to learn more about patients and how to manage their care. While the majority of providers report that extenders have enabled them to see more patients and spend more time with sicker patients, only half believe extenders have enabled them to

better coordinate care across settings, and just one-third are using them to analyze more information about their patients.

The ability to improve critical thinking on the front lines will be key. But aside from a few measures, clinicians still practice medicine as an art rather than a science, as many of them perceive that too much data and too few algorithms can prevent them from quickly deciphering reams of raw data.

Recommendations

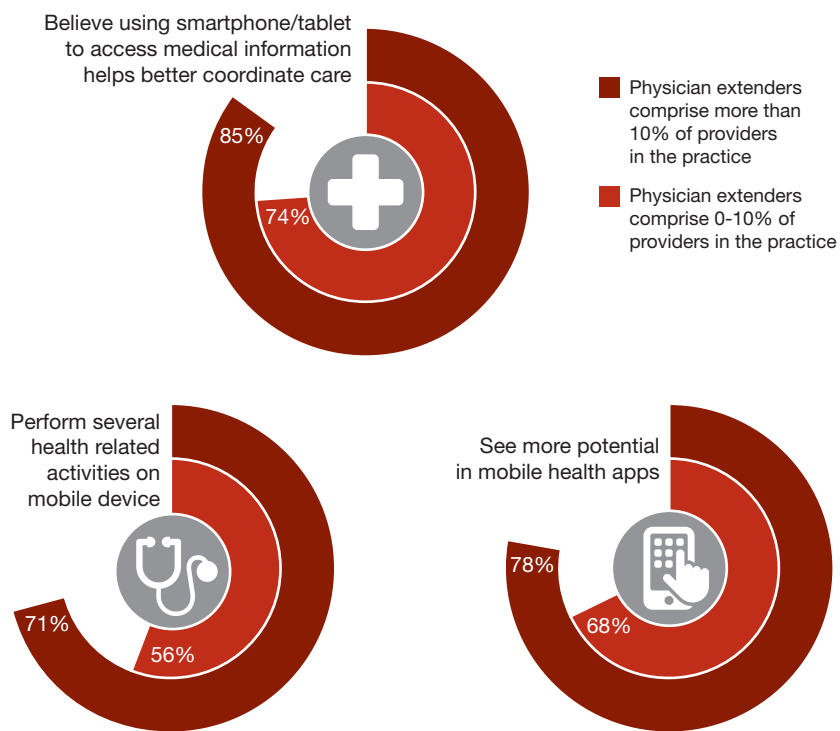
- **Design new workflows early on:** Healthcare companies must design new processes for the

care team alongside technology implementation—such as how to evaluate a patient’s skin condition via e-visit versus in the clinic, how data generated by an app on a patient’s medical device is incorporated into the patient’s record, and how to rely on community-based caregivers to support patients post-discharge.

Often, as has been the general case with EHRs, workflows are an afterthought and care teams are left to figure out how to force-fit new tools into old workflows. But companies such as Bon Secours Health System show that this doesn’t have to be the case.

Figure 6: Providers who are rethinking the workforce appear more technologically savvy²²

Providers who staff more extenders are more likely to...



Source: 2014 HRI Clinician Workforce Survey

“The last thing people need is 400 apps that confuse the patient even more,” said Leonard Lichtenfeld, deputy chief medical officer at the American Cancer Society.

Bon Secours developed their EHRs to accommodate team-based care from the start, reassigning roles and responsibilities to physicians, extenders, nurses, pharmacists, social workers, nutritionists, and others.²³ Much of the value of digital health tools comes from integrating them into the workflows of the broader care team and minimizing any disruption to the physician.

Healthcare companies also need new protocols for digital health. For example, companies that choose to embrace mobile health apps should have staff and processes in place to receive and respond to the deluge of data apps generate and know when to alert a physician. “The last thing people need is 400 apps that confuse the patient even more,” said Leonard Lichtenfeld, deputy chief medical officer at the American Cancer Society. “We have to figure out how these work in a way that they fit into a system of care. The development of apps alone is not sufficient. They can’t be stand-alone.”

- **Use information to extend the care delivery team:** Beyond modifying existing job descriptions, entirely new roles and responsibilities will emerge during the next five years as a result of the continuing evolution

of digital tools and information. UnitedHealthcare has started to collaborate with community health workers in “hotspots”—areas with high concentrations of members with chronic illnesses. “We’ve found that some of our members are in the same zip code, and yet one cohort of members is adhering and the others are not,” said Ho. “What’s the trick here? We are trying to connect them so that they can learn from each other.”

One organization developed a patient access center that transcends general appointment and surgery scheduling by predicting who is likely to need follow-up after discharge. For patients assigned to the health system’s accountable care organization, the center’s community-based care managers rely on data—both administrative and clinical—from the health system’s information exchange to ensure the right information is flowing to the right people at various patient care transitions.

Health systems should consider family caregivers a critical element of the extended care team. Their role in promoting the adoption of digital tools and sustaining their use should not be underestimated.

For example, when BJC HealthCare in St. Louis started offering its 27,000 employees an online personal health record several years ago, the health system quickly learned that its main users were not using it for themselves, but rather were tracking the health of dependents and elderly parents.²⁴ Especially when patients get sick, family caregivers are likely to be receptive to using online sites, videoconferencing, remote monitoring, and health apps to help manage their loved ones’ care when they are incapable of caring for themselves.

- **Teach through simulation:** Kaiser Permanente uses persona-based vignettes to start conversations with its employees and physicians on how technology and new care delivery models might change in the future. Such vignettes help Kaiser Permanente staff envision how they will treat members and how their jobs may change.

According to Holland, employees can follow “Marcus,” a college-educated, underemployed millennial looking for health insurance who may be open to lower-cost, custom-designed coverage that includes telehealth. Or, they might follow “Gina,” a pregnant woman who struggles to manage gestational diabetes.

Conclusion

Healthcare companies should help physicians and other caregivers make effective use of digital tools.

To survive in a New Health Economy that is demanding technologies to support measurable, value-driven care, healthcare companies should help physicians and other caregivers make effective use of digital tools to bridge the gap of time and distance between themselves and consumers. If they do not, they risk not being able to keep pace with changing consumer demands, maintain financial sustainability in an increasingly risk-based reimbursement world and effectively compete with new industry entrants that continue to gain traction.

Digital technologies are changing how companies innovate, interact and do business. Consumer industries such as retail, electronics

and telecommunications already use digital technologies to more closely connect to customers, better understand their needs and be more responsive.

For healthcare, the next five years will be critical in linking data generated by these technologies with data from traditional systems and integrating that information seamlessly into clinicians' everyday practice. Companies that have strategies that combine the right incentives, people, workflows, and data will emerge as leaders.

Endnotes

1. Centers for Medicare & Medicaid Services, Data and Program Reports: 2014, <http://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/DataAndReports.html> (accessed Oct. 13, 2014).
2. Medicare EHR Incentive Program. <http://dashboard.healthit.gov/quickstats/pages/FIG-Medicare-Professionals-Stage-One-Meaningful-Use-Attestation.html> (accessed Oct. 13, 2014).
3. PwC Health Research Institute, "Healthcare's new entrants: Who will be the industry's next Amazon.com?" April 2014. <http://pwchealth.com/cgi-local/hregister.cgi/reg/pwc-hri-new-entrants.pdf> (accessed Oct. 13, 2014).
4. PwC Health Research Institute, "Companies rethink their roles in the new health economy." December 2013. <http://www.pwc.com/us/en/health-industries/top-health-industry-issues/rethinking-roles.jhtml> (accessed Oct. 13, 2014).
5. PwC Health Research Institute, "Healthcare Unwired: New business models delivering care anywhere." September 2010. <http://pwchealth.com/cgi-local/hregister.cgi/reg/healthcare-unwired.pdf> (accessed Oct. 13, 2014).
6. PwC Health Research Institute, "Top Health Industry Issues of 2014." December 2013. http://www.pwc.com/en_US/us/health-industries/top-health-industry-issues/download.jhtml (accessed Oct. 13, 2014).
7. PwC Health Research Institute, "Health Wearables: Early Days." October 2014. (accessed October 21, 2014).
8. PwC Health Research Institute, "Top Health Industry Issues of 2013." January 2013.
9. The value of medical device interoperability: Improving patient care with more than \$30 billion in annual health care savings. West Health Institute, 2013. <http://docs.house.gov/meetings/IF/IF14/20130320/100535/HMTG-113-IF14-Wstate-SmithJ-20130320-SD001.pdf> (accessed Oct. 13, 2014).
10. PwC Health Research Institute, "Healthcare's new entrants: Who will be the industry's next Amazon.com?" April 2014. <http://pwchealth.com/cgi-local/hregister.cgi/reg/pwc-hri-new-entrants.pdf> (accessed Oct. 13, 2014).
11. PwC Health Research Institute, "Healthcare's new entrants: Who will be the industry's next Amazon.com?" April 2014. <http://pwchealth.com/cgi-local/hregister.cgi/reg/pwc-hri-new-entrants.pdf> (accessed Oct. 13, 2014).
12. Just launched: Our 2012 Consumer Health Apps Report. Mobihealth News, 2012. <http://mobihealthnews.com/17925/just-launched-our-2012-consumer-health-apps-report/>.
13. PwC, "Making care mobile, Introducing the apps pharmacy." April 2014. <http://read.ca.pwc.com/i/298503> (accessed Oct. 13, 2014).
14. PwC analysis.
15. Medicare to Start Paying Doctors Who Coordinate Needs of Chronically Ill Patients. New York Times, 2014. http://www.nytimes.com/2014/08/17/us/medicare-to-start-paying-doctors-who-coordinate-needs-of-chronically-ill-patients.html?smid=tw-nytimeshealth&seid=auto&_r=3# (accessed Oct. 13, 2014).
16. PwC Health Research Institute, "Medical cost trend 2015: Behind the numbers, PwC Health Research Institute." June 2014. <http://pwchealth.com/cgi-local/hregister.cgi/reg/pwc-hri-medical-cost-trend-2015.pdf> (accessed Oct. 13, 2014).
17. PwC, "The five behaviours that accelerate value from digital investments, 6th Annual Digital IQ Survey." March 2014. <http://read.pwc.com/i/283718> (accessed Oct. 13, 2014).
18. JASON, "A Robust Health Data Infrastructure." April 2014. http://healthit.gov/sites/default/files/ptp13-700hhs_white.pdf (accessed Oct. 13, 2014).
19. PwC Health Research Institute, "Data-driven progress: As informatics evolves, clinicians find ways to stay ahead of illness and revamp care delivery." May 2014. <http://www.pwc.com/us/en/health-industries/assets/pwc-hri-himss-report.pdf> (accessed Oct. 13, 2014).
20. HRI health system interview conducted Jul. 30, 2014.
21. "Connecting People to a Healthy Future." YouTube video, 3:50. Posted by "Kaiserpermanenteorg," August 17, 2012. <http://www.youtube.com/watch?v=gxz9ZVvduGc>.
22. PwC Health Research Institute, "Data-driven progress: As informatics evolves, clinicians find ways to stay ahead of illness and revamp care delivery." May 2014. <http://www.pwc.com/us/en/health-industries/assets/pwc-hri-himss-report.pdf> (accessed Oct. 13, 2014).
23. "Providers reporting that physician extenders represent 11% or more of the providers in the practice."
24. PwC Health Research Institute, "Putting patients into "meaningful use." <http://e-patients.net/u/2011/02/PH-11-0101-Putting-the-patients-into-meaningful-use-PwC.pdf> (accessed Oct. 13, 2014).

Acknowledgments

Jennifer Covich Bordenick
eHealth Initiative

Karen DeSalvo, MD
National Coordinator for Health
Information Technology Acting
Assistant Secretary for Health

Paul Eddy
Walgreen Company

Janine Gesek
Virtua Health

John Geyer
MetLife

John Glaser, PhD
Siemens Medical Solutions

Sam Ho, MD
UnitedHealthcare

Mike Holland
Kaiser Permanente

Stan Huff, MD
Intermountain Health

Leonard Lichtenfeld, MD
American Cancer Society

Erin Mackay
National Partnership for Women
and Families

Edward Marx
Texas Health Resources

Michael McGarry
Ascension Health

Richard Milani, MD
Ochsner Health System

James Murray
CVS Health

Marc Probst
Intermountain Health

Cris Ross, MD
Mayo Clinic

Mark Savage
National Partnership for Women
and Families

Lee Schwamm, MD
Massachusetts General Hospital

Mark Smith, MD
MedStar Health

Sarah Sossong
Massachusetts General Hospital

Steven Stack, MD
American Medical Association

Russ Thomas
Availity

Joseph Touey
GlaxoSmithKline

Susan Turney, MD
Marshfield Clinic Health System

About the PwC network

PwC helps organizations and individuals create the value they're looking for. We're a network of firms in 158 countries with more than 180,000 people who are committed to delivering quality in assurance, tax and advisory services. Tell us what matters to you and find out more by visiting us at www.pwc.com. PwC refers to the PwC network and/or one or more of its member firms, each of which is a separate legal entity. Please see www.pwc.com/structure for further details.

About the PwC Health Research Institute

PwC's Health Research Institute (HRI) provides new intelligence, perspectives, and analysis on trends affecting all health related industries. The Health Research Institute helps executive decision makers navigate change through primary research and collaborative exchange. Our views are shaped by a network of professionals with executive and day-to-day experience in the health industry. HRI research is independent and not sponsored by businesses, government or other institutions.

Health Research Institute

Kelly Barnes

Partner
Health Industries Leader
kelly.a.barnes@us.pwc.com
(214) 754-5172

Ceci Connolly

HRI Managing Director
ceci.connolly@us.pwc.com
(202) 312-7910

Trine Tsouderos

Director
trine.k.tsouderos@us.pwc.com
(312) 298-3038

Ben Comer

Senior Manager
benjamin.comer@us.pwc.com
(919) 791-4139

Sarah Haflett

Senior Manager
sarah.e.haflett@us.pwc.com
(267) 330-1654

Melanie Dunn

Research Analyst
melanie.a.dunn@us.pwc.com
(646) 471-4974

Neeta Dhawan

Research Analyst
neeta.dhawan@us.pwc.com
(617) 530-4351

HRI Regulatory Center

Benjamin Isgur

Director
benjamin.isgur@us.pwc.com
(214) 754-5091

Bobby Clark

Senior Manager
robert.j.clark@us.pwc.com
(202) 312-7947

Matthew DoBias

Senior Manager
matthew.r.dobias@us.pwc.com
(202) 312-7946

Caitlin Sweany

Senior Manager
caitlin.sweany@us.pwc.com
(202) 346-5241

HRI Report Advisory Team

Charlie Anastos

Anwasha Dutta

Daniel Garrett

Kulleni Gebreyes

Simon Samaha

Christopher Wasden

Additional contributors

Dave Chin

John Edwards

Serena Foong

Jeff Gruen

Shephalie Lahri

Karen Montgomery

Catherine Tronni

Carol Wells

Nadia Leather

To have a deeper conversation
about how this subject may affect
your business, please contact:

Daniel Garret

Principal, Health Information
Technology Practice Leader
daniel.garrett@us.pwc.com
(267) 330-8202

Charlie Anastos

Principal
charles.anastos@us.pwc.com
(617) 530-5031

Simon Samaha, MD

Principal
simon.samaha@us.pwc.com
(908) 347-3054

Ceci Connolly

HRI Managing Director
ceci.connolly@us.pwc.com
(202) 312-7910

www.pwc.com

www.pwc.com/us/healthindustries

www.pwc.com/hri

twitter.com/PwCHealth