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Volume 32, Number 1

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¹National Center for Health Statistics, *Use and Characteristics of Electronic Health Record Systems Among Office-based Physician Practices: United States, 2001–2013*, January 2014

²Gartner, *Business Process Management Summit 2013*, February 2013

³IDC, *Bigger Data for Better Healthcare*, September 2013

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As the industry continues to transform itself into what's commonly known as "the new healthcare," it's becoming increasingly difficult to distinguish between the intersecting and sometimes overlapping forces driving those changes. This year's annual Top Ten Tech Trends package provides guidance from healthcare leaders who give their perspectives on the policy, industry and technology trends changing the face of healthcare.

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The LEGO Solution

Who will have the agility to master the new healthcare environment? The case for embracing change



Mark Hagland

I've been reading the recently published book by Stephen R. Covey, author of "The 7 Habits of Highly Effective People," and several other books on success, personal development, and business management. "The 2011 book, *The 3rd Alternative: Solving Life's Most Difficult Problems*," focuses strongly on cooperation and conflict resolution.

One section, "Teaming Without Frontiers," in the chapter, "The 3rd Alternative at Work," particularly caught my attention. Covey writes, "One of the great things about our high-tech century is that complementary teams know no boundaries. Groups can synergize in ways undreamed of only a few years ago... A wonderful example is LEGO, the Danish toymaker that is often called the most trusted company in the world. LEGO counts its millions of customers as an active part of a complementary team. How would you react if customers secretly began hacking into your company's computers?" Covey asks. "Call the police, right? When this happened to LEGO, they reacted with dismay, just as anyone would. But then they asked themselves, 'Why would customers do this?' And being the LEGO company, they became fascinated with the question and tried Talking Stick communication with the culprits."

As Covey further writes, "When they talked to the hackers, they found they were LEGO fans who wanted to build their own creations. The hackers had broken in so they could go around the company's inventory system and order individual parts that normally came packaged with other parts."

As a result, LEGO's director of community development, Tormod Askildsen, led a change process that led to a new policy and process that allowed LEGO fans to create new LEGO designs and to share those designs with other customers, ultimately creating "hundreds of thousands of ideas for new products that the LEGO firm never has to develop." Askildsen calls it a "platform for LEGO in the twenty-first century."

In other words, once LEGO executives figured out what had happened, they developed a process-based solution that addressed the real needs of the company and its customers. As Covey puts it with regard to what barriers in today's global business environment, "The only walls standing in our way are cultural walls, and some great organizations are working hard to raze those walls as well."

The idea that cultural change remains one of the core obstacles to process transformation in business organizations is particularly tantalizing when one applies such questions to healthcare. As many know, the healthcare industry, after decades of being a laggard compared to other industries, is now in the midst of transformative change. Yet cultural obstacles to change—including old medieval guild-like notions of how clinicians and other healthcare professionals should interact, old forms of departmental and institutional territoriality, and above all, simple inertia—remain in healthcare organizations nationwide.

Fortunately, the trendlines towards change are clear everywhere. It is exciting for us, the editors of *Healthcare Informatics*, to bring to you our readers the *Healthcare Informatics Top 10 Tech Trends for 2015* (pp. 8-28). As always, we've spoken with true industry leaders, and have carefully sifted through a plethora of shifting landscapes and influences, to bring you this year's selections.

The question, for the leaders of hospitals, medical groups, integrated health systems, accountable care organizations, health plans, health information exchanges, and public health agencies, remains clear: will the leaders of healthcare organizations be able to overcome old patterns and cultural inertia, and move into the future of healthcare? Let's hope the answer is yes—not only for healthcare organizations themselves, but especially for patients and communities.

A handwritten signature in black ink, appearing to read "Mark H. Hagland".

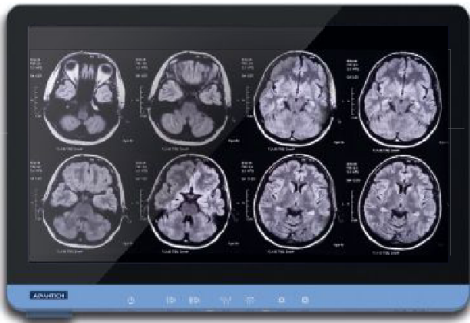
Mark Hagland
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HCI's Top 10

**TECH TRENDS 2015:
PARSING THE SWIRL**





Will health information exchanges, as a class, survive the present moment of instability? Will the ongoing advances in wearable device technology lead to a blooming of patient-generated data for care management? Will patient care organizations develop comprehensively successful strategies that make doctors truly mobile in their day-to-day practices? Will hospitals, large medical groups, and integrated health systems be able to find and cultivate the clinical informaticists leaders they need in order to move to the next level of clinical transformation? Will FHIR really “catch on” as a transformational interoperability standard? Will hospitals and other providers really be able to master the readmissions challenge—and will they be able to regularly successfully document care transitions?

These are just a few of the countless pressing questions facing the leaders of patient care organizations across the U.S.—and internationally—as the healthcare system grinds forward, pushed by policy, regulatory, and reimbursement mandates, buffeted by macroeconomic and business trends, and assisted by rapid technological advances.

Indeed, the reality is that as we grope our way forward towards what we at *Healthcare Informatics* are increasingly calling simply “the new healthcare”—a healthcare delivery and payment system refocused on care quality, patient safety, efficiency, cost-effectiveness, accountability, transparency, and population health—all the various trends affecting you, our audience, are becoming more and more interconnected, and in many cases, messily overlap.

In other words, more and more, separating one trendline from another is becoming an increasingly tricky business. Nonetheless, it’s up to journalists like us to help separate and articulate the various intersecting and overlapping trends, and it is in that context that we offer you, our readers, our Top Ten Tech Trends for 2015. In the following pages, you will find ten articles looking at some of the most important trends now emerging in healthcare. Each of the ten trends has its own significance—and urgency; together, they help paint a portrait of the landscape in U.S. healthcare at a time of fundamental change and intensifying activity.

We hope this package of articles will intrigue you, engage you, and support you, our readers. Enjoy!

—The Editors of *Healthcare Informatics*





Trend: Interoperability and Policy

SETTING THE ROADMAP ON FHIR

As the private sector coalesces around HL7's draft standard, what is the role of ONC and meaningful use? **BY DAVID RATHS**

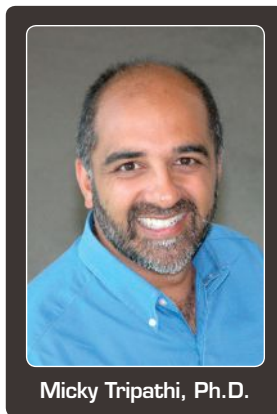
Last year, *Healthcare Informatics* made the HL7 draft standard Fast Healthcare Interoperability Resources (FHIR) one of our Top 10 Tech Trends to watch (www.healthcare-informatics.com/article/top-ten-tech-trends-catching-fhir).

This year, interoperability is the first topic of conversation wherever CIOs and CMIOs gather, and FHIR is now at the center of the discussion. Standards developers may be used to people ignoring their work, but suddenly they are in the spotlight. At this year's American Medical Informatics Association conference in Washington, D.C., the sessions on FHIR and public application programming interfaces (APIs) were standing-room-only.

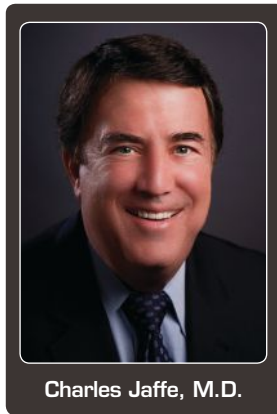
With so many provider organizations struggling with Stage 2 of meaningful use, observers are wondering what role the Office of the National Coordinator for Health IT (ONC) will play in standards development and promotion. Some have suggested that ONC "declare victory" with meaningful use and move on or narrow the focus of Stage 3 to interoperability issues alone.

One person at the center of the "FHIR storm" in terms of what the draft standard could mean to policy development and regulation is Micky Tripathi, Ph.D., president and CEO of the Massachusetts eHealth Collaborative (MAeHC). He co-chaired the ONC's JASON Report Task Force and chairs the Policy Committee's Interoperability and Health Information Exchange Workgroup as it makes recommendations on ONC's 10-year interoperability roadmap. MAeHC is taking the project management role on HL7's Argonaut Project to accelerate FHIR's development and adoption.

Tripathi says that ONC might be at a turning point. "We have to recognize, as we turn the corner from Stage 2 to Stage 3 on the interoperability side, that we are starting to see some developments happening in the private sector, and it raises the



Micky Tripathi, Ph.D.



Charles Jaffe, M.D.

question of whether the federal government needs to play a role anymore," he says. "Are we at a point where the market could actually pick it up and play the lead role? There is a strong sense in the industry that we are at that point."

There's one key question the Interoperability Work Group is posing to ONC about the roadmap under development, and it gets to a larger issue about the future role of ONC itself in interoperability. "Is it just going to describe what is happening in the marketplace?" Tripathi asks, "Or if it is going to be prescriptive, with what authority and incentives are you going to be prescriptive? We have to understand the role ONC imagines playing."

He stresses that it is valuable to create a roadmap and ONC is the right organization to set goals, but he added that any time you start talking about 10 years, things tend to get highly speculative. "In our workgroup, we've said let's just talk about the next three years. Beyond that, it is anyone's guess."

HL7 CEO Charles Jaffe, M.D., Ph.D., agrees with Tripathi that planning for 10 years out is too difficult, beyond setting an ultimate goal. He stresses the significance of the Argonaut Project, in which several leading EHR vendors, including Epic and Cerner, and some integrated health systems such as Intermountain Health, have put their financial support behind FHIR development. "I think you

can tell from the landscape that the private sector has taken the initiative to develop some of its own pathways to interoperability," he says. "And I think even for the most optimistic of us, it will not be a big bang, where one day we didn't have interoperability and the next day we did. It will come in stutter steps and great leaps; and I think some of the things going on now are great leaps."

Speaking at a November webinar panel discussion on interoperability issues, John Halamka, M.D., CIO at Beth Israel Deaconess Medical Center and co-chair of the HIT Standards Committee, said the industry needs more than standards; it needs an

ecosystem and a coordinated architecture. “It’s not sufficient that every EHR [electronic health record] simply have an API,” he said. “In the JASON Task Force report, they propose a data-sharing network or arrangement with the notion of a trust fabric determining who can get access to data.”

Halamka explained that consolidated clinical document architecture (CCDA) and Direct messages send packages of data, but that just pushing data is insufficient. It is difficult to parse CCDA and write back to data structures. The industry needs to be able to pull discrete data and write back, and an API approach allows that. The other key, he said, is to avoid a single top-down approach. If we create a federation of loosely coupled data sources, APIs would allow them to be linked, he said. Entrepreneurs could create new apps and modules. Patients could download data from everywhere they are treated. “Epic has created its Care Everywhere network. Great—use the ecosystem as a way to leverage what we already have and knit them together,” he said. “Federated and coordinated and distributed.”

In the same panel discussion, Arien Malec, vice president for data platform and acquisition tools at Relay Health, calls the interest in FHIR unprecedented. “I don’t think I’ve seen anything that has received this much attention from folks at HL7 in the last decade,” he said.



John Halamka, M.D.



Arien Malec

WE HAVE TO RECOGNIZE, AS WE TURN THE CORNER FROM STAGE 2 TO STAGE 3 ON THE INTEROPERABILITY SIDE, THAT WE ARE STARTING TO SEE SOME DEVELOPMENTS HAPPENING IN THE PRIVATE SECTOR, AND IT RAISES THE QUESTION OF WHETHER THE FEDERAL GOVERNMENT NEEDS TO PLAY A ROLE ANYMORE. —MICKY TRIPATHI, Ph.D.

David Minch, president and board chair of the nonprofit California Association of HIEs (CAHIE), recommends moving from second-generation data exchange protocols and content packaging, which have reinforced “walled garden” approaches, toward open APIs, simple content packaging, and

Internet-appropriate protocols (FHIR). He also suggests that rather than focusing on policy levers that establish governance mechanisms for health information exchange, ONC should support the development of technical standards and especially concise and explicit reference implementations of the standards.

Minch says he knows how strongly National Coordinator for Health Information Technology Karen DeSalvo, M.D., feels about the importance of interoperability, “But if we continue business as usual, this whole roadmap exercise is just one more self-flagellation about moving things forward, even though we are staying in place,” he says. “She can make a tremendous impact on ONC in terms of changing its trajectory, but it is going to take standing up to the vendor community. Just a little bit of backbone goes a long way.”

Tripathi says some people have expressed concerns that the JASON Report Task Force was suggesting dropping everything else going on to focus on something that hasn’t even been tested in the marketplace yet. “That is not what we said. It is an evolving market, with lots of

ways of doing things, and they will persist and people should keep doing those,” he says. “But the current approaches are structurally limited, and they are not going to get us to the next level. We have got to work toward getting there.”



Trend: Security

FOR HEALTHCARE ORGANIZATIONS, THE HACKERS ARE HERE

With hackers targeting healthcare organizations, data breaches are no longer limited to a forgotten USB drive or a stolen computer **BY GABRIEL PERNA**

Easter weekend is one of the craziest three-day stretches in the calendar year in Boston, which made the hack against Boston Children's Hospital all the more difficult.

The Easter/President's Day/Marathon Monday trifecta in Boston makes that weekend already very stressful, but in 2014 especially so with it being the one-year anniversary of the Marathon bombing. Luckily, for Boston Children's, a 395-bed facility, IT leaders had time to prepare for the hack.

According to Paul Scheib, chief information security officer (CISO) at Boston Children's, the hospital found out about the potential attack in mid-March. People who claimed to be representing the hacktivist collective known as Anonymous had posted threats to Boston Children's on PasteBin because of a controversial child custody case going on in the hospital.

Despite the prior knowledge, the distributed denial-of-service (DDoS) attack put Boston Children's up against the metaphorical wall on Easter weekend. "At some point, I think Sunday, the levels [of attack] increased to such a significant level that it basically congested all of the Internet circuits coming into the hospital and the greater Harvard [Medical School] community. We get Internet access through Harvard, as does many of the Harvard affiliated hospitals. It was this bleed-over effect with other large Boston hospitals feeling the impact of the DDoS attack," Scheib recalls.

The hack made life incredibly difficult at Boston Children's, recalls Scheib. Internet-related activity, such as ePrescribing and transitions-of-care information sharing, suffered. Also, the hospital was forced to take down its email system as well as patient and physician portals for a period of time. The attack forced the hospital to put in place several workarounds and harken back to older processes.



Paul Scheib



Dan Berger

"It tests your ability to respond to an incident and [figure out] what communications is required within your organization to ensure that business as usual can continue," says Scheib.

GROWING THREAT

Whether it's "activism" hacks or cyber criminals looking to gain access to valuable information, healthcare organizations like Boston Children's are living in a new world, where these kinds of threats are very real and no one is safe. No longer is a data breach limited to a forgotten USB drive or a stolen computer. Threats to data security are now coming from hackers, who in turn, could be coming all the way from China, as the Franklin, Tenn.-based large hospital chain, Community Health Systems, found out.

Along with Boston Children's, attacks against Community Health and the Healthcare.gov website were two other notable hacks in 2014, but this is a growing industrywide problem, says Dan Berger, CEO of the Carpinteria, Calif.-based RedSpin, a data security testing provider. "It was only a matter of time before there was so much electronic health data for an organized group of hackers or even a lone wolf hacker to go after," he says.

According to an annual report from the Ponemon Institute, the Traverse City, Mich.-based consulting firm, the percentage of healthcare organizations that have reported a cyber attack has doubled in the last five years, from 20 to 40 percent. The hacking threat has become such a problem that this past summer, the Federal Bureau of Investigation sent multiple warnings to healthcare organizations saying they were at risk.

Jeremy Molnar, vice president of technical compliance services at CynergisTek, an Austin, Texas-based consulting firm, notes that the amount hackers could see medical records for on the open market is only going to increase over time. Berger



adds that unlike a credit card, which can be changed, a medical record is permanent and has many avenues in which hackers can exploit for fraud.

Moreover, Chris Van Pelt, principal in the healthcare IT practice at PricewaterhouseCoopers Advisory LLC, told *HCI* that healthcare organizations may find themselves in the crosshairs of foreign governments and other crime syndicates looking to gain intellectual property; similar to what happened with Community Health. “These criminals and governments are coming at anything they can get access to. Water seeks its own level, and they’re going to access anything they can. So frankly, whatever size patient care organization you are, they’re coming after you,” says Van Pelt.

BE PREPARED

At the height of the crisis over the Easter Weekend at Boston Children’s Hospital, Scheib’s team decided to divert traffic to a third-party vendor’s offsite service that filtered out the DDoS attacks. That allowed them to resume normal operations the next day.

After the DDoS attacks died down, the hackers began targeting the organization through phishing emails and application-level attacks. To counter this, the hospital put into place application-level firewalling and brought down its email for a time. This went on for about a week until someone, also claiming to be associated with Anonymous, essentially told the hackers to back off.

Phishing attacks are a whole new ball game, notes Scheib. Recently, the UC Davis Health System notified 1,800 patients of a phishing scam that compromised three physicians’ email accounts. Dothan-based Southeast Alabama Medical Center (SAMC), a 400-bed community facility serving Southeastern Alabama and portions of the Florida panhandle, has taken a multi-layered approach to safeguarding data against phishing scams. The organization has invested in advanced email filtering technologies to block unwanted messages and keep its system free of adware, spyware and viruses.

Similarly, Boston Children’s has looked at technologies to help block phishing attacks but overall, Scheib admits because of human nature it’s difficult to stop. “No matter how much you train, people will click on a link by accident, not knowing what it’s unintended for. We’ve done a lot of training and raised awareness on it, but by no means is it never going to happen,” he says.

Organizations must prepare, and risk and gap analyses are vital, say Molnar and Berger. So is being annoying: “You’ve got to scream, yell, and basically be a pain in the neck in the executive suite. Security in healthcare is not just the domain of IT, it extends to everyone in the organization,” says Berger.

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Trend: Public Health

MAKING SENSE OF AN ONSLAUGHT OF DATA

Finding relevant data at the local level and building bridges to clinical care requires a nuanced approach **BY JOHN DEGASPARI**

Historically, public health has been viewed as something of a poor stepchild when it comes to the billions of dollars in investments that have been aimed at transforming clinical care. Public health funding continues to be an issue, and the capabilities of local public health departments vary widely.

In fact, that is a problem even in the largest urban local health departments, according to a paper in the January issue of the *Journal of Public Health Practice*. According to a survey of 45 public health leaders in 16 large urban public health departments, timely information and data on chronic disease that are available in smaller geographic units are still difficult to obtain. Technology such as electronic health records (EHRs), claims data and hospital discharge data, was cited as useful data sources, but fewer than half of local health departments polled used systems that collected or disseminated data from EHRs or health information exchange.

The question is: Has the time arrived for public health to benefit from the technological transformations that are benefitting clinical acute care, and what are the barriers that stand in the way of data sharing that will enable a better partnership between public health and clinical care? In interviews, several public health experts give a qualified “yes.”

BRIDGING THE INFRASTRUCTURE GAP

Brian Lee is chief public health informatics officer, Office of Public Health Scientific Services, of the Centers for Disease Control and Prevention (CDC) in Atlanta. “New techniques and new technologies will allow us to amplify the work of a single smart epidemiologist or practitioner by allowing him to use tools that didn’t even exist 10 years ago,” he says. Although there will more data, and more timely data, available, the challenge for public health is going to be filtering out the



Jeff Engel, M.D.



Brian Lee

relevant data, and especially making sure that the people who are interested at the local level have the ability to see that it’s relevant.

Public health departments will increasingly get data from EHRs, and it will be important that various systems that collect data for particular conditions work together, Lee says. He notes that investments are needed in EHRs to ensure that data systems are interoperable to public health, and that actionable public health decisions can be made from that data. He adds that standards are needed that allow for exchange of the right data and the right meaning of that data.

Lee adds that the CDC is developing standardized tools and procedures for rapidly collecting data, using it and tying it back so it is useable at the local, state and federal levels. One example of that effort is the CDC’s BioSense program, part of the national Syndromic Surveillance Program, which is aimed at developing additional analytics capabilities and more capacity to send and receive data as the level of syndromic data increases.

Jeff Engel, M.D., executive director of the Council of State and Territorial Epidemiologists in Atlanta, says the technology infrastructure requires setting up a platform that works

within government IT. Security issues, firewall issues, and working with other departments such as public safety face every jurisdiction, he says. He also sees an emerging requirement for what he terms public health informaticians—highly skilled epidemiologists, who can write code and translate the English language into machine language, particularly for reportable conditions.

Brian Castrucci is program director of the de Beaumont Foundation, a Bethesda, Md.-based not-for-profit that “works to transform the practice of public health through strategic and engaged grantmaking,” and has a background as an epidemiologist with local health departments. He says the U.S. has a health system that is purely set up to manage



the consequences of disease. Clinical practices have tremendous depth, but that is only half of the equation, he says. In his view, public health workers have the skills to analyze data around the upstream causes of diseases, but there has been a disconnect in that clinicians do not contextualize their information at the community level.

“If we can bring this together, use the multi-billion dollar investment in health IT to bridge the gap between those looking for the consequences of a disease and the causes, we could leverage better partnerships between clinical medicine and public health,” he says. He adds: “We have this Tower of Babel throughout health; we have a lot of information, but it’s in different formats, different EMRs, and in different organizations. We have to harmonize the information for the public health good it can do,” he says.

WE HAVE THIS TOWER OF BABEL THROUGHOUT HEALTH; WE HAVE A LOT OF INFORMATION, BUT IT’S IN DIFFERENT FORMATS, DIFFERENT EMRS, AND IN DIFFERENT ORGANIZATIONS. WE HAVE TO HARMONIZE THE INFORMATION FOR THE PUBLIC HEALTH GOOD IT CAN DO.

—BRIAN CASTRUCCI

Castrucci calls attention to a public health concept called foundational capabilities, which is aimed at developing a national standard for what local health departments need to deliver their services, and is aimed at identifying the right data points for local public health. “EHRs get a lot of attention, but they are insufficient. We don’t have the data in the right places to make the right choices for our citizenry,” he says. “We must figure out a way to get sub-county data in a real-time way, so our public health leaders can make the same informed decisions that our clinicians make when treating individual patients.”

BIG DATA: RELEVANCE ON A LOCAL SCALE

Getting the right data—both clinical and non-clinical—that is relevant to public health is also the central challenge of us-

ing Big Data, according to the CDC’s Lee. “The challenge is in working with healthcare, and also the broader health system, to identify what is helpful to public health,” he says, adding that a lot of what takes place at the state and local levels is useful to public health.

What is new in public health is an onslaught of novel data sets that require novel techniques, he says. “When you look at public health practices, and look at surveillance, we have incoming data streams, we have ongoing surveillance activities and we need to analyze that in real time or near real time, which requires Big Data approaches,” he says.

Oscar Alleyne, director of epidemiology and public health planning at the Rockland County Department of Health, Pomona, N.Y., who also chairs the Biosurveillance Workgroup of the National Association of County and City Health Officials, agrees. He says that epidemiologists “love data,” but local health departments require useful data. “We may have terabytes of data streaming in, but if only a gigabyte of that terabyte is useful data, it is of little use,” he says. He adds that that there has been progress from the perspective of what data points are relevant to public health.

“Local health departments can and do identify key indicators that are of value to the health of the community. When Big Data says ‘We have these elements,’ unless they can articulate how the data collected allows us to have actionable items, that’s the progress to which I am speaking,” Alleyne says.

Incorporating Big Data, improving bio-surveillance and incorporating electronic health record information in a meaningful way, will improve public health, according to those interviewed. Nonetheless, they acknowledge that significant hurdles remain. Engel, for one, is optimistic that new technologies will enhance public health, but he urges patience: “It’s not going to happen overnight in government because of the lack in resources and workforce. It’s going to take time.”



Trend: Telehealth

DIRECT-TO-CONSUMER: ALTERNATIVE METHODS OF TELEHEALTH TAKE HOLD

Telehealth is no longer limited to expensive equipment and high-end medical centers **BY GABRIEL PERNA**

When Google does something, the rest of the world notices. The powerful tech giant has that kind of influence, whether it is in search, mobile, or some other kind of software service. Thus, when the company launched a “direct-to-consumer” telehealth service, it got the mainstream media’s attention, despite the lack of an announcement.

The company is conducting a pilot program with Boston-based Massachusetts General Hospital, Scripps Health, a San Diego-based non-profit health system, and One Medical Group, a San Francisco-based technology-focused medical practice. When someone searches for basic health information, Google will give the consumer the ability to connect with a doctor from one of those organizations via telehealth.

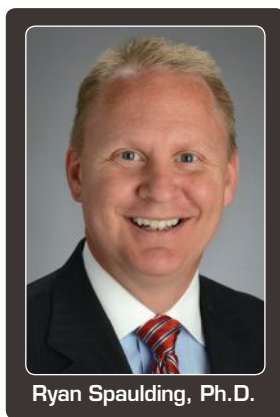
Google’s move is part of a larger trend that is bringing telehealth directly to the consumer. In the past, telehealth has taken part in the confines of a smaller medical facility that is connecting to a larger hospital with access to specialty care. Companies like TelaDoc, MDLive, AmericanWell, and multiple others, are bringing telehealth capabilities directly to the patient. They have started up, received millions from investors, and formed partnerships with large health systems like Mount Sinai in New York, pharmacies like Walgreens and others.

“Access, cost, and convenience: those three things are driving this,” says Peter Antall, M.D., medical director at the Boston-based Online Care Group. Online Care Group is a physician-based medical group that specializes in telehealth care.

“The reality is that it takes 19 days for a patient to get an ill visit for their primary care physician’s office. Nineteen days. By 19 days, you’re either better, in an ER, or dead,” Antall says. “That’s access. For cost, more of the burden is being put on the patient. [Most direct-to-consumer telehealth services] are cheaper than any other visit except at a convenience care clinic. And convenience, we hear from patients who say, ‘I accessed your system



Peter Antall, M.D.



Ryan Spaulding, Ph.D.

within 15 minutes, had a visit, got a prescription sent to my local pharmacy, and I didn’t have to miss work.’ There’s no price on that level of convenience.”

DRIVING FACTORS

Access, cost, and convenience are driving it forward, plus advancement in technological capabilities, says John Jesser, vice president of engagement strategy at Anthem Blue Cross, an affiliate of the Indianapolis-based WellPoint. With Boston-based AmericanWell, which also contracts with Online Care Group, the payer launched a “direct-to-telehealth” service to small- and large-group fully insured customers and self-funded national employers in California and Ohio. UCLA Health is part of the initiative and will make its doctors available for patients.

“Historically, telehealth meant expensive video conferencing equipment in a clinic at one location and expensive video conferencing in a hospital somewhere else. [The technology] now allows doctors to log in and log out easily at their convenience and it allows patients to seek care when they want it, from their iPhone or Android. That’s changed everything,” Jesser says.

The Anthem Blue Cross and Online Care Group telehealth services connect consumers to doctors at any time of day for the price of \$49 per encounter. In some cases, Antall says, members are covered for the visit through their employer.

Moreover, payers and providers are linking providers to payers directly through telehealth in more ways than just through a mobile app. Leaders at the Mayo Clinic in Albert Lea and Austin, Minn., have launched kiosks at each location that are akin to the self-checkout machine at a grocery store. The kiosks allow patients to connect with a remote doctor via telehealth equipment. Along with video capabilities, each kiosk is equipped with a stethoscope, scale, blood pressure cuff, pulse oximeter, thermometer, otoscope, and dermascope.

DIRECT-TO-CONSUMER CONCERNS

Because it's within the confines of a health system, one of the advantages Mayo's direct-to-telehealth service has over others is that it's tapped into the patient's electronic medical record (EMR). Patient data from the encounter are fully integrated.

The lack of this capability is why everyone is not fully on board with the trend. Some, like Ryan Spaulding, Ph.D., director of the Center for Telehealth and Telemedicine at the University of Kansas Medical Center, have concerns with the impact these kinds of services will have on coordinated care.

"It's hard to see where that's going to go. A lot of the patients who are served need to be connected to a health system somewhere. As you know, reimbursement, especially with Medicare and Medicaid, requires everyone to have a primary care physician to help manage their care. When you bring in a third party like Google or another service, the care is moved outside the approved gatekeeper," Spaulding says. He also notes that the access factor, which is driving the trend, still may not reduce the digital divide. Many underserved communities can't afford to pay for a \$40 encounter, he believes.

Reimbursement is an issue affecting all forms of telehealth, says Gary Capistrant at American Telemedicine Association (ATA), senior director of public policy. He says there are ar-

tificial barriers, both at a federal and state level, preventing providers from being reimbursed for telehealth. In particular, Medicare being a poor payer of telehealth has a downward facing affect on the rest of the industry.

"Not only is it the nation's largest single payer but many of the lives it covers are the heaviest users of healthcare," Capistrant says. Antall at the Online Medical Group concurs and says that the biggest challenges for reimbursement his organization faces are with the Centers for Medicare and Medicaid Services (CMS).

GROWING ENTHUSIASM

Even with these concerns and barriers, it's hard not to see the enthusiasm among providers, payers, and patients only growing for direct-to-consumer telehealth services. Jesser at Anthem Blue Cross says thus far, the service has been a hit for busy moms, college students, and business travelers. He says the payer will launch the service for Spanish speaking patients in the coming months.

"It should never replace a person having a relationship with their own primary care doctor but I believe that within three to five years, it will be fully integrated as one of the ways people get care," Jesser says.

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Trend: Big Data

EARLY BUILDING BLOCKS OF THE LEARNING HEALTH SYSTEM FALLING INTO PLACE

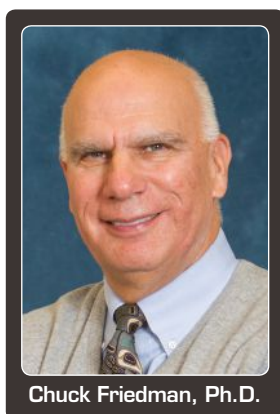
Clinical data research networks lay the groundwork for more rapid and cost-effective research **BY DAVID RATHS**

Many informatics experts see the signs of health IT progress taking place today as stepping stones toward the development of a learning health system, in which health systems routinely share data to learn more about the causes of disease and the treatments for disorders.

Although that type of network is years away, in 2015 we already are seeing the foundational elements being put in place and can watch the pioneers doing the early work, especially the 11 clinical data research networks funded by the federal Patient-Centered Outcome Research Institute (PCORI), including the National Pediatric Learning Health System (PEDSNet) and the Chicago Area Patient-Centered Outcomes Research Network (CAPriCorn).

Speaking to the Health Data Consortium on May 28, 2014, PCORI Executive Director Joe Selby, M.D., M.P.H., said the work is “designed to enable practice-changing research by harnessing the vast data locked within health systems and clinical settings, as well as information and experiences reported by patients themselves...Our goal is to use the power of large sets of healthcare data, under policies developed with the help of patients, to enable more rapid and cost-effective clinical research.”

These new networks are federations of entities coming together to learn from sharing data and doing analytics on that data. “They apply learning back to inform practice in ways that improve health,” says Chuck Friedman, Ph.D., chair of the University of Michigan Medical School’s Department of Learning Health Sciences and one of the most vocal advocates of a national-scale learning health system. “Each of these is a valuable experiment when you view the large-scale picture of how we are going to do this for the whole country. We have these experiments busting out all over the place,” he adds. “Complementary to those networks are places like Intermountain, Kaiser and others that have become mature learning systems within the



Chuck Friedman, Ph.D.



Bruce Eckert

boundaries of their own organizations.”

Michael Kahn, M.D., professor of epidemiology in the Department of Pediatrics at the University of Colorado Denver, is one of the principal investigators of the PEDSNet project, which is creating a distributed network of standardized data on more than 1 million children to enable data sharing, cohort identification and research. Kahn says the goal is to leverage the data infrastructure being created to establish a learning health system of rapid-cycle improvement, incremental changes, and distributed clinical decision support.

The learning network concepts have been in development for several years, but because of the PCORI funding and attention, it is accelerating, he says. “I think we are learning how to do this better.”

The difficult data and terminology harmonization work is “door-to-door combat,” Kahn says. “But we needed to be sensitive to the fact that different organizations had placed institutional investments in different starting points.”

These networks of large data sets add complexity in terms of governance and consent, he added. How long before PEDSNet starts seeing research results? “I think we are more than a

year out and less than two years out,” Kahn says. “You have to have enough data of enough depth to be of interest. Drips and drabs are not enough. You have to have a fairly heavy base. We are focused on getting to that critical mass of data.”

The American Society of Clinical Oncology (ASCO) is building its own research data network, CancerLinQ, to aggregate and analyze a massive amount of real-world cancer care data. By the end of 2015, it expects to have the platform built and 15 vanguard practices fully engaged in using it, says Robert Hauser, PharmD, senior director of ASCO’s quality department. One goal is to provide real-time clinical decision support to help physicians choose the right therapy for each patient.

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"I don't think it is too early to be thinking about a national learning health system," Hauser says. "We believe the whole premise of this is to break down silos so you can rapidly learn from the data. So just creating bigger silos wouldn't help. We are behind the idea of a national learning health system."

Although a learning health system is a relatively new concept, it is seen as the Holy Grail of healthcare analytics, says Bruce Eckert, national practice director, strategic advisory, for the Weymouth, Mass.-based Beacon Partners consulting firm. "It is great that we are automating processes inside organizations, but ultimately the big win is leveraging that data to improve our clinical performance."

Eckert says there are many challenges to making this work. "There are all kinds of data mismatch problems. The big one is the patient-matching problem, which has yet to be solved in many settings, including this one," he notes.

Other problems involve the nuts and bolts of data exchange and analytics, making sure people are using the same ontologies, code sets and definitions. "Then you get into workflow and practices in the organizations. Are their standards of data collection the same? As we get into it, we'll find there are lots of questions and issues about the ability to compare data across health systems," Eckert says; but the learning health system movement will continue to drive standardization in these areas, he added, so it is easier to compare data.

Eckert adds that he would like to see the learning network effort linking with the all-payer claims database effort—that might go a long way toward solving some of these issues.

Another concern is the business model around learning health systems. We may see the same sustainability issues we have had with HIEs, he said. "It takes a lot of resources to do this at the local level and aggregated level. The question is: What is the business? Why should health systems invest scarce dollars in a learning health network? There are mission-driven reasons for participating and some competitive pressures to not do it. "That is not going to be resolved overnight," Eckert says.

By establishing a Department of Learning Health Systems, the University of Michigan has made its service mission to help health systems become learning systems. It is setting up initiatives in its own health system initially focused on diabetes care to help UM Health within its boundaries, says Friedman, who is also helping the state of Michigan organize as a learning health state. "There are compelling reasons for all the healthcare entities in one state to form a learning organization," he says. The nonprofit Center for Healthcare Research and Transformation is facilitating a project called Learning Health for Michigan. More than 100 stakeholders came to an initial meeting. "This concept," Friedman concludes, "may finally be what gets us all on the same page."

Trend: Consumer Tech

TAKING CONSUMER-GENERATED HEALTH DATA TO THE NEXT LEVEL

There is enormous potential for wearable technology to help providers to track and care for high-cost patient populations. But are the devices being used to the best of their capabilities? **BY RAJIV LEVENTHAL**

Most people associate healthcare with the care you receive when you're inside the four walls of a physician practice or hospital. But according to Jay Nagy, associate principal of corporate strategy for The Advisory Board Company, headquartered in Washington D.C., the 5,000 hours between periodic encounters with patients provides an additional enormous opportunity to collect data without a face-to-face visit. "This amount of time refers to when sickness and health happen, which is outside the clinical setting, for the most part," says Nagy. "If you're able to quantify that somehow, it will lead to not only better treatment and diagnosis, but ultimately better outcomes," he says.

Thus, we have now entered the world of patient-generated

health data (PGHD), an emerging concept that was covered in last year's Top 10 Tech Trends, but has since evolved as an increase in chronic diseases (according to a Pew Foundation survey, 45 percent of U.S. adults are dealing with at least one chronic condition). The high cost of managing such diseases has led many to turn to a technological solution to ease the burden on healthcare professionals, and provide useful tools to the elderly and chronically ill.

Analysts predict that the wearables market will grow tenfold to \$50 billion over the next three to five years. So undoubtedly, putting personal devices in the hands of patients has begun to change the way patients and physicians communicate with each other. But while much of the focus has been on the Fitbits,

Jawbones and Apples—the last of which recently introduced its HealthKit, serving as an iPhone dashboard for consumer health and medical apps—Nick Reddy, senior vice president of information system investments at the Dallas-based Baylor Scott & White Health, says that the prevention side is where the clinically-relevant things are happening, compared to just the 10 steps that are tracked by a wearable device. “We want to spin business intelligence and analytics on it,” Reddy says. “If you’re a diabetic and you haven’t been walking your steps or taking your morphine, let’s flag you so your case manager can intervene. That’s where our roadmap is taking us,” he says, referring to the Baylor Scott & White Quality Alliance (BSWQA), a 3,700 physician-strong network that is one of the largest accountable care organizations (ACOs) in the country.

Joy Ku, Ph.D., research technical manager, labs and programs at the Stanford University School of Medicine in Palo Alto, Calif., agrees with Reddy, noting that there is a disconnect between what wearables are being used for and what they could be used for. Right now, if someone with a cerebral palsy, for example, comes into the Stanford lab, there is a motion capture system that puts reflective markers on his or her body as the patient performs different quantitative movements that are captured and fed into a computer program, Ku explains. This process in a lab can be very expensive and it only provides a one-time snapshot rather than getting the patient in his or her natural environment.

Thanks to a grant from the National Institutes of Health (NIH), Stanford University has a new lab designed to pull measurable and meaningful data from wearable devices. “A wearable sensor could change the way these diagnostics are done,” says Ku. “It’s inexpensive and people won’t find it to be much of a hassle. A lab-grade type of a wearable sensor would let you bring the patient in and see what kind of data there is. Is a patient more at risk for developing osteoarthritis, for example? And you can do this across populations,” Ku says.

According to Ku, the traditional way to study the impact of wearable devices would be to try out your idea with a healthy population, and if that’s successful, conduct the clinical trial, and then recruit the targeted patient population. But with Stanford’s mobilized center, researchers are flipping that idea around. “We’re saying, okay, there is all of this data out there being collected already from the Fitbits [and others]. The question



Jay Nagy



Nick Reddy



Joy Ku, Ph.D.

is, if we gather all of that together, and do studies with low-fidelity type data from the wearables combined with the high-fidelity data from the lab and understand that relationship, can you say anything clinically from that data? And that’s certainly possible,” says Ku.

BEYOND THE TECHNOLOGY

For wearables to take the next leap forward, Reddy says that those who will be successful in this space will not focus on the “nerdiness” of the devices, but instead, the outcomes. “Americans aren’t healthy because we have all these toys. It makes us conscious, but consciousness doesn’t improve outcomes. And healthcare costs aren’t going down because we can track calories on our iPhones,” Reddy says.

Reddy uses a diabetic patient as an example of applying the technology to change behavior and outcomes rather than focusing on glorifying the device, noting that if the patient’s blood glucose levels were above 100 mg/dl for 10 consecutive days, it would be time for a doctor’s visit. “I want to push towards interventions rather than just look at the sexy glucometer and say, ‘We’re connected.’ This is what I call our ubiquitous transparency initiative, under our digital patient experience,” he says.

To this end, Matthew Diamond, M.D., Ph.D., medical lead at Misfit, a Burlingame, Calif.-based wearables manufacturer, says that there are different ways to determine the value of these devices, but a key step in the process is to learn about the user. Speaking at the New York eHealth

Collaborative’s (NYeC) 2014 Digital Health Conference on Nov. 17, Diamond said that personal interventions that support the user must be put in place. “If you get a message Monday night that says your calendar is full tomorrow and you won’t have time to exercise, the device—knowing you have a bike—will tell you to bike to work,” he says. Going a step further, Diamond even suggested that it could tell you to lay your clothes out the night before so you will have time to cycle.

“Right now, wearable devices aren’t passing the ‘turnaround test,’ which is, ‘If I leave home without this thing, will I turn around to get it?’” Diamond continued. “Cell phones pass this test, and we want that to be the standard for wearables as well. In an ideal world, wearables will become invisible—you shouldn’t have to work to use them. It’s not just a device; it’s a system of support that comes with it.”



Trend: Transitions of Care

CLOSING THE GAPS IN PATIENT CARE

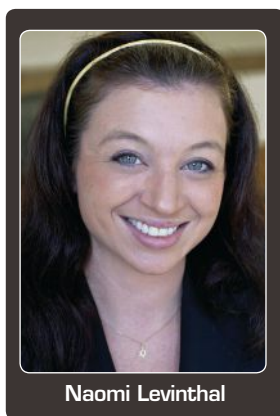
Federal mandates are pushing providers to follow patients along the care continuum, but it will take more than just meeting measures to keep patients out of the hospital **BY RAJIV LEVENTHAL**

The movement of a patient from one setting of care to another—and the electronic documentation of that movement—is vital in accurately being able to tell the patient's entire story, but has also become an area that providers have struggled with in terms of meeting the transitions of care (TOC) mandate for Stage 2 of meaningful use.

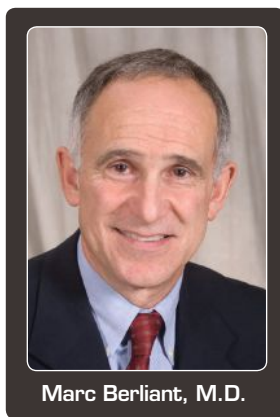
A study published last year in *Health Affairs* that looked at the adoption of electronic health record (EHR) systems in hospitals since the enactment of the Health Information Technology for Economic and Clinical Health (HITECH) Act found this measure to be a major pain point for healthcare organizations trying to attest to Stage 2. Researchers came to the conclusion that “Functions related to electronic data exchange, both with other providers and with patients (in particular, providing summaries of care during transitions and giving patients the ability to view online, download, and transmit their health information) are critical gaps.”

While the transitions of care objective in Stage 1 is optional, the Stage 2 requirement includes three measures, two of which rely solely on the use of Certified EHR Technology (CEHRT) to electronically transmit summary care records for transitions of care and referrals. These TOC summaries are provided each time the patient moves along the care continuum.

There certainly are health systems that have met this measure with varying degrees of ease. In Columbus, Ohio, for example, Mount Carmel Health System became one of the first 30 eligible hospitals to attest to Stage 2 last July. Mount Carmel met the TOC requirement of the program by using CliniSync—the health information exchange (HIE) in Ohio—to assist the health system with the ability to send and receive transitions of care documents with other treating providers, says Jay Wallin, M.D., chief clinical information officer of Mount Carmel. Historically, this kind of health informa-



Naomi Levinthal



Marc Berliant, M.D.

tion may not have been sent, and if it were, in many cases would have been faxed or placed in a paper file that would be transported to the doctor on the other end in a much less timely manner. But today, through a national Direct Trust framework, the information is exchanged electronically through secure, encrypted emails, Wallin says.

CLOSING THE GAPS

For many other health systems, the transition of care challenge has been much greater, and both vendors and policymakers have been working to close the gaps mentioned in the *Health Affairs* study. To this end, Naomi Levinthal, consultant, research and insights at The Advisory Board Company (Washington, D.C.), points out that since two of the three TOC Stage 2 measures require CEHRT, the Centers for Medicare & Medicaid Services (CMS) has provided some recent relief as of September 2014. “CMS said that as it was gauging folks’ readiness for Stage 2, it was finding that people were unable to get their hands on the certified upgrade that everyone needed to be up and running on in 2014,” says Levinthal, who spends all nearly all of her time in the meaningful use arena. “For some providers, their vendors weren’t certified in the first place for this new criteria that they needed to satisfy; others couldn’t get the technology fully implemented,” she explains. As such, CMS has said that if you find yourself in one of those buckets, it will let you roll back the clock and report on earlier versions of meaningful use measures and objectives from Stage 1 even if you’re supposed to be in Stage 2 in 2014.

Regarding vendors, Levinthal says that what is required to be built into these systems is pretty rudimentary, but as the industry moves towards Stage 3, that could change. “For example, I don’t have to prove that you looked at the summary of care record if I’m the hospital sending it out to the

specialist,” she says. “But I think we will see some evolution as we move towards Stage 3, how we will have to encourage the market to be more actionable with information that is ported from one source to the next.” Levinthal thinks that, based on the Health IT Policy Committee’s recommendations, some sense of this actionability will be required in Stage 3, including alerts, notifications, and proof that one provider looked at what another provider sent him or her.

MORE THAN JUST A MEASURE

While the policymakers in D.C. and vendors across the country work to help close these gaps, for many patient care organizations, transitions of care has become about more than just checking something off a list, but instead about trying to create a fuller picture of the patient. To this end, Michael Elley, vice president and CIO of the 477-bed Owensboro Health in Owensboro, Ky., says that continuity of care documents (CCDs) help physicians—even ones not on Owensboro’s Epic system—receive information from other physicians that will inform them if a patient had a lab test done, for example, which in turn avoids repeat exams, lowering the cost of healthcare. “And if there are levels of care that we can’t provide, but we can send them to Nashville or Louisville, we will do that, and it’s to our benefit,” Elley says.

OUR NUMBER OF PATIENTS SEEN WITHIN TWO DAYS POST-DISCHARGE IS 45 PERCENT, BUT THERE ARE REASONS WHY THAT NUMBER WILL NEVER BE 100 PERCENT, NOR SHOULD IT BE. BUT IT’S BETTER THAN IT WAS, WHICH WAS PROBABLY ZERO.

—MARC BERLIANT, M.D.

What’s more, in a broader context, transitions of care ties into readmissions, an area that most hospitals need to improve on (a recent *Kaiser Health News* report found that, based on a study of Medicare data, 2,610 U.S. hospitals, or fully three-quarters of those subject to the program, are be-



Michael Elley

ing penalized for having too many patients return within a month for additional care). Traditionally, efforts to reduce avoidable readmissions have focused on hospitals, but it is becoming clear that many factors along the care continuum influence readmissions, as statistics find that 42 percent of patients in the acute care setting end up in some sort of a post-acute care setting.

Three years ago, at the University of Rochester Medical Center (URMC) in Rochester, N.Y., leaders at the healthcare organization realized that medical groups were working in silos when it came to readmissions strategies,

says Marc Berliant, M.D., associate chair for clinical affairs in the department of medicine at URMC. Eventually, all of the groups were put together, and a program called “Safe Transitions” was formed, designed to reduce hospital readmissions and foster improved communication among care teams, patients and primary care physicians.

The program was based on three essential principles, Berliant explains: medication reconciliation at the time of admission, time of discharge, and at time of arrival at primary care provider’s office; refined discharge summaries; and following up post-discharge. Berliant admits that it’s difficult to see if these specific elements have moved the needle on readmissions, however. “Our number of patients seen within two days post-discharge is 45 percent, but there are reasons why that number will never be 100 percent, nor should it be. But it’s better than it was, which was probably zero,” Berliant says.

The idea is that following the patient along the care continuum will lead to lowered readmissions, and thus healthier patients and lower costs. This is why, according to Levinthal, it’s important to not let meaningful use become too “checklisty,” which it is for too many organizations right now. “I think that people are still trying to think about that end game,” she says. “We don’t know when [this program] will sunset, but nobody wins in meaningful use if you don’t figure out ways to make it more meaningful to you and the patient.”



Trend: IT Governance

CLINICAL INFORMATICS 2.0: TIME FOR SENIOR CLINICAL IT LEADERS TO STEP UP THEIR GAME

What will senior clinical informaticists need going forward? Rock-solid skills and big-picture understandings and leadership capabilities, that's for certain **BY MARK HAGLAND**

Alrigh, can we just come out and say it? Picking out a so-called “tech-head” doc and designating her or him as the new CMIO at your organization is just so last century. Really. Because, while such an ad hoc tactic, used to help move a first electronic health record (EHR) implementation forward, might have been acceptable in a community hospital 15 years ago, the reality is that the emerging healthcare system is increasingly demanding the emergence of a new generation of clinical informaticists willing to take on a dizzying range of new roles and responsibilities, particularly as new titles like chief health information officer, chief clinical information officer, and chief clinical transformation officer, emerge.

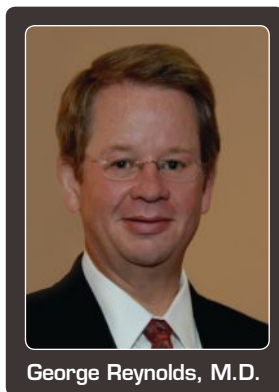
The demand will only continue to intensify for clinical informaticists able to help their organizations lead true clinical transformation, leverage IT and analytics for population health and accountable care organization (ACO) development, and satisfy demands for value-based care delivery, readmissions reduction, and other initiatives coming out of both federal healthcare reform processes and demands U.S. healthcare system-wide by purchasers and payers for increased value for expenditure, as well as from newly energized healthcare consumers.

What kinds of people will be needed? Individuals with solid clinical (medical, nursing, pharmacy, etc.) backgrounds, as well as interest, ability, and familiarity with informatics and IT, plus a (very solid) dose of leadership ability, who are systems thinkers and ready to help bring together all the diverse stakeholders around the transformational-change table. And yes, we've got shortages.

David Levin, M.D., who was CMIO at the Cleveland Clinic Health organization from 2011 through 2014, and is now consulting as founder and partner in Amati Health, a Suffolk, Va.-based consulting firm, says this: “We as a healthcare system



Brian Patty, M.D.



George Reynolds, M.D.

have been about implementation the past five years, getting the infrastructure into place. And we're not done, but we're well down the road.” But now, he notes, the CMIO role “is starting to converge with the roles of the chief quality officer or chief medical officer, roles that are about performance management, about envisioning a better future and achieving better performance, including around concepts of the Triple Aim.” As a result, he says, what has been framed as the CMIO role has begun to “morph and migrate” into roles around strategy and performance management. “In some cases, CMIOs are becoming CIOs,” he notes. “In other cases, they're creating new roles, like that of the chief health information officer.” Nor is the CHIO going to be limited to working with physicians, he emphasizes. Some senior nurse informaticists will also inevitably rise into CHIO roles, he says.

Brian Patty, M.D., vice president and CMIO at the Health East Health System in St. Paul, Minn., is definitely seeing the shifts in dynamics, and he believes that current CMIOs are totally caught up in the changes taking place. “You really end up being the catalyst or glue across the whole organization,” he says. “A lot of patient care organizations are heavily siloed. Now that modern EHRs truly cross the continuum of care, oftentimes, what I'm finding is that the CMIOs are driving the conversation around how their organizations can connect enterprise-wide, not just through the EHR, but via our workflows, how we engage patients, and through processes, and so on.” In other words, there's no question about the fact that senior clinical informaticists in patient care organizations nationwide are going to need to step up their game.

At the Falls Church, Va.-based Inova Health, Ryan Bosch, M.D., the organization's vice president and CMIO, and Patricia Mook, R.N., M.S.N., its CNIO, are wading through heavy waters there as they help lead their organization into and through



ACO and population health development in a rapidly changing metro market. Helping to lead hundreds of colleagues in continuous change at their five-hospital, 16,000-employee health system, they fully embrace the “clinical informaticists 2.0” concept; indeed, Bosch says he believes he was among the earliest clinical informaticists to use the phrase in public presentations. In any case, Bosch and Mook are living the challenges and the opportunities, and they agree that they and their fellow CMIOs and CNIOs are going to need to ramp up their capabilities to unprecedented levels.

Senior clinical informaticists are going to need to “understand workflow, understand business process redesign and total quality management, in the Lean sense of the term,” Bosch emphasizes. And Mook says, while “You need that baseline knowledge of clinical care and some informatics, Ryan hit the nail on the head,” she says: “you have to understand the needs of operations, including the business side of the organization, and be able to marry the business and clinical sides.”

And working with data at a deeper level, emphasizes George Reynolds, M.D., CIO and CMIO of Children’s Hospital Medical Center in Omaha. “The informaticists 1.0 model was about the collection of data, getting people to adopt the EHR and use it

and fine-tune it,” says Reynolds. “2.0 is about how you present data. We’re talking about interoperability, so that people can get information from all sorts of different places; and we’re talking about the need to better present data. There’s a whole piece here around data visualization and the psychology of data presentation that we’ve just begun to scratch the surface on, in order to support population health and quality improvement.”

Summarizing the thoughts of the other clinician informaticists leaders interviewed for this article, Scott Weingarten, M.D., M.P.H., senior vice president and chief clinical transformation officer at Cedars-Sinai Health System in Los Angeles, puts it this way: “You know how Lance Armstrong wrote a book titled, “It’s Not About the Bike”? Well, I don’t think this is about the computer; it’s really about the patient care and business needs of the organization; and the technology is an enabler to help achieve the clinical and financial goals. So I think the clinical informatics leader of the future will understand healthcare delivery quite well, and patient care, and the changes from fee-for-volume to fee-for-value, will understand risk-based payment and accountable care, and will view technology as an enabler to achieve those goals; to me, that’s clinical informatics 2.0.”

Trend: HIE Sustainability

SURVIVOR-EDITION HIE: CAN STATEWIDE HIEs ACHIEVE SUSTAINABILITY?

The answer is a qualified ‘yes’—but, say those in the know, it will take business realism and a strong dose of ingenuity **BY MARK HAGLAND**

Can health information exchanges (HIEs) survive the present moment? The question might seem overly simplistic, but the reality, as knowledgeable observers note, is that broad-based, and particularly statewide, HIEs are indeed failing or faltering across the country. Indeed, many public and semi-public statewide HIEs are struggling these days, in the wake of the dwindling of federal and state grants to support them. What are industry observers seeing? Largely this: that many of the statewide and regional HIEs created with wonderfully high-minded intent, but without a hardheaded business focus on long-term sustainability, are finding it difficult to make ends meet as the grant money begins to wither.

At the same time, a small number of statewide HIEs are moving forward strongly, buttressed by broad stakeholder support, state government-level policy directives, and above

all, clever strategy. Their biggest secret? Providing stakeholders with services they will pay for, particularly in the areas of alerting providers and payers to patient events like emergency department (ED) visits and inpatient admissions.

Four statewide HIEs are among those setting an example for their peers in other states: those in Maine, Michigan, Colorado, and Ohio. In Ohio, the Columbus-based Ohio Health Information Partnership (OHIP) runs CliniSync, Ohio’s statewide health information exchange. OHIP, established as the regional extension center (REC) for its region, is set up as a privately run 501c3 organization, but is Ohio’s state-designated entity, explains Dan Paoletti, CEO of OHIP.

Part of OHIP’s success lies in how it was created, Paoletti says. “We were created in the late summer of 2009 by the administration at that time,” he explains. “We spent the first



two years planning, developing, and getting the technology in place. In other words, we spent a good two years at a very low budget cycle, with only a couple of employees, trying to get everything arranged. We really started our implementations in 2011, and our first hospital went live in December 2011.” Now, he notes, 143 hospitals across Ohio—all but about 20 in the state—are working with CliniSync, and 73 have gone live in data-sharing. What’s more, 600 practices representing over 3,000 physicians not already connected to CliniSync via their participating hospitals, are also participating.

Three elements in particular have helped OHIP to thrive: providing results delivery, Direct messaging for clinicians, and enabling the sharing of continuity of care documents (CCDs). “Results delivery is important, even though it’s very basic,” Paoletti says. “But you’re talking about potentially \$60,000 to \$100,000 per primary care physician in ancillary revenue, and that’s money that is up for grabs or moving. And us being a delivery mechanism for the community hospitals not only saves them money, but allows them to grow their ancillary services.” Indeed, OHIP is now racking up between 1 and 2 million transactions a month solely through results exchange.

A similar story is playing out in Michigan, where Great Lakes HealthConnect—the result of a July 2014 merger between Michigan HealthConnect (based in Grand Rapids) and Great Lakes Health Information Exchange (based in Lansing)—has created a nearly-statewide exchange across that state. There, according to Doug Dietzman, the organization’s executive director, “What’s been driving our business the most has been meaningful use requirements—so, immunization data-sharing, reportable labs, and syndromic surveillance; and we’re a HISP for folks who need a HIS for Direct as well,” he reports.

As Dietzman puts it, “Operating on a private model as we do, you have to build a business, just like anybody else does. You have to sell services and solutions that people will pay for, and if you can’t, you’ll be out of business just like anybody else who doesn’t.” Thus, as has OHIP, Michigan HealthConnect has found a path to sustainability through the provision of services that subscribers will willingly pay for.



Doug Dietzman



Devore Culver



Greg McGovern

The same is true at HealthInfoNet, where executive director Devore Culver is able to boast that his organization is providing leading-edge support to providers. “We have a set of tools in the field that is dynamic—the data being used is a day old, driven by clinical and event data,” he notes, “and is predicting things like who will show up in the emergency department. Who’s going to get readmitted in the next 30 days? That runs while the patient is in the bed.”

Meanwhile, in Colorado, CORHIO, a Denver-based statewide HIE, is not only working with that state’s Medicaid office on ADT alerting, as Brian Braun, CORHIO’s chief financial and strategy officer; it has also contracted with two large health plans, Anthem, and Kaiser Permanente, to alert them when plan members are having ED visits or admitted to hospitals.

A small number of HIEs are also attracting smaller physician practices as subscribers, as is Greater Houston HealthConnect, reports CTO Phil Beckett. The secret? Providing them with very timely data and information they really need on current patients, Beckett says.

Greg McGovern, a director at the Pittsburgh-based Aspen Advisors consulting firm, and a former health system CTO, notes that while enterprise HIEs—private HIEs established by individual hospital and health system organizations—are mostly doing fine, because their *raison d’être* is built into their function, “When states provide something, if all that they offer is a way to get stuff from point A to point B, that’s not very useful, because most organizations are able to do that through their EHRs. But if you’re going to offer other services, or direct functionality to long-

term care services, for the transmission of continuity of care documents, for example—people will pay for those kinds of things.” He agrees completely that the statewide HIEs doing well now have figured that out, and cites CliniSync as a particularly successful example.

In the end, all those interviewed for this article agree: statewide and regional HIEs can survive—and even thrive—but it’s going to take considerable business sense and a good dose of ingenuity, to do so, going forward. Time, everyone agrees, to stop thinking castles in the air, and instead, think boots (data) on the ground, instead.

Trend: Mobile Physician

MAKING DOCTORS MOBILE: ZEROING IN ON CLINICAL WORKFLOW

Health systems seek 'purposeful embrace of mobility' **BY DAVID RATHS**

Donald Plumley, M.D., a pediatric surgeon at Arnold Palmer Hospital for Children in Central Florida, recently wrote a moving firsthand blog account of how access to medical images on his mobile device helped save a life. A regional medical center needed immediate expertise with a newborn patient with an abnormal X-ray. Plumley was taking a personal day off, but because his Level 1 pediatric trauma center had joined a cloud-based image-sharing network, from his car he was able to pull over to the side of the road and use his iPad to look at a scan and diagnose a condition that needed emergency surgery, which ended up saving the child's life. "Cloud-based image-sharing is not only revolutionary, it's life-saving," he wrote.

Although that type of story is becoming more common, for several years the hype about mobile tools has been running a little ahead of their actual utility in clinical practice. Too often, doctors have gotten excited about the idea of viewing results on their iPads, only to have to seek out a PC with a keyboard in order to enter orders. But in 2015, with the increasing maturity of devices and software, some organizations are starting to refine what mobile means to their clinicians by closely studying the impact on workflow. Also, advances in mobile solutions targeting healthcare are starting to eliminate communications inefficiencies. A recent PwC Health Research Institute survey found that 79 percent of physicians believe using mobile devices can help clinicians better coordinate care.

"Many healthcare organizations have embraced mobility for the sake of leveraging mobility," says Rasu Shrestha, M.D., chief innovation officer for the University of Pittsburgh Medical Center (UPMC) health system in Pittsburgh. "But we don't believe in just doing mobility to put a checkmark on a requirement list. Yes, we have done mobility, but it has to be a very purposeful embrace of mobility."

A 2014 survey of nearly 600 clinicians by research firm Software Advice found that 35 percent use tablets and 20 percent use smartphones (respondents could choose more



Rasu Shrestha, M.D.

than one option.) And a surprisingly high 17 percent reported using mobile and portable devices exclusively to use their systems.

For John Salmon, senior director of the EMR Group at the University of Pennsylvania Health System in Philadelphia, mobile vs. desktop is not really an either/or situation. "We seek to understand which environment and which context a mobile app may be most helpful in vs. when you need a keyboard and full screen," he says. Penn Medicine is seeing increasing uptake of mobile apps. For the Epic users in the ambulatory environment, they are regis-

tering 3,500 mobile log-ins a month and 300 distinct users out of 1,800 physicians. "Epic has done a good job of understanding where mobile is most helpful to clinicians," Salmon said, adding that Penn Medicine has not yet implemented order entry on mobile devices.

Elsewhere, Penn Medicine's thinking about mobile tools has evolved, says Glenn Fala, senior director of software development. Of the 75 applications developed in-house, about 10 percent are mobile apps. "As more users shift to mobile, we try to present a subset of the data in a mobile app. And anything we start new these days, we are thinking immediately of the mobile part of it." The app can be built once and run on desktop or mobile. "We realize certain user stories that are mobile ones," Fala says. "They only need to do certain things on the phone. We focus on the use and that tells us what to build."

Penn Medicine is working on several mobile solutions. In an internal study, researchers found clinicians spending too much time on administrative tasks and communicating. "They were having the same conversation with 10 people, but not at the same time," says Neha Patel, M.D., director of quality in the section of hospital medicine at the Hospital of the University of Pennsylvania. "That led us to pilot secure messaging for group exchange throughout the day in real time that allows for closed-loop communication." In May 2013, the hospital started using an application called Cureatr. Anecdotally, residents are saying that its use saves them one to



three hours a day, and nurses about an hour, Patel says.

"It not only saves a lot of time, it improves the quality of care," says Subha Airan-Javia, M.D., assistant professor of clinical medicine and director of internal medicine residency EMR and health IT training at Penn Medicine. "Everyone involved in the patient's care gets the same text. As soon as anybody gets information, everyone is on the same page working toward the same thing. It has made better or earlier discharge possible."

Dr. Airan-Javia also has helped Penn Medicine software developers create an app called Connexus that aggregates data from five siloed applications for a comprehensive view of the patient. "It was designed to match how the clinicians want to see the data and to integrate data doctors and nurses get separately," she says. Getting all that data to fit a phone format was a design challenge. "We put aside assumptions about the display and focused on the user stories we are trying to address. We threw out a lot of assumptions about how it should look, and all of us have been pleasantly surprised."

MANY HEALTHCARE ORGANIZATIONS HAVE EMBRACED MOBILITY FOR THE SAKE OF LEVERAGING MOBILITY. BUT WE DON'T BELIEVE IN JUST DOING MOBILITY TO PUT A CHECKMARK ON A REQUIREMENT LIST. YES, WE HAVE DONE MOBILITY, BUT IT HAS TO BE A VERY PURPOSEFUL EMBRACE OF MOBILITY. —RASU SHRESTHA, M.D.

UPMC has done something similar with a homegrown application called Convergence, a tablet-based platform that extracts patient data from a variety of clinical information systems and presents it in a visually compelling way. UPMC is rolling out 2,000 Surface tablets across a wide range of clinical scenarios. "The challenge is that you have these legacy solutions that don't talk to each other," Shrestha says. "But if you create a mobile app on iOS, you are almost distancing yourself from the investments you've made in these legacy solutions." He said UPMC initially created Convergence on an iPad. "The visual layer was fantastic. But when you needed to take action, such as placing an order it essentially became useless," he says. You had to put it down and find a Windows desktop to log in to Cerner or Epic, a process that

was very labor-intensive and disconnected. "But when Windows came out with Windows 8, we saw a great opportunity to connect past, present and future." The past is the legacy solutions with valuable data, he explains. The present is the touch form factor, with intelligent visualization; the future will be moving Convergence into the clinical care pathways where health care reform is going, such as utilization appropriateness and evidence-based guidelines.

Mobile technology also has a physician engagement component. A few years ago Rockdale Medical Center, a 138-bed acute care hospital near Atlanta, held a physician engagement group around IT. "We found that many of them wanted to have greater access to mobile technology," says Lisa Gillespie, M.D., chief medical officer. "Also, as you seek to attract new providers, they want to know what you are doing with technology. We wanted to make it easier for them to use their own devices, so they don't have to learn anything new."

Rockdale has been rolling out a mobile patient monitoring technology called AirStrip One that allows obstetricians to monitor labor and delivery patients and gives cardiologists access to electrocardiograph data on their smartphone or tablet. Gillespie says the plan is to expand usage of AirStrip technology to critical care teams and hospitalists. Also, EMS technicians will soon send cardiologists EKG results on the way to the hospital. "The EMS truck can do an EKG and be talking to the cardiologist on the phone at the same time," she says. "The cardiologist can decide if the patient needs an intervention and activate a team before the patient gets to the hospital." ♦

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Streamlined Staffing: Taking the Guesswork Out of Labor Allocation

In an industry where staffing is crucial to patient care, better agency management and automated scheduling provide the best match

BY JOHN DEGASPARI

At a time of continual change in the healthcare industry driven by an evolution in regulations, care delivery, and payment models amid rising demand for healthcare services, human resources professionals will be expected to do more with less.

That's one conclusion of a survey on healthcare HR initiatives released last year by the American Society for Healthcare Human Resources Administration and HealthcareSource, a talent management solutions vendor. According to that survey, which polled over 500 HR professionals at healthcare organizations across the U.S., nearly three-quarters of respondents named streamlining HR processes as their top initiative for reducing costs. Furthermore, inefficient systems and inadequate technology were cited as among biggest barriers to achieving their HR goals.

Almost by definition, automating HR processes can help relieve some of these pain points. Implementing technology can make a difference not just in the bottom line, but also in standardizing processes within a provider organization, increasing efficiencies and providing transparency for employees. To be sure, those changes can't be expected to happen overnight, and sometimes require difficult cultural changes.

Is the effort worth it? What follows is



the experience of two major health systems—one to standardize its dealings with contingency staffing agencies, and the other that is in the early implementation scheduling software, with the ability to predict staffing requirements.

BON SECOURS SIMPLIFIES CONTINGENCY STAFFING

Bon Secours Hampton Roads operates three acute-care hospitals, two long-term care facilities and two assisted living facilities in Virginia. It is part of the \$3.3 billion Bon Secours Health System that encompasses facilities in six states. Overall, the Bon Secours Health System

makes use of more than 50 staffing agencies to fill both per diem and long-term shifts, including both clinical and non-clinical positions.

Several years ago, Bon Secours Health System decided to address concerns of its local health systems around contingency staffing and working with outside agencies. In 2008, it decided to implement a vendor management system (supplied by ShiftWise, Portland, Ore.), and piloted the program at the Hampton Roads health system.

Helen Anderson, administrative director of HR at Bon Secours Hampton Roads, explains that, at the time, chief

nurse executives struggled to track agency hours, and often were not certain which agencies the hospital had contracts with. “It was not a well-oiled machine. It was dysfunctional, paper-intensive and time-intensive. We were frustrated, the agencies were frustrated, and it was not a feel-good for anyone,” she says.

WE TRIED TO MINIMIZE THE NUMBER OF AGENCIES WE WORKED WITH TO HAVE BETTER RELATIONSHIPS AND BUILD BETTER RAPPORT WITH THEM AND VICE-VERSA. —HELEN ANDERSON

Initially, the solution was implemented for the contingency nursing staff, which accounted for 77 percent of the labor job type usage, according to Anderson, who coordinated the rollout there. Since its initial rollout, the vendor management system has been expanded to other areas, including allied clinical areas such as radiology.

Anderson says that using an automated vendor management system has streamlined the organization’s dealing with agencies by standardizing its processes and providing transparency for both the hospitals and the agencies.

For example, Anderson’s team identified an orientation packet that it uploaded into the vendor management system, which outlined the organization’s code of conduct, expectations and requirements. These so-called prerequisites, as well as a background check, are taken care of before the agency person is approved, Anderson says. She adds that the agency is aware of hospital’s expectations and takes the responsibility of ensuring that the person meets those expectations before being placed on a shift.

She notes that this gives a level of comfort to the nursing executives, as well as human resources executives, that the contingency person hired has met the same expectations as regular hospital employees. It has also streamlined the auditing process when the hospital is visited by regulatory agencies. Pulling the profile on a contingency employee is simple and can be done in minutes on the computer, she says.

One of the most significant advantages of the vendor management system is that contracting has been standardized, Anderson says. The hospital now hires contingency labor only through contracted agencies that are entered into the system.

THREE MIGRATIONS OF VENDOR MANAGEMENT

According to Anderson, implementing the vendor management system has been an iterative process. She explains that the Hampton Roads health system has gone through three

“migrations,” by which it has streamlined its process of working with agencies. During the first phase, it uploaded 14 agencies into the system, all of which had signed contracts. “We tried to minimize the number of agencies we worked with to have better relationships and build better rapport with them and vice-versa,” she says. This put the agencies on a level playing field: all had to meet the same expectations to place an employee.

In the next migration, it identified the three top agencies that gave Hampton Roads the most personnel and met certain quality measures, such as fill rates, time to fill and staff performance. Those three agencies were designated “first tier” agencies, and were offered a deal that they would be given first preference to fill a position, at a slightly reduced hourly rate, which would be made up for in volume. “That was beneficial, because they continued to give us quality people, the relationships with those folks increased, and we knew the types of people we were getting. It was a great win-win,” Anderson says.

The third migration occurred in July of last year, when the decision was made to expand the vendor management system in a coordinated way to other local hospitals within the Bon Secours Health System. With that expansion, the vendor management system is also being expanded beyond nursing to other employment categories—allied clinical as well as clerical and financial positions. “Basically, any position that we had used an agency for in the past, we included across Bon Secours,” she says. “Our agency numbers that we have loaded in ShiftWise and the agencies we have agreements with have dramatically increased.” (Hampton Roads remains the only local system, so far, that maintains the first tier designation for top agencies, however.)

According to Anderson, automating its vendor management process has saved costs for the organization. It has seen gains in time and efficiencies by eliminating reliance on phone use to fill slots with contingency employees, as well as by standardizing contracts with all agencies. Standardizing the contracts across the board for all agencies has also allowed the hospital system to focus more on quality measures and performance in conversations with the agencies, she says. She adds that the vendor has taken on a significant role in re-negotiating vendor contracts, and that the agreed-upon rates were market rates.

Anderson says vendor management system offers the data and transparency that has allowed the hospital system to manage its labor supply more efficiently. “We are able to get daily, by shift, however you want to slice it, reports as to where our agency is being utilized, where it is being utilized, and the type of agency we are utilizing,” she says. That gives the hospital more information to have a dialog with department managers about their labor needs and the best ways to fill them, she says.

STAFF SCHEDULING AS CULTURAL SHIFT

Inpatient nursing units are some of the top cost centers at the

University of Vermont Medical Center in Burlington, according to Jan Carroll, administrative director of nursing. That represents a possible \$2 to 3 million opportunity for potential savings, she says.

That was one of the reasons behind its decision to make staffing and scheduling on the inpatient side of nursing more efficient. Carroll's team brought in scheduling software (supplied by Avantas, Omaha, Neb.), which would improve the hospital's ability to accommodate last-minute staffing changes, including the ability to flex up or down according to demand. "It's a tool to minimize variance," she says. While acknowledging that quality patient care is the top priority, "We wanted to make sure that we are stewards of our resources, especially as we know that the dollars are going to get tighter as the years go on," Carroll says.

The scheduling software has been applied to all inpatient units in the hospital, from the ED to the ICU and general med-surg floors, according to Carroll, and encompasses full-time, part-time, and per diem nursing staff as well as agency nurses. "We focused on the inpatient nursing units for two reasons: That's where our biggest labor-saving opportunity is, and we all, for the most part, abide by the same business rules," she says.

One of the hospital's goals is to centralize its staff scheduling, so that it can build a pool of nursing professionals that staff that it can apply to areas where there is a need due to staff fluctuations and census, she says. Although the hospital has had a central staffing office, some department managers have been reluctant to use it, because they regard staff scheduling as one of their departmental responsibilities.

The reluctance amounts to a cultural issue, Carroll acknowledges. "In any culture old habits die hard, and especially in patient care, everybody is worried that they are not going to have enough staff to take care of the patient," she says. "Now this is more of a system responsibility that they are a part of. That is a shift for them," she says.

The hospital is taking a gradual approach to winning the acceptance of the department managers. "It's just a matter of education and helping to bring them along in terms of logic and why we need to go this route," she says. "We are trying to be thoughtful in doing this, and setting it up for success."

Carroll believes that the gradual approach is worthwhile, and that it will pay off. In the meantime, the hospital system is working with the vendor to improve the predictive accuracy of the solution—which is crucial to winning the support of the department heads. She says that in some departments the model works well, and in others it is being tweaked for more accurate results.

Improving the predictive accuracy of the system is a process that takes some time as more data is incorporated. It was im-

plemented using three years of census data, and the University of Vermont Medical Center, working with the vendor, is fine tuning it with additional data from the Centers for Disease Control and Prevention (CDC), the Google Flu Index, and local variables related to the hospital. "We are in the process of working that out, and we will get there," she says.

Carroll believes that the scheduling software will have a big impact on workflow improvement. "In the past, managers spent a lot of time working on their schedules and doing staffing, as well as completing time cards to reflect what actually happened, and it was consuming a lot of their day," she says. "That's not what they were trained to do; this work does not require a clinical background." Automated scheduling can enable a move away from the cumbersome process of using spreadsheets, which are prone to scheduling mistakes, she says. The transparency it offers is popular with employees, who can access it via the web to view their schedules, as well as for the staffing office, which can get an overall view of staffing issues throughout the organization at a glance. ♦

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Eight Essential Principles for Governance Success

Texas Health Resources CIO Ed Marx offers a set of eight bedrock principles on which to base good IT governance—anywhere **BY MARK HAGLAND**

In a wide-ranging keynote presentation, entitled “A Time to Lead: Re-engineering Governance to Execute Business Strategies,” delivered on Dec. 11 as part of the Health IT Summit in Houston, sponsored by the Institute for Health Technology Transformation, or iHT2 (a partner with *Healthcare Informatics* under our Vendome Group corporate umbrella), Ed Marx, CIO of Texas Health Resources (THR), a 14-hospital integrated health system based in the Dallas-Ft. Worth suburb of Arlington, eschewed the notion of a universal model for organizational governance. Instead, he stressed a set of broad principles he believes CIOs can apply to any healthcare organization in order to lead at a time of massive change and intensifying pressures in U.S. healthcare.

“What’s the silver bullet for governance? There is no silver bullet for governance,” he told his audience flatly. “People talk about governance models all the time. When I was in Philadelphia, we built a beautiful model for governance; and it worked there, but not in other places. It’s not about the specific model,” he said. Instead, he stressed, organizations need to work from a core set of principles, in order to fashion models that work for them. He gave an example of cultural differences, noting that, “I developed a specific strategic plan in Cleveland, and had all my VPs sign off on it. That was cool in Cleveland.

At THR, I tried to have my executives sign off on it, and they said, ‘What? We don’t do things like that. Just trust our word.’ So you’ve ultimately got to work according to principles” that can be applied to diverse cultures, he emphasized.



Ed Marx

CORE PRINCIPLES, DEFINED

His eight principles: transparency; boldness; trust; co-chairs; accountability; excellence; alignment; and escalation.



Transparency comes first, he noted, because everything one does as CIO must be above-board, open, and clear to all stakeholders. Meanwhile, he said, “You have to be bold in your principles. It’s better to be blunt and upfront in your ‘no’ than to encourage all sorts of passive-aggressive behavior. Passive-aggressive behaviors kill governance.”

As for trust, he asked rhetorically, “Have you built that trust in your organization?” Is there a level of trust in one another among everyone working in the organization?

Meanwhile, in order to execute and make effective any strategy, Marx said, “No matter where I’ve been, I’ve multiplied the effectiveness of governance tenfold by having co-chairs.” The system of governance is so strong these days at THR, he noted, and the co-chairs of committees and initiatives feel so empowered, that processes are highly streamlined.

As for excellence, Marx noted that “If you do your governance with excellence, it’s going to build trust,” he said.

Another core principle is alignment to strategy, which is absolutely key in order to keep processes and activities on target in any organization, he added.

The final principle he noted was an interesting one, and Marx explained it in some detail. It is the principle of “escalation.” What that means, he said, is that if an individual or

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Some Consensus on Data Security and the Cloud

As providers move more and more into cloud-based computing, strong data security and data privacy regimens are possible **BY MARK HAGLAND**

Some level of consensus emerged among participants in a panel discussion entitled “Data Security in the Cloud: Leveraging Accessibility While Managing Risk,” the first panel of the day on Dec. 10 at the Health IT Summit in Houston, which was held at the Royal Sonesta Houston Hotel, and sponsored by the Institute for Health Technology Transformation, or iHT2 (since December 2013, iHT2 has been a partner organization with *Healthcare Informatics* under the joint umbrella of the Vendome Group, LLC, *HCI’s* parent company).

Panel moderator Nora Belcher, who is the executive director at the Texas e-Health Alliance (Austin), led discussants through a broad range of topics. Participating with her were Theresa Meadows, M.S., R.N., senior vice president and CIO, Cook Children’s Health Care System (Fort Worth, Texas); Ferl Howard, director of technology and information security, Trinity Mother Frances Hospitals and Clinics (Tyler, Texas); Phil Alexander, information security officer, UMC Health System (Lubbock, Texas); David La Brosse, strategic partner manager at the Sunnyvale, Calif.-based NetApp; and Doug Rufer, regional business manager, at the Rochester, N.Y.-based Carestream Health.

THE CLOUD ALLOWS YOU TO LEVERAGE MORE OPERATIONAL CAPITAL AT A TIME OF CHALLENGES WITH EXPENSES, AND THE ADVANTAGE IN GOING TO THE CLOUD IS THAT YOU BUY ONLY WHAT YOU NEED IN TERMS OF SERVICES AND CAPABILITY. —FERL HOWARD

Given the recent, troubling data breaches at organizations nationwide, Belcher asked fellow panelists what they would tell the public about the security of cloud-based computing.



THE CLOUD OFFERS BENEFITS, BUT REQUIRES DILIGENCE

“My answer,” said Howard, “is that I don’t treat the cloud any differently from how I treat any onsite solution; I require of it the same level of audit management, the same security parameters; I expect the same capabilities. It can be a secure environment, but it’s up to you to make sure that happens.”

Meadows added that “The cloud requires a very diligent education process. I would expect that, just as with a physical data facility, I could do a walk-through at any time, to test the security procedures. When you are selecting a vendor, you need to do those things physically,” she emphasized. “We do spend a lot of time educating” internal stakeholders about what they’re doing, she said. “I’m asked once a week whether we use the cloud and should use it; and I say, yes, securely. We use athenahealth, and I don’t think anyone thought of it as cloud-based, but as a Web-based solution for us. So it’s an ongoing education process for our physicians, staff, and patients.”

“What are the upsides of moving to the cloud?” Belcher asked.

“One of the big advantages we see is cost,” said Alexander. “We’re talking security, so—you have to be careful not to let cost override security, but cost is a huge benefit for us. It’s one of the top-tier benefits involved” in cloud-based computing.

“To dig a little deeper into the cost,” Howard offered, “obviously, the cloud allows you to leverage more operational capital at a time of challenges with expenses, and the advantage in going to the cloud is that you buy only what you need in terms of services and capability.”

A GENERATIONAL SHIFT TOWARD ACCEPTANCE

La Brosse stated that, “Whether we’re ready or not, the young people have no hesitation about jumping into the cloud. I have four teenage boys, and they wouldn’t have any question about it.” In other words, over time, a generational shift in favor of cloud-based computing is inevitable, he said.

“And we’re in an era where people want to bring their own devices to the possible,” Belcher noted. “Even though the cloud makes that super-possible, there’s a lot of anxiety that I hear. What if there’s something bad on that device? What if a device takes over your network and you get hacked? So per BYOD [bring your own device], how do you handle that?”

Alexander quickly pointed out that “There are a number of apps now that are controlled by role. Users can log into the app, and there’s nothing on their device, and they can’t screen-shot or add anything to the app, so it’s a protected environment,” he noted.

Meadows added that at Cook Children’s, “We work on virtual desktops, which is great, because people can’t really mess things up. Fundamentally, though,” she said, data security success in a cloud-based environment means that “you have to create a security plan and stick to it.”

“You need to have a policy,” Alexander emphasized, sharing an anecdotal experience that emphasized the need for well-thought-out, consistent policies across patient care organizations. “We had a nurse who was in surgery in the OR. She took her iPhone out and took a snapshot—did not take a picture of the patient’s face, but she showed a photo on Facebook. Because the accident involved, with a very bizarre injury, was so unique, the family recognized the bone sticking out right way in that Facebook photo, so you’ve got to have privacy and security policies in place,” in order to manage the full range of privacy and security incidents possible, he said.

When it comes to mobile app-facilitated care delivery, La Brosse told a story regarding a healthcare situation in his own family. “My son had Lyme disease,” he recounted. “And we called the pediatrician, and the first thing she said was to take a picture of the rash. We did that, and emailed it to her. In hindsight,” he said, “I wondered, where is that photo today? So you need to have some wiggle room to have a Plan B around all this. There’s also always the possibility you might experience some amount of downtime, and you have to plan for that as well.”

Meadows noted, “With regard to policy development around all of this, it’s never a ‘one and done’ situation. The standards change, the policies change, the situations change. And the hardest thing is to hold people accountable to the process.” ♦

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group of individuals feel dissatisfied with a process taking place at THR, they can “escalate” their disagreement up to higher levels in the organization, namely up to the CEO. “You have to create escalation paths” to allow for the resolution of serious disagreements over the execution of policy or strategy, he said, but he quickly added that, “I’ve been at THR for seven years, four months, and 11 days, and only once has anyone escalated an issue up to the CEO.”

AS POST-MODERN CIOs, WE NEED TO MAKE SURE TO BUILD RESILIENCY AND NOT GET STUCK IN OUR WAYS. PART OF THE REASON IT IS SO FAR BEHIND IN HEALTHCARE IS THAT WE’VE GOTTEN STUCK IN OUR WAYS.

—ED MARX

Cultures are very diverse across U.S. patient care organizations, Marx stressed, but he emphasized that the principles he cited could work anywhere, and do.

Meanwhile, Marx expressed his view that, “In the past, we CIOs have been reluctant to lead; we’ve taken a back seat, and have been order-takers.” He added, “The post-modern CIO is a dichotomy. We all want a seat at the table. Often, the IT seat is missing,” he said. “We all want to be at the executive table, but we haven’t fulfilled the calling of our leadership in terms of technology leadership. My presupposition is, it’s time to lead. Time to ‘cowboy up,’ as they say in Texas, and lead. You have to be a leader, particularly now that IT is a strategic asset.”

Marx also noted that, “As post-modern CIOs, we need to make sure to build resiliency and not get stuck in our ways. Part of the reason IT is so far behind in healthcare is that we’ve gotten stuck in our ways.” Following the right governance principles, the right strategies, and of course, executing excellently, they now have an unprecedented opportunity to show leadership at a high, system-wide level, in their organizations, he said.

How will CIOs know if their IT governance processes are working well? There will be “peace” and “finality” around them, Marx said. Peace, meaning, a low level of conflict around governance processes. “Finality,” in this way: “It’s never perfect,” he said, “but people know they have the opportunity to present their case, and the judgment is final. No going around and gossiping and engaging in passive-aggressive behavior” to derail decision-making or the execution of strategies. “That sense of finality about things is how you know you have something decent going on.” ♦

Federal and State Privacy Laws: Strategies for Analysis of Big Data in Healthcare

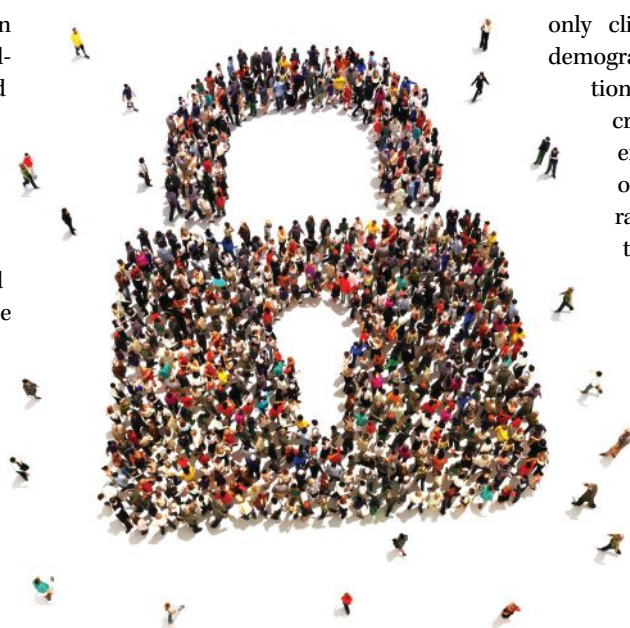
Access to big data means complying with federal as well as multiple state privacy laws. A legal expert offers advice for meeting existing legal requirements at both levels **BY M. LEEANN HABTE**

In recent years, there has been a dramatic increase in the ability of organizations to create and analyze large health data sets, often referred to as “Big Data.” In healthcare, Big Data has created many new opportunities to improve the quality of care, improve treatment of diseases, and advance public health. However, the analysis of Big Data involves certain obstacles because Big Data typically involves data obtained from multiple sources and of various types—clinical data from health care providers, data from government agencies, and data from consumers.

While Big Data integrates different types of information from different sources, U.S. privacy law is sector-specific. It regulates specific types of entities (such as health plans and health care providers) and provides special protection for certain sensitive information (such as HIV or genetic information). Further, the laws differ between states. This means that the use and disclosure of Big Data in healthcare requires an understanding of the source and type of the data, the laws that govern such information, and the impact of these laws on data use and disclosure. Although this tension between the potential of Big Data and the state- and entity-specific legal framework may ultimately prompt a reconsideration of the ways in which personal healthcare information is protected, this article offers assistance in navigating the existing regulatory structure.

FEDERAL LAWS

At the federal level, the Health Insurance Portability and Accountability Act (HIPAA) governs a broad range of health information. Protected health information (PHI) includes not



only clinical information, but also demographic and financial information about an individual that is created or received by a covered entity. Although the definition of PHI encompasses a broad range of identifying information regarding an individual's past, present, or future health condition, healthcare services, or payment for services (including demographic information), HIPAA applies only to covered entities—health plans, health care clearinghouses, and certain healthcare providers that engage in standard electronic transactions—and their business associates, i.e., any downstream subcontractors that provide financial, administrative, data transmission and certain other services for or on behalf of covered entities. Organizations that store or transmit PHI such as electronic health record (EHR) vendors and health information exchanges (HIEs) are all considered business associates under these regulations, and a covered entity may also act as a business associate of another covered entity.

HIPAA prohibits the use or disclosure of PHI without individual authorization other than for treatment, payment, and healthcare operations and for certain limited purposes as defined in the Privacy Rule. For example, uses of PHI for research or marketing require individual authorization. Not all health information held by a covered entity is subject to HIPAA. For example, HIPAA does not govern the health information in education records (such as records from school health clinics) or employment records held by a covered entity in its role as employer (such as records related to sick leave, or records gen-

erated by the employer). HIPAA also does not apply to information that is not individually identifiable, such as aggregate data or de-identified data. However, HIPAA does apply to information that is not individually identifiable but that can be identified by a covered entity through the use of a list, key, or other means. For example, HIPAA applies to information that is not individually identifiable but that can be identified by a covered entity through the use of a list, key, or other means.

erated in an on-site health clinic). HIPAA also does not govern health information gathered directly from consumers, such as information gathered through online applications. In addition, other records are specifically protected under other federal laws. For example, the federal Confidentiality of Alcohol and Drug Abuse Patient Records law protects patient records that are maintained by, or in connection with, a federally-assisted drug or alcohol program.

STRATEGIES FOR USE OF BIG DATA UNDER HIPAA

To facilitate the analysis of Big Data in compliance with HIPAA, several strategies are outlined below:

Internal Analysis for Covered Entities’ Treatment, Payment, or Health Care Operations (TPO): A covered entity may analyze PHI for its own treatment, payment, and health care operations and may analyze the PHI of entities with which it has entered into an Organized Health Care Arrangement (OHCA), as defined in the Privacy Rule. TPO encompass a broad range of analyses, such as those in support of utilization review, quality assurance, and business planning.

Creation and Use of Statistically De-Identified Data: Covered entities or business associates may de-identify PHI under the Privacy Rule and may generally use such de-identified information without limitation. There are two methods through which PHI may be de-identified under HIPAA: the Safe Harbor Method (which requires the removal of 18 identifiers) and the Expert Determination Method (which involves a formal determination by a qualified expert). The Expert Determination Method is likely a better alternative to satisfy the de-identification standard, because it allows for preservation of a greater number of data elements and a more robust data set than under the Safe Harbor Method.

Creation of Research Databases for Future Research Uses of PHI: Although there are several methods for creation of a research database under HIPAA authorization, for creation of the database and future research, uses should be requested from patients or consumers to ensure maximum flexibility for future research.

STATE LAWS: CONSIDERATIONS FOR USES OF DATA

Although technology and federal policy is leading to the amassing of a growing body of Big Data, state laws are inconsistent and can act as barriers to the exchange and analysis of health information. Whereas HIPAA establishes a federal floor for protection of health data that is consistent across all types of health information, it does not preempt contrary state laws or regulations that are more stringent than HIPAA with respect to the protection of the privacy of health information.

DATA MAPPING FOR USES OF DATA UNDER STATE LAW

State laws generally vary depending on the factors discussed

below. To address the multiplicity of state law requirements, it is essential to map the type of health information, source, and proposed uses to ensure compliance with state privacy law. Such uses may require a more individualized strategy for sensitive data, such as segmentation of certain data elements or records that contain these data.

Type of Health Information: Almost all states have laws related to “specially protected” information, e.g., sensitive information such as genetic information, HIV test results, substance abuse information, and mental health information. Therefore, any analysis of the use of health care databases must begin with the type of information involved.

Source of Data: State laws may apply to certain entities, such as healthcare providers or insurers, or may apply to health information generally. This means that information gathered directly from consumers, medical device companies, and other entities may not be subject to the same restrictions. Therefore, any determination of the applicability of state law also depends on the source of the data.

Uses of the Data: Although HIPAA governs the uses and disclosures of PHI, many state laws only restrict the disclosures of health information. This means that state law restrictions may not apply to uses of the data by the entity that created the information.

State Law Restrictions: Research uses of the information are often subject to separate authorization requirements. Additional restrictions may also apply to any uses for marketing or related secondary purposes and may require separate authorization. Certain states also impose specific requirements for valid individual authorizations for the use and disclosure of health information. Therefore, organizations should have some mechanism to track patient authorizations for disclosures and uses of health data.

CONCLUSION

In consideration of the complex regulatory scheme governing the privacy of individually identifiable health information, organizations using Big Data in healthcare should map the source, type, uses, and legal restrictions of data to identify potential barriers to proposed uses of data. Advance planning for any proposed secondary uses of such data is critical, as strategies must be developed to address the segmentation of protected data elements or records, authorization/consent, or methods for de-identification of the information. ♦

M. Leeann Habte is a senior counsel with Foley & Lardner LLP, where she is a member of the Health Care Industry Team. She is also a Certified Information Privacy Professional and a member of the firm’s Privacy, Security, & Information Management Practice. A former director at UCLA and the Minnesota Department of Health, she has practical experience in developing and implementing data privacy and security policies and procedures and managing information technology resources.

In Ohio, Optimizing Stroke Care with Telemedicine

Inside a large Ohio health system, the OhioHealth Stroke Network uses video conferencing and clinical documentation tools to have stroke neurologists on call 24/7 **BY RAJIV LEVENTHAL**

Recent statistics say that stroke is the third leading cause of death in the U.S.; more than 140,000 people die from stroke each year in the country. Undoubtedly, it is urgent to seek emergency care at the first sign of a stroke, as early treatment saves many lives and reduces the effects of stroke.

Often times, however, patients in rural areas don't have access to this much-needed care. Columbus, Ohio is not one of those rural areas, but it's the home of OhioHealth, a 17-hospital health system servicing a 40-county area. Inside the health system is the Ohio Health Stroke Network, designed to work in the manner of a "hub and spoke" model, which connects several smaller spoke hospitals to one or more hub hospitals via formal agreements to engage in telemedicine consultation. The idea is to maximize efficiency in stroke care, while minimizing the need to transfer a stroke patient elsewhere for specialized care. In this specific network, there are two hospitals or "hubs" in Columbus—Riverside Methodist Hospital and Grant Medical Center—and 19 partner hospitals or "spokes."

OUR STROKE NEUROLOGISTS ALL CARRY LAPTOPS WITH 4G CARDS EMBEDDED IN THEM SO THEY CAN LOG IN FROM ANYWHERE—FROM THEIR OFFICE, HOME, THEIR KID'S BASKETBALL GAME, OR EVEN PULLING OVER ON SIDE OF ROAD. WE'VE SEEN ALL OF THESE HAPPEN.

—STEVE HICKENBOTTOM

When a stroke victim is brought to a partner hospital's emergency department, the emergency medical team provides direct treatment on-site, while collaborating with OhioHealth's emergency stroke team, using real-time technology from a mobile cart, explains Steve Hickenbottom, the system business relationship manager at OhioHealth Stroke Network. This mobile cart, equipped with a two-way camera



and audio connection powered by the Alpharetta, Ga.-based REACH Health technology, is located in the partner hospital's emergency department and connects to OhioHealth's electronic intensive care unit (eICU).

The advanced technology allows OhioHealth stroke specialists, who are on-call, to actually see the patient. They can evaluate the patient's condition; view test results; confer with the community hospital's physicians; and help determine the correct course of action immediately. After initial evaluations and tests are completed, the OhioHealth stroke team can help determine whether or not the patient should remain at the local hospital or be transferred to an OhioHealth certified stroke center, Hickenbottom says.

HOW A TELESTROKE NETWORK CAME ABOUT

In 2009, the concept of a telestroke network emerged in Ohio when leaders at OhioHealth began to realize that when a patient in a remote hospital had the signs or symptoms of a stroke, it was necessary that the patient needed to be looked at by a stroke neurologist. The neurologist would determine if that patient was a candidate for the clot-busting drug tissue plasminogen activator (t-PA) or other procedures that could benefit that patient immediately, Hickenbottom explains.

"The problem was that these smaller hospitals didn't have a neurologist on staff or didn't have one available 24 hours a day," Hickenbottom says. "So the only option was to put that patient in a helicopter and fly him or her to a larger facility

where a neurologist would be available. As we know, time is brain and the quicker and sooner we could diagnose and get treatment to the patient, the more brain cells we could save," he says.

[THIS SERVES AS AN] EXTRA SET OF EYES AND EARS. IT HAS BEEN A WAY FOR US TO UTILIZE TECHNOLOGY AND ADD ANOTHER LAYER ON TOP OF OUR BEDSIDE NURSING. WE HAVE BEEN ABLE TO IMPROVE OUTCOMES BECAUSE OF IT; eICU IS A TRIAGE POINT FOR OUR STROKE NETWORK.

—STEVE HICKENBOTTOM

As such, leaders at the health system started to look at how telemedicine could solve this issue. During the early stages of this process, they started off by putting together their own homegrown system using in-house technology and video conferencing tools that were already in place. But a good mechanism for capturing the clinical information was missing, notes Hickenbottom. In 2010, he says, REACH's clinical documentation tool was put in place, and eventually, the vendor's fully-integrated platform with the clinical documentation tool as well as the video conferencing tool was implemented, putting everything in one application. "What we had before was clunky and difficult for physicians to use, as they had multiple applications open at the same time," Hickenbottom says. "There was a bandwidth issue with our partner hospitals, so we struggled with having a reliable platform. But we have been able to solve those Internet issues," he says.

A GAME-CHANGING PROGRAM

In OhioHealth's eICU, critical care nurses sit in front of monitors and oversee the critical care beds in all of the health system's facilities. As Hickenbottom puts it, this serves as an "extra set of eyes and ears." He adds, "It's been a way for us to utilize technology and add another layer on top of our bedside nursing. We have been able to improve outcomes because of it; eICU is a triage point for our stroke network," he says.

When a patient shows up in one of the rural hospitals, the nurses in the ER pull a mobile cart into the room and kick off the process, notes Hickenbottom. "We encourage our hospitals to register any patient that comes in that might be a stroke candidate of any kind. Our eICU nurses will then help to triage those patients," he says. Between the eICU nurses and the physician at the hospital, if a decision is made to bring on

a neurologist, the eICU nurse will get the neurologist to join the consult, Hickenbottom explains. "Our stroke neurologists all carry laptops with 4G cards embedded in them so they can log in from anywhere—from their office, home, their kid's basketball game, or even pulling over on side of road. We've seen all of these happen," he says.

Hickenbottom recalls a situation in which a 58-year old female patient with stroke symptoms came into the ED at one of the northern Ohio facilities. Based on the NIH Stroke Scale (NIHSS) a tool from the National Institutes of Health used by healthcare providers to objectively quantify the impairment caused by a stroke, the patient had a score of 7 on the 0-44 scale (0 is best, 44 is most severe). "We fired up the mobile cart, and the neurologist was on the screen within a few minutes," Hickenbottom says. "The patient was given t-PA, but she got worse rather than better. The neurologist recommended that she should be flown to our hub hospital in Riverside for more careful evaluation. There, the clot was pulled out of her brain mechanically, and blood flow was restored. She walked out of the hospital two days later with no deficits. If not for this telemedicine program, the deficits would likely have been far greater."

FIGHTING THROUGH CHALLENGES

In today's healthcare, of course, not all telehealth costs are reimbursed. According to Hickenbottom, there is not good legislation on the books in several states, including Ohio, when it comes to telemedicine reimbursement. "Currently there are strict rules around what is considered a rural area—there are many caveats involved," he says. "So for us to be able to determine which hospitals we would be able to bill for these consults and which ones we wouldn't, coupled with the amount of reimbursement, which only comes out to \$30 or \$40 for one, it's not worth it to us considering the overhead costs," he explains. He adds that legislation in the state is being considered to force third-party payers to reimburse for telemedicine. "But that is not happening currently, so it's a struggle, and I know Ohio is not alone with that struggle."

Considering this reimbursement challenge, another stumbling block presents itself in the form of getting attending physicians to buy in to the value of telemedicine. "It's been difficult to convince the ER physicians in the local hospitals that it's better for the patients to put them on the telemedicine cart and have a neurologist take a look at them," Hickenbottom says. "It's difficult to change that mindset, because many of the physicians just want to get the patient out of their ER as quick as possible. The telemedicine cart slows that down." Hickenbottom notes that since the neurologists get a stipend for these calls, they're more on board with the program. "But it's not just the stipend," he attests. "They have seen and thus believe that telemedicine leads to better outcomes." ♦

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Adapting to the Priorities of the New Healthcare IT Workforce

Millennials are highly educated, ambitious and mobile. Will your organization be able to attract and hold on to the best people? **BY TIM TOLAN**



Tim Tolan

An organization's most important asset can be defined in a number of ways, depending on the person defining the term and their own role. I am a big believer that, in most organizations, the most important asset is the human capital that makes everything happen. While the balance sheet report gives us a snapshot of the health of an organization in terms of assets and liabilities, it does not capture the

relevant importance of the people who "keep the trains running on time."

I am in the human capital business, and I have seen the employment market change dramatically over the last seven years—it's not been stellar in most sectors. Many markets are still struggling to find their way through this long, drawn out recovery. Some sectors have fully recovered, while others have seen their best days and a real recovery is not going to happen any time soon—if ever.

This brings me back to why I believe (and why you should believe) that your greatest asset is the team you've assembled that supports your mission and the organization's objectives. In years past, many of us have taken this asset for granted because of the job market and the freedom to be more selective when hiring new recruits. Many healthcare organizations asked employees to wear multiple hats instead of hiring more people due to budgets and a slowdown in hiring. Market dynamics have now changed and things are improving across our sector—and in fact, the forecast looks very bright.

The North American HCIT market is forecast to grow at a compound annual growth rate of 7.4 percent, to reach \$31.3 billion by 2017 from \$21.9 billion in 2012. That's huge. The growth is mainly due to an increased demand for skills around clinical information technology, as well as administrative solutions and services. It's exciting on one hand but a bit scary on the other, as the demand for who I refer to as "the do'ers" is going to grow. In a recent survey, the greatest demand in healthcare IT includes IT/technical management leaders, analysts, informatics, system analysts and project

managers. So the do'ers are going to be in demand, and heavily recruited by healthcare organizations using higher compensation and other perks that are more important to younger, more educated employees than ever before.

The data is real, so get ready to adapt or watch your up-and-comer millennials look for greener pastures.

The U.S.—Bureau of Labor Statistics predicts that millennials will make up approximately 75 percent of the workforce by 2030.

MILLENNIALS DON'T THINK WORKERS SHOULD BE EXPECTED TO STAY WITH THEIR EMPLOYER MORE THAN A YEAR. THAT'S A BIG CHANGE COMPARED TO BOOMERS. —TIM TOLAN

Here are a few data points to consider:

- Millennials are the most educated generation in history.
- Approximately 79 percent of those in the Gen-Y category hold at least a bachelor's degree, compared to 69 percent for those in the Gen X category and only 62 percent for Boomers.
- Millennials don't think workers should be expected to stay with their employer more than a year. That's a big change compared to Boomers.
- Millennials are ambitious and eager for their careers to grow and more hungry to learn new skills than their Gen X or Baby Boomer counterparts. Also, they favor managers who are friendly.

Here's the net: We all need to think different about the value as an employer you bring to the table. In years past if you had an open requisition you could fill it in a reasonable amount of time—for the most part. That is all about to change and while the demographic shift will be gradual it will also be noticeable. If you adapt and understand the new workforce dynamics, you should be fine.

If not, it could be a very slippery slope. ♦

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