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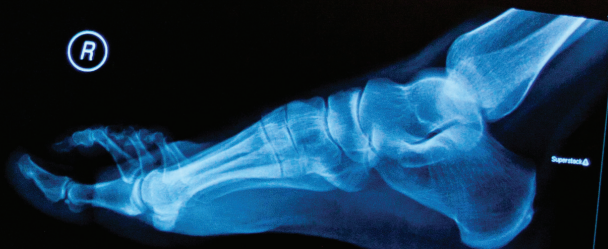
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COVER STORY

8 POSTCARDS FROM THE IMAGING INFORMATICS ROAD

This month's cover story package gathers the perspectives of five leading pioneers in imaging informatics, which together provide a glimpse of the path ahead in a strategic landscape that is filled with contrasts and paradoxes. The lead story provides a broad overview of the current policy and reimbursement landscape, followed by four separate profiles: the inside stories of a system for improving the diagnostic process for trauma patients; radiologic financial analysis in a group practice setting; advancements in cardiology information systems; and a self-developed federated image viewing platform **BY MARK HAGLAND**

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The power to do more

Imaging Informatics Pioneers, State Healthcare Legislation, HIE Sustainability Secrets

A combination of factors—rapid advancing technology, the expansion of medical archiving across medical specialties, and imaging as a key component in the development of HIEs—is moving imaging informatics forward towards new innovations. In this month's cover story, which begins on page 8, Editor-in-Chief Mark Hagland interviews five imaging informatics pioneers, and presents the big picture of how these changes are influencing the strategic landscape of this vital sector, as well as profiles leading provider organizations that have leveraged innovations to advance their strategic visions.

On page 18, Senior Contributing Editor David Raths examines what CIOs are doing to meet state government health IT legislation, with an eye on what it means for patient privacy and security, technology requirements, and payment reform that go beyond federal mandates.

The question of economic viability of health information exchanges has become more and more important as HIEs gain a foothold in many regions across the U.S. In the feature story on page 24 Associate Editor Jennifer Prestigiaco analyzes the findings of a report recently released by the Washington, D.C.-based National eHealth Collaborative, which presents case studies of 12 economically sustainable HIEs nationwide.

This month's Quality Perspective on page 36 looks at major Medicare reimbursement changes that may be on the horizon, stemming from a proposed rule for the Medicare Hospital Inpatient Prospective Payment System. Mark Hagland discusses the implications with Jane Metzger, principal researcher at the Global Institute for Emerging Healthcare Practices, a division of the Falls Church, Va.-based CSC, who with research analyst Caitlin Lorincz has co-authored a report on performance-based reimbursement.

This issue's Expert's Corner on page 42 takes an inside look at how a team of clinicians, researchers, and informatics personnel at the Mayo Clinic developed an ICU data mart, an integrated database where all pertinent data regarding critically ill patients are stored in near real-time.

Correction: In the September issue on pages 6 and 18, the deadline for the transition from ICD-9 to ICD-10 was misstated. The correct date is October 1, 2013. We regret the error.

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Images, Everywhere

FORTUNATELY, FOR IT-AVERSE DOCTORS, IMAGING INFORMATICS INNOVATORS ARE KEEPING MDs IN MIND



Mark Hagland

In the April 2010 edition of this column, I wrote about my college friend “Linda” (not her real name), who, out of a desire never to end up as a secretary, made a childhood vow with her several sisters not to learn to type, believing that avoiding typing class would save her from a lifetime clerical fate. Of course, numerous developments in the larger world have forever altered the landscape against which Linda made her youthful vow. Indeed, 40

years later, keyboarding has become an essential skill for practically everyone, as typing has become fundamental to the use of computers of all kinds, and the use of computers has become a core part of living in the modern world.

To add to the irony of it all, Linda, a liberal arts professor, has even been forced in the past few years to teach a couple of online courses to undergraduates (an experience she found highly distressing). Perhaps not surprisingly, Linda has come to strongly resent technology; she refuses to buy or use a cell phone, uses computers only as absolutely necessary at work, and is virulently opposed to social media such as Facebook. She regularly expresses nostalgia for the pre-Internet era, and proudly describes herself as a Luddite who wants society to go back in time to a less technologically infused world.

Of course, sadly for Linda, the world is not moving in reverse—technologically or in any other way. And while most of the readers of this magazine will probably find Linda to be a rather curious person, they should always keep in mind that many physicians—who use medical technology as a matter of course in their work-lives—remain rather “Linda-like” in their hesitancy to engage with information technology as part of their daily workflow.

Happily, many of the innovations being moved forward in the imaging informatics space are being aimed directly at not only improving care quality, but also at making

the lives of physicians—whether ordering physicians, radiologists, or consulting physicians—easier. For example, at Denver Health, CTO Jeffrey Pelot has been helping to lead an impressive initiative that is speeding and greatly improving the series of processes around potential patient transfers to that trauma center, and saving precious minutes for clinicians and patients, as well as in many cases averting unnecessary re-radiation of patients.

Meanwhile, at other patient care organizations, such as Cooper Health System in Camden, N.J., leaders are moving forward to implement cardiovascular image management. And at the 20-hospital University of Pittsburgh Medical Center (UPMC) health system, Dr. Rasu Shrestha has been helping to lead the implementation of a federated viewing platform that is bringing needed images to physicians at the point of care and study across a vast, complex integrated health system. The challenges in moving forward in imaging informatics, not only technologically, but also in terms of working with care delivery processes, are, of course, manifold and complex.

All of these initiatives, and more, are described in my cover story in this issue. What’s fascinating to me is how diverse the various approaches to imaging informatics innovation have been and continue to be. What’s more, it’s been heartening to learn how intent healthcare IT leaders have been, and continue to be, in their emphasis on making things work for physicians in their daily work-lives. Technology-driven change is always challenging for end-users; but it’s good to know that leaders in the field are keeping in mind the many “Lindas” out there as they move forward to improve care delivery processes for everyone.

Mark Hagland
Editor-in-Chief

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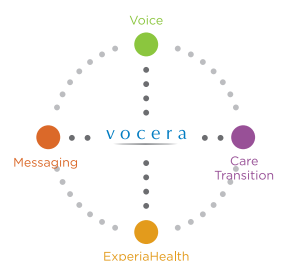
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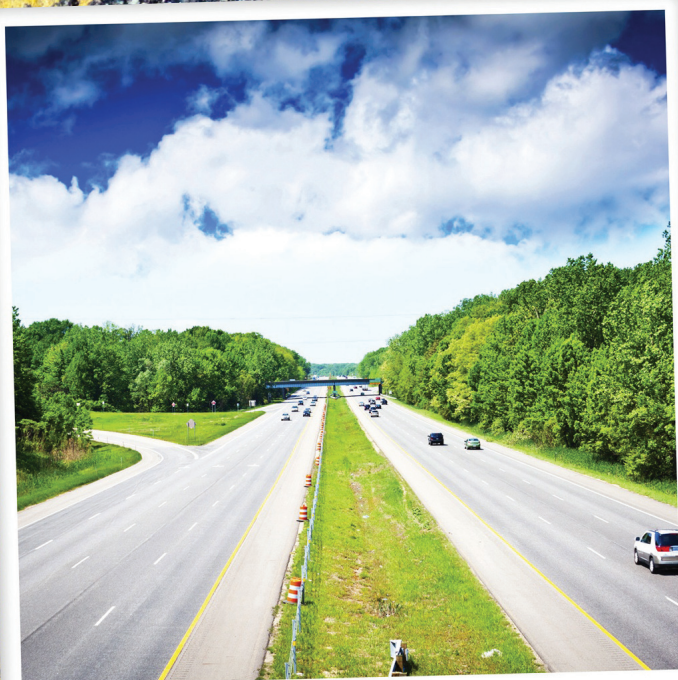
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Postcards From the Imaging Informatics Road





DESPITE POLICY COMPLEXITIES,
DIAGNOSTIC IMAGING INFORMATICS
MAKES PROGRESS ON MULTIPLE FRONTS
BY MARK HAGLAND

EXECUTIVE SUMMARY:

The current strategic landscape for imaging informatics is one filled with great contrasts and paradoxes. On the one hand, because imaging informatics was not explicitly addressed in Stage 1 of the meaningful use requirements under the American Recovery and Reinvestment Act/Health Information Technology for Economic and Clinical Health Act (ARRA-HITECH) legislation, it instantly lost some of the environment of turbo-charged energy characterized by areas that were directly addressed by the HITECH Act, such as quality data reporting, care management, and of course, core electronic health record (EHR) development.

On the other hand, an interesting combination of factors—rapidly advancing technology, the expansion of the image archiving concept across different medical specialties, and the inclusion of diagnostic image-sharing as one element in the development of health information exchange (HIE) arrangements nationwide—is nonetheless pushing imaging informatics forward towards new innovations.

The five articles below provide readers with different glimpses of the path ahead for imaging informatics. The first presents a look at the current policy and reimbursement landscape. Each of the four subsequent articles delve into different aspects of innovation, from a process developed at a public hospital to improve and speed up the diagnostic process for trauma patients, to a radiology-specific financial analytics solution in the group practice setting, to an advance in cardiology information systems, to a self-developed federated image viewing platform at one of the nation's largest integrated health systems.

Each of those initiatives is very different; yet it is clear that a great deal of innovation is taking place across the U.S. healthcare system when it comes to imaging informatics. With a landscape filled with uncertainties and potential policy, reimbursement, and industry shifts in the offing, CIOs, CMIOs, and other healthcare IT leaders will need to think very strategically where this critical area fits into their organizations' overall clinical IT strategies going forward.

LOOKING ACROSS THE INDUSTRY AND POLICY LANDSCAPE

THE ACR'S KEITH DREYER, M.D., IS MAKING THE BIG PICTURE AROUND IMAGING INFORMATICS

Keith Dreyer, M.D., is as involved as any practicing radiologist with the policy and strategic IT issues facing radiologists as any radiology professional in the country these days. Not only is Dreyer vice chairman of radiology at Massachusetts General Hospital (one of the member hospitals within the Boston-based Partners HealthCare), and assistant professor of radiology at Harvard University; he is also co-chair of the Informatics Committee at the Reston, Va.-based American College of Radiology (ACR), and chairman of the ACR's Government Relations Informatics Committee.

Dreyer sees three important trends advancing within the imaging informatics world. The first is the shift towards vendor-neutral archiving; the second is forward progress around meaningful use, as well as interest in accountable care organization (ACO) development under healthcare reform. And the third is technological and tactical changes in approaching

image capture and acquisition in hospitals and other patient care organizations. In addition, Dreyer is carefully tracking current reimbursement and policy trends, and representing the ACR and his fellow radiologists on policy issues in Washington, D.C.

The first industry trend, towards vendor-neutral archiving, is evolving forward in the context of enterprise-wide clinical image management, Dreyer notes. "For example," he says, "at Partners HealthCare, we installed PACS [picture archiving and communication systems] in the mid-1990s. And at that time, our then-CIO, John Glaser, Ph.D., said to me, "This isn't really my thing, it's a radiology thing." That view was nearly universal among CIOs at the time, Dreyer says; the first PACS were seen as department-level systems meant to help radiologists with what were seen as uniquely specialized needs.

Fast-forward to the present day, however, and it's become increasingly clear to CIOs and other healthcare IT

leaders that, "Now that radiologists have had their needs met, the cardiologists, pathologists, gastroenterologists, and other specialists are increasingly seeing the need for image archiving systems for their specialties." And while the industry initially responded to cardiologists' needs with "cardiology PACS," it's becoming clear that the only workable solution is to create an enterprise-wide image archiving system that meets the needs of all specialties (and of their referring physicians) for such tools.

SHARING IMAGES ACROSS ENTERPRISES

At the next level, of course, there is image-sharing that takes place among providers in different organizations. "It's very easy now to take an image from an MR or CT and store it in a PACS system; and nearly everybody can also store images now in the EMR," Dreyer says. "But what nearly no one can do is send that image across to another enterprise." Fortunately, he

(Continued on p. 16)



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DENVER HEALTH: Co-Development at a Safety-Net Hospital

Denver Health, the 500-bed safety-net hospital for the Denver area, faces unique opportunities and challenges. On the one hand, part of the operational lifeblood of the hospital is referrals and transfers of trauma patients to its facility from outlying hospitals in the region. On the other hand, operating within a public-hospital context, Denver Health's 150-member IT staff has always had to make do with less-than-unlimited financial resources. So it's not surprising that the organization should pioneer imaging-sharing advances through collaborative development work with its vendor, says Jeffrey Pelot, Denver Health's chief technology officer.

"To be clear," Pelot says, "trauma care is a money-making opportunity; and to be good at trauma, you have to do a lot of it. There are four other level 1 trauma hospitals in the Denver area. So this was a business development effort, and the intent was to provide a very quick and reliable method for level 2 and level 3 hospitals to contact us and to send images to help determine whether a patient should be transferred."

But the historical method for handling such situations involved 11 steps, he notes, including bringing a patient into Denver Health, facilitating physician-to-physician phone consults, burning a CD,—“and we might end up doing duplicate exams” because various time-lag elements.

Pelot says, “My PACS administrator came up with an idea for a solution. We approached what was Amicas at the time, and said, we'd really like to be able to receive images with great rapidity, as opposed to going through a typical CD-burning process. So they built a CDCOM router for us.” Ultimately, the solution, which first went live at Denver Health three years ago, was enhanced and commercialized as iConnect, one of a suite of solutions from the Chicago-



Andrew Steele, M.D., director of medical informatics at Denver Health, uses the iConnect imaging solution that was co-developed by Denver Health and Merge Healthcare. Photo: Merge Healthcare; photographer: Stephen Higham

based Merge Healthcare.

Nowadays, when a remote hospital facility produces a diagnostic imaging study, that study can be communicated to Denver Health with the push of a button. The study is immediately put into a pending status, so once the associated patient arrives at Denver Health, the study is assigned to that patient, with a medical record number immediately attached to it. As a result, more than an hour's worth of time is usually saved, which, in the context of trauma care, is an enormous time savings.

What's more, 27 care sites are linked to Denver Health through the solution, across three states, Colorado, Wyoming, and Nebraska. And the volume involved is significant, with more

than 500 diagnostic imaging studies per quarter are involved. In addition, Denver Health has created a cardiology gateway, with cardiac image-sharing capability; and the organization also participates in a Web-facilitated tumor review board process with other hospitals in the region.

Asked what the lessons learned so far in Denver Health's venture have been, Pelot says, “We continue to learn stuff all the time. The biggest thing we've learned so far is that we're providing much better patient care, because we can decide far more rapidly whether a patient should be transported or not; and when we do transport, the chances of the patient surviving are very, very high.” ♦



KOOTENAI IMAGING: Better Financial Management in Idaho

Like radiology groups around the country, the 12-radiologist Kootenai Imaging in Coeur d'Alene, Idaho has been typical in its growing need for optimized billing management. With only two non-physicians on staff—the organization's practice administrator, Scott Venera, and one nurse practitioner, Kootenai Imaging is a lean medical organization, and until earlier this year, the practice had its billing and collections work done by a small, locally owned firm. "But we've essentially outgrown that model," Venera says. "So we put the whole thing out to bid, and at the end of the day, we settled with McKesson"—the McKesson Revenue Management Services solution from the Alpharetta, Ga.-based

McKesson Corp.

Today's reality for medical groups, Venera says, is that "You can't just send out a bill any longer and call it good." Instead, he says, he and his colleagues came to realize that "We needed a better pulse on our financial practices, and the ability to data-mine, so that we would be better prepared for changes we're currently facing, and are about to face, including competitive pressures, reimbursement, the transition to ICD-10, and the PQRS pressures," referring to the quality measures required under the Medicare program's Physician Quality Reporting System, which currently provides bonuses for meeting certain quality standards, but which will also involve reimbursement cuts

in the next couple of years.

The solution went live on July 1, and at press time, Venera and his colleagues at Kootenai Imaging were just beginning to plumb the first metrics around improvements in efficiency and effectiveness of their billing system. But what is already clear, Venera says, is that the future in this area lies in the ability to apply data analytics to all aspects of billing and collections in the medical group setting. "Data is so important to analyze moving forward," he emphasizes. "You really need to anticipate where you need to be; and if you don't have the ability to take the data that you generate and be able to show measurements of various types, you're not going to succeed." ♦

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COOPER HEALTH SYSTEM: Cardiology Considered

At Cooper Health System in Camden, N.J., which encompasses a 500-bed urban university hospital and over 80 physician office locations, Phil Curran, CIO, and Rose Alapatt, applications analyst, have been helping to lead innovation in a number of areas, one of which has to do with cardiology. As in other hospital organizations nationwide, the cardiologists at Cooper Health System found themselves struggling to manage the ever-expanding welter of images and data they need to work with in order to best serve their patients. So beginning in late 2008, Curran, Alapatt, and their colleagues began looking into vendor solutions in the cardiology area. What Curran and Alapatt knew from the outset was that cardiology image management is very different from radiology image management, for a variety of reasons.

Asked whether they believed initially that implementing a cardiology image management system would be similar to implementing a radiology PACS, Curran says, "We never made that assumption. And we work very closely with the cardiology folks, and they flat-out told us, we need more information, we need to manipulate the images differently; so it's not a cardiology PACS system."

For one thing, as Alapatt notes, "Cardiology images are moving images, whereas the radiology images are still," meaning that any kind of image management system in cardiology must be very robust from the get-go. Indeed, she reports, "Four of our five outside offices do images, and we did have to increase the bandwidth from those offices to our cardiology information system at our data center. We figured out the average number of bytes per image, figured out how many images would be taken during a day, added that to the amount of bandwidth that they already had, and added that much more bandwidth to those four offices" in preparation for the go-live, she says.

After vetting several products, the folks at Cooper ended up going with the Horizon Cardiology cardiovascular information system (CVIS) from McKesson, going live with the CVIS in the spring of 2010, and interfacing it with the hospital's core EHR, from the Verona, Wis.-based Epic Systems Corp. As of press time, the CVIS, which is web-enabled, is fully implemented for echocardiology and vascular medicine, across about 12 modalities, and across the hospital's main campus and four satellite locations. Any clinician with appropriate access to the

CVIS can now view an image or interact with the system from any PC across the health system. What's more, virtually 100 percent of the cardiologic images are going into the Epic EHR (which spans inpatient and outpatient care delivery), Curran notes.

"This was a very big team effort between cardiology and IT," testifies Curran. He and Alapatt agree that having the cardiologists on board from the very outset has been essential to the success of their CVIS implementation. Another critical success factor, Alapatt says, is doing what the Cooper IT team always does, which is establish the goals and objectives before anything moves forward.

What would he advise other CIOs? Tellingly, Curran says that "If they don't have any type of PACS system in place yet, they need to think about getting all their 'ologies' into place in a coordinated way: radiology, cardiology, pathology, and so on. If they do have a radiology PACS system in place, they need to make sure the front end of the radiology PACS system works well with cardiology. And the third thing is to significantly reduce the physical footprint. They do need to consider virtualization; you can call it an internal cloud, if you'd like." ♦



UPMC: In Pittsburgh, a Federated View of Diagnostic Images

If anyone might be said to have a big-picture view of the future of imaging informatics, it would be Rasu Shrestha, M.D., vice president for medical information technology and medical director for interoperability and imaging informatics, at the University of Pittsburgh Medical Center (UPMC) health system.

Shrestha, who practiced as a radi-

ologist for a number of years before gradually moving towards full-time imaging informatics management and strategy, is helping to lead a revolution in informatics across this vast integrated healthcare system, which encompasses 20 hospitals, 400 outpatient sites, nearly 50,000 employees (including 2,700 employed physicians), and, when it comes to im-

aging, has a staggering 400 terabytes worth of radiologic images stored in its servers (out of 1.9 petabytes of data and images system-wide), and whose clinicians are performing 2 million diagnostic imaging exams a year across UPMC's 20 hospitals and 30 imaging centers.

Given such a huge volume of images and studies, as well as diverse

PACS systems across its hospitals and imaging centers, it should come as no surprise that Shrestha and his colleagues would have “developed a number of things around addressing the pain points” in terms of physician access and management of information, as Shrestha puts it. Indeed, one of the signal informatics achievements of the past few years at UPMC has been the development of a platform called SingleView.

SingleView is not a vendor-neutral archive, Shrestha emphasizes. Instead, it is a federated platform. “It’s like an umbrella,” he explains, “deployed across 20,000 desktops across UPMC. And both attending radiologists and referring physicians rely heavily on SingleView, because it provides a federated view of the patient across systems.” Rather than acting as an archive, SingleView works in the background, he explains,

“bringing up different radiological reports from other hospital’s within the enterprise, and from other PACS systems that previously did not talk to each other.”

Work began on developing SingleView after a conversation Shrestha had had with a UPMC radiologist who is considered one of the top MRI neuroradiologists in the U.S. That doctor had fortuitously guessed at the existence of a study for a patient who had been treated in two different UPMC hospitals during different periods of time. The logic of creating a federated view, Shrestha says, was unassailable. So he and his team set to work, architecting the federated platform within about six months.

SingleView has proven to be a great success among physicians across UPMC, Shrestha reports. What’s more, the platform’s capabilities will only become more broadly applied, as

the integrated health system moves forward in multiple informatics areas, including, notably, its breakthrough digital pathology initiative, announced late last year as a partnership with GE Healthcare, through the longstanding UPMC-GE joint venture, Omnyx.

As digital pathology comes online, and as other specialties move forward with digital informatics initiatives, it will be through such architected solutions as SingleView that UPMC clinicians will be able to make the most of the vast, if highly diffuse, resources, of their integrated health system, Shrestha says. He adds that the benefits will be improved patient safety, care quality, clinician workflow, efficiency, and cost-effectiveness. In other words, getting the big picture will continue to be an essential part of the journey forward in clinical informatics. ♦

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(Continued from p. 10)

notes, vendors are beginning to create secure private or public clouds (or mixed private-public clouds) that can securely and in a timely way get images from one clinician to another, as appropriate, so that, “without build-

that cross-enterprise image import,” he says, and notes that his organization is already able to exchange diagnostic images through that technology without the use of CDs. As that technology improves over time, he emphasizes,

IT'S VERY EASY NOW TO TAKE AN IMAGE FROM AN MR OR CT AND STORE IT IN A PACS SYSTEM; AND NEARLY EVERYBODY CAN ALSO STORE IMAGES NOW IN THE EMR. BUT WHAT NEARLY NO ONE CAN DO IS SEND THAT IMAGE ACROSS TO ANOTHER ENTERPRISE.
—KEITH DREYER, M.D.

ing VPNs or dedicated lines or anything, they can create that connectivity and sharing.”

In addition, Dreyer and his colleagues at Mass General and Partners HealthCare have implemented and have been enhancing “technology that loads a CD from another organization and transmits the images into our PACS and then into our EMR. We call

patient care organizations will finally move out of the current situation, in which imaging departments find themselves drowning in CDs, some of them in non-compatible formats, from other organizations, and sending out many thousands a year themselves. (Mass General alone produces 200,000 CDs a year for other organizations, Dreyer notes.)

REIMBURSEMENT ISSUES COMPLICATE EVERYTHING

On the policy and reimbursement front, numerous diverse trends are affecting radiologists in different ways. On the one hand, the Office of the National Coordinator for Health IT (ONC) confirmed last year that radiologists are considered eligible providers under both the Medicare and Medicaid HITECH programs; under the Medicare stimulus program, a physician cannot provide more than 90 percent of their Medicare-covered services in the inpatient or emergency room settings. But there are still some complications around achieving the meaningful use requirements, and it is not entirely certain that the Stage 2 requirements will clarify things for radiologists. Still, the ACR has been urging radiologists to participate in MU/HITECH.

More broadly, however, Medicare physician reimbursement overall may pose more serious issues for radiologists, particularly if the “super-committee” created in the U.S. Congress to work out remaining unresolved issues from the bipartisan agreement this summer over lifting the federal debt ceiling cannot resolve certain questions. Some federal policy analysts are predicting major provider payment cuts under Medicare, with specialists the most vulnerable. In addition, the ongoing lack of resolution around the

issues; “and there are a lot of advocacy efforts involved around that, because you could end up decreasing imaging, but increasing costs elsewhere. But regardless of what happens from a reimbursement standpoint, the challenge for radiologists around MU is very simple, because the 25 main requirements don’t really apply to what we do, and don’t really speak to the necessary technology necessary for improving patient care within our specialty,” he adds.

Given all this uncertainty around

he says. They need to start looking at enterprise visualization tools [formerly referred to as “enterprise image distribution tools”] and cross-enterprise image-sharing,” as tools that can appeal to radiologists as they begin to transition to the emerging world of image management. And on the other side of the ledge, CIOs should look into clinical decision support for image-ordering, for ordering/referring physicians.

And then there is the work towards creating health information exchanges (HIEs), which will most certainly involve radiologists at some point, in every organization.

In the end, Dreyer says, CIOs and other healthcare

I WOULD BET THAT NO MORE THAN 25 PERCENT OF CIOs REALIZE THAT RADIOLOGISTS ARE GOING TO BE ELIGIBLE PROVIDERS, SO CIOs NEED TO GET RADIOLOGISTS INVOLVED IN THE CONVERSATION. —KEITH DREYER, M.D.

continuing delay in implementing the sustainable growth rate (SGR) formula for Medicare physician payments (with an average 29.5-percent pay cut looming next year), is adding uncertainty to the mix.

“I don’t disagree with you that radiology may get hit,” Dreyer says of the cluster of physician reimbursement

reimbursement, which likely will strongly influence how radiologists respond to the meaningful use imperative, Dreyer urges CIOs to “get educated. I would bet that no more than 25 percent of CIOs realize that radiologists are going to be eligible providers, so CIOs need to get radiologists involved in the conversation,”

IT leaders need to look at the imaging informatics world as one key piece of the overall clinical informatics puzzle. With technological, policy, and industry changes all creating shifts in the landscape, radiologists and imaging informatics will, he concludes, become more and more a part of the broader conversation going forward. ♦

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State of Change

AS CIOs GRAPPLE WITH STATE GOVERNMENT HEALTH IT LEGISLATION, TECHNOLOGY REQUIREMENTS FOR PAYMENT REFORM ARE NEXT ON THE STATES' AGENDA **BY DAVID RATHS**

EXECUTIVE SUMMARY:

State legislation poses an added layer of challenges for CIOs in meeting privacy and security, patient consent, technology, and payment reform that go beyond federal mandates.

When it comes to health IT policy mandates, regulations and legislation, Meg Aranow may have different opinions depending on which hat she is wearing on any given day.

As vice president and chief information officer for 508-bed Boston Medical Center in Massachusetts, Aranow thinks she knows what is best for her organization and the right pace of change for her institution. "Your attitude tends to be, I am smart and well intentioned, so leave me alone."

But as a member of the Massachusetts Health Information Technology Council, charged with overseeing implementation of statewide interoperable health records by Jan. 1, 2015, she sees things quite differently. "As a member of the council, I have a much greater appreciation for the role of policy and legislation to move groups of people at a faster pace."

And in Massachusetts, legislation pre-dating the Health Information Technology for Economic and Clinical Health (HITECH) Act has serious con-



sequences for non-complying providers. Chapter 305 of the 2008 legislative session the Massachusetts Legislature requires that hospitals and community health centers use interoperable computerized physician order entry (CPOE) systems by October 2012 as a

condition of licensure. By 2015, physician licensure will be conditioned on demonstration of competency in CPOE, e-prescribing, and other forms of health IT, as determined by the Board of Registration in Medicine.

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ing firm attention focused on federal efforts to promote health information technology adoption, the role of state legislation is often overlooked. But in many states, including California, Massachusetts, New York, and Minnesota, health IT incentives and mandates preceded the HITECH Act, and CIOs in those states must calibrate their efforts to respond to both meaningful use and state-level requirements, which can be especially tricky when it comes to privacy and security guidelines.

Traditionally, state privacy laws have been scattered rather than uniform, notes Helen Oscislawski, a Princeton, N.J., attorney who is a member of the New Jersey Health Information Technology Commission. State laws about privacy and security were written for a paper world and most haven't caught up yet, she adds. "For instance, here in New Jersey there have been laws that apply to licensed ambulatory care centers and different laws that apply to hospitals about consent for sharing data."

Oscislawski says that the national push to share data outside the four walls of an institution is forcing state legislatures to make their own judgment calls on privacy and consent issues and legislators must weigh the practical impact of laws they pass.

"CIOs would like one simple set of rules," she says, "but unfortunately they have to look at both federal and state rules and follow whichever is most stringent."

Some CIOs say that tracking the combination of new federal and state rules is daunting. "There is a rainstorm of new regulations and incentives from Washington, some of them doing wonderful things, in HITECH and PPACA [Patient Protection and Affordable Care Act]" says Tina Buop, chief information officer for Muir Medical Group IPA, a multi-specialty IPA of more than 600 physicians in Walnut Creek, Calif. "But with so many requirements changing, it is a challenge to find them all and have them in one place. Add in state requirements, and it is incredibly difficult to keep up."

Although she has served on the California Privacy and Security Advisory Board, Buop says she still has difficulty keeping up to date. In California, she has her eye on three pieces of legislation, two of which have been signed into law. AB 211 requires providers to implement specific safeguards to patient data security and SB 541 increases the fees across any breach and the disclosure reporting requirements. Covered enti-

ties in California may face both state and federal investigations in breaches affecting more than 500 records.

Not yet signed into law, SB 850 would require an electronic health or medical record system to automatically record and preserve any change or deletion of electronically stored medical information, and would require the record to include, among other things, the identity of the person who accessed and changed the medical information and the change that was made to the medical information.

"At Muir, we have tight change controls and a tracking system," Buop says, "but what if a physician started to write a prescription and then realized it was for the wrong patient. As the hosting organization, would we have to automatically preserve the initial mistake, which may require additional archiving and cost physicians more? Every time the legislature passes something like this, there is a financial impact for hospitals and physicians."

From a technical standpoint, she adds, rules that are uniform across the country are much easier for software vendors and for implementation teams to put in place.

DON'T MESS WITH TEXAS' PHI

Also on the privacy and security front, the Texas Legislature raised some eyebrows this year by passing HB 300, which among other things, requires ongoing employee training about laws concerning protected health information (PHI) and increases penalties for the wrongful disclosure of PHI.

"It's ironic that a Republican-controlled legislature that is against most forms of regulation would pass something like this unanimously," says Michael Silhol, an attorney in the healthcare practice group of Haynes and Boone LLP in Dallas. "This is



Meg Aranow



Edward Marx



Tina Buop



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pretty heavy-handed. It replicates a lot of HIPAA, but these people believe HIPAA doesn't go far enough." The biggest difference, he says, is in the definition of a covered entity.

"You have one definition for HIPAA and HITECH and another for Texas."

"What it does more than anything else is monkey with the thresholds," says Michael Frederick, chief information security officer at Baylor Health Care System in Dallas. For instance, HB 300 shortens the window of time to respond to a request from patients for their EHR data in electronic format

to 15 days from 30 days, the federal standard under HIPAA. The biggest impact on hospitals might involve training. An employee must complete training about handling PHI within 60 days of hire and such training must be repeated at least once every two years, a more stringent requirement than the HIPAA Privacy Rule.

Tony Gilman, CEO of the Texas Health Services Authority (THSA), a public-private cooperative charged with developing standards for interoperable healthcare in the state, says Texas has always had a strong history of protecting patient information, "so it wasn't surprising that this was something the legislature chose to address as we move

Edward Marx, senior vice president and chief information officer for 24-hospital Texas Health Resources and THSA chair, says THSA made a concerted effort to get input from CIOs and CISOs and held stakeholder meetings prior to HB 300's passage.



Rick Shoup

"I think it is very beneficial to have this clarity at the state level," Marx adds. "We see the federal requirements as the floor and by no means the best practices. I think the CIOs in our state don't accept just meeting minimum standards. Why not take

it to another level and raise the bar for ourselves?"

LEGISLATING CONSENT

Besides the security and governance of health information exchanges, state legislatures, and designated HIT entities are grappling with patient consent issues. In this year's legislative session in Maine, a bill drafted with the support of the Maine Civil Liberties Union was introduced that would require the state's HIE to switch from an opt-out model of consent to opt-in, which leaders of the state's HealthInfoNet HIE thought would be unworkable. A compromise was crafted that gives patients a separate form about the HIE

the implementation phase and adjustments are having to be made," says Ree Sailors, program director of health IT for the National Governors Association. Some states that started with Medicaid as the lead agency began with opt-out as the default and have had to adjust as the public learns more about health data exchange, she adds.

Boston Medical Center CIO Meg Aranow believes that it would help to have privacy and consent policies developed on the national level. "Having each state work out their own rules and then have to harmonize with each other for interstate exchange is more work than necessary," she says.

The Commonwealth of Massachusetts is still working on establishing privacy and security rules for state-wide health data exchange. But Aranow believes that Chapter 305 was well constructed to promote widespread health IT usage. "In terms of legislation, it was as good as it gets," she says. "I don't expect legislators to come down here and work for a month to better understand the issues. There was input from CIOs, filtered through policy makers and then through legislative staff members, she adds. "Of course, the CPOE aspect is going to be a greater challenge for some hospitals than for others," Aranow says. "It is a challenging time anyway for community hospitals financially." But the legislators understood that the key to getting many entities to make changes is a long ramp time, she says.

Rick Shoup, director of the Massachusetts eHealth Institute and the state-designated health IT coordinator, says his office is working closely with providers to make sure they can meet the Chapter 305 goals, as well as meaningful use goals. Most of the 72 hospitals in the state are making progress toward the 2012 CPOE deadline, he says, and

I THINK IT IS VERY BENEFICIAL TO HAVE THIS CLARITY AT THE STATE LEVEL. WE SEE THE FEDERAL REQUIREMENTS AS THE FLOOR AND BY NO MEANS THE BEST PRACTICES. —EDWARD MARX

from paper to electronic exchange of information. We have had a different definition of covered entity since 2001, but this extends the current law from a paper domain to an electronic one."

and explicitly offers the opportunity to opt out.

That contentious issue is being played out all across the country. "Consent is going from the theoretical to

there may be funding in the Regional Extension Center to help ones that are having difficulty. “We are very metrics-driven and report to the HIT Council, the Massachusetts Technology Collaborative board and the Legislature on progress toward these goals,” Shoup says. “We already have 75 percent adoption of EHRs.”

Like Massachusetts, Minnesota has been a leader in legislating the use of health information technology. It has had an e-health initiative since 2004. Minnesota has e-health mandates involving e-prescribing by 2011 and the use of interoperable electronic health records by 2015. Recent legislation also specifies rules about how health information organizations exchange data.

Unlike in Massachusetts, Minnesota’s e-health mandates have no enforcement mechanisms, notes Liz Cinqueonce, the deputy director of the Minnesota Department of Health Office of Health Information Technology. The state has had to align its efforts with federal efforts. “After the HITECH Act passed, we had several calls from people unsure whether to continue work to meet the state e-prescribing mandate or work toward broader EHR goals of meaningful use that include e-prescribing,” she says. “Our answer was that if they could demonstrate that they were working toward the larger goal, they shouldn’t make any decisions or purchases that are just to meet the short-term e-prescribing goal.”

The state’s EHR mandate is complementary to meaningful use and its timeline is still a few years out, she says.

The state has begun gathering and publishing data on a series of e-health measures. “We use this assessment data to see who is advancing and who is not,” Cinqueonce says.

“It can help monitor advancement toward meaningful use and identify barriers and needed resources. In some cases it may be workforce rather than software or funding issues.”

TOWARD PAYMENT REFORM

Next up on the agenda of many state legislatures is payment reform, and that will include definitions of the role of health IT as the infrastructure. Hospital CIOs should be paying attention to state efforts related to integrated delivery systems, ACOs, payment reform and the ability to measure and report performance, says Lynn Dierker, senior program director for the National Academy for State Health Policy. “States like Colorado and Vermont that are working on their own

pioneering efforts at payment reform recognize that they have to be built on top of their IT platform,” she adds, “and the legislatures have to define how quality measures are reported.”

Some states may pass legislation that requires quality reporting through the state HIE to help with its sustainability case, NGA’s Sailors adds. “They want to discourage Lone Rangers who don’t share data outside their own health systems.”

Rick Shoup expects the Massachusetts Legislature to tackle payment reform in 2012. “It will be hard to participate in that without the systems in place and connectivity. So we have to get our specialists, behavioral care, and long-term care providers involved in HIEs.” ♦



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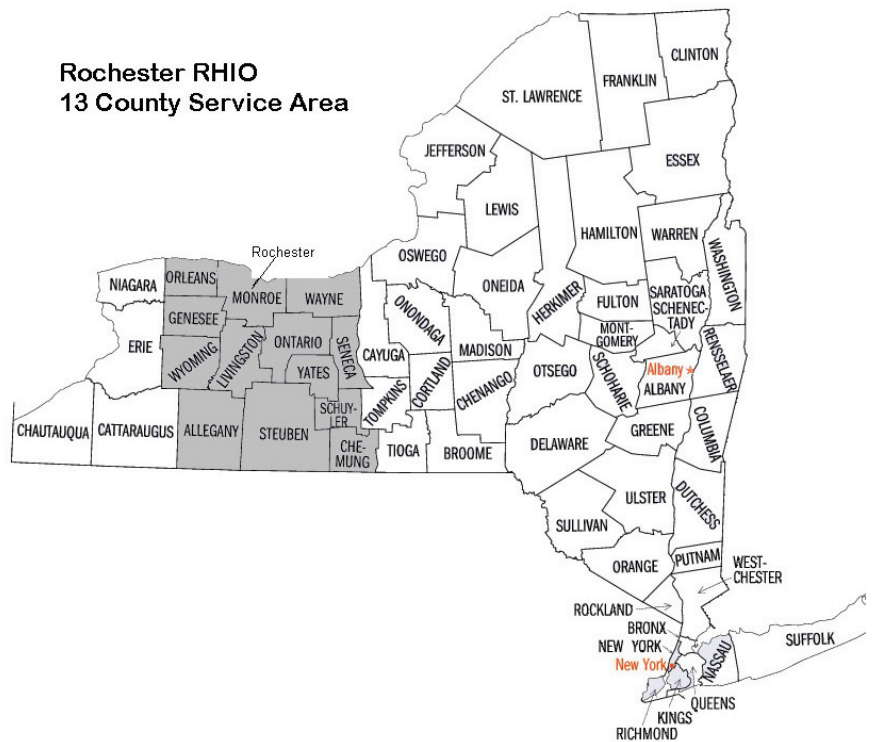
EXECUTIVE SUMMARY:

Getting effective stakeholder engagement, including that of payers, and creating innovative value-added services that provide alternate revenue streams beyond basic subscription services, are just a couple of the common traits of the flourishing health information exchanges profiled in the sustainability report released in August by the National eHealth Collaborative.

How can health information exchanges (HIEs) ensure that they will have the financial viability to be around for the long haul? A recent report by the Washington, D.C.-based National eHealth Collaborative (NeHC) can provide some guidance.

The report, "Secrets of HIE Success Revealed: Lessons from the Leaders," provides case studies on 12 successful, sustainable HIEs nationwide. The HIEs represent a diverse group of organizations, including for-profit entities, non-profit entities, and a government agency. NeHC CEO Kate Berry said in a *Healthcare Informatics* podcast (<http://www.healthcare-informatics.com/sustainability-tips>) in August that the organizations were chosen based on their innovative strategies and business models, the value and impact they are having in their respective communities, their maturity in achieving sustainability and the geographic diversity among them.

Rochester RHIO 13 County Service Area



COMMON TRAITS OF SUCCESS

Of all the HIEs profiled in the NeHC report, one of the commonalities they share is effective stakeholder engagement. Rochester RHIO, which is based in Rochester, N.Y. and serves 13 counties, illustrates this concept well, as it was founded in 2006 not only with a \$4.4 million state grant, but \$1.9 million in funding from local businesses, hospitals, and payers. Its user mix is as diverse as its board, and includes hospitals, physician practices, home care,

long-term care, and behavioral health settings. "The major theme in our implementation was that we realized one of the values is to have as much information as possible; the other is to have as many people using it as possible," says Marty Lustick, M.D., Rochester RHIO board member, and senior vice president and corporate medical director at Excellus BlueCross BlueShield. "You need both of those at the same time in order for people to gain confidence that there's value in it."

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Jill Eisenstein, Rochester RHIO's associate director, adds that to get these other healthcare entities involved in the RHIO, the barriers for adoption have to be very low. To that end, Rochester RHIO provides a virtual health record portal that only requires the healthcare organization to have Internet, rather than a full EHR, to access patient information.

Enlisting business leader support early on, says Lustick, is extremely important for the viability of any exchange. He notes that Rochester RHIO received both financial support and personal involvement in the board from business leadership. "Inevitably in this process when you're doing something this big and this new, there are times when there is ambivalence from the point of view of any particular healthcare stakeholder about how this is going to improve its position competitively," he says. "The business leaders play a major role in keeping everybody focused on the community as a whole."

Berry says being a trusted entity is a prime goal among HIEs, and hard work has to be done to build trust among stakeholders and maintain a reputation as a reliable, neutral entity that values protecting patient information and the interests of its participants above all else. Jacksonville Fla.-based Availity, which is a commercial for-profit that serves nearly 20 states with its multi-payer web portal that provides physicians with real-time access to patient information such as eligibil-



Kate Berry



Dev Culver

ity, benefits, and claim status, is the only profiled exchange of its kind that was borne from payers. It owes its vaunted status to starting with a small set of transactions and focusing on core strengths. In 2001 two health plans, Blue Cross and Blue Shield of Florida and Humana, agreed on guiding principles to gain value in finding billing efficiencies in providers' offices, while giving customers a common look, feel, and user experience.

Availity also exemplifies another core trait of a successful HIE, which is moving beyond sheer information exchange to operating on strong business directives and value-add services. "One of biggest challenges has always been,

how do you create a sustainable model that will live beyond the grant money," says Russ Thomas, COO and president, Availity. "We on the other hand went at it from solving today's problems in the physician office, which was inefficiencies in the way with which they interacted with health plans." Thomas says that Availity has been profitable since 2004, and he owes that in large part to only exploring opportunities that have a business model behind them.

"We believe we're in a good position to leverage the existing network we have, which is 200,000-plus physicians and more than a billion transactions over our network, to be a part of that next generation of health information," Thomas says.

GETTING PAYER BUY-IN

Three of the HIEs profiled in the NeHC report, Quality Health Network (Grand Junction, Colo.), Availity, and Rochester RHIO, drew much of their success from incorporating the payer community as a key stakeholder, leader, and revenue source from the beginning. These HIEs convinced payers of the benefits of the HIE's services in terms of cost savings achieved through reductions in services utilization, NeHC's CEO Kate Berry notes.

"Employers and health plans as purchasers of healthcare do see the value of health information exchange, and how that is going to lead to better quality and care coordination and more effective cost management because they are going to avoid duplicated tests and better manage the care so you have lower downstream costs," Berry says.

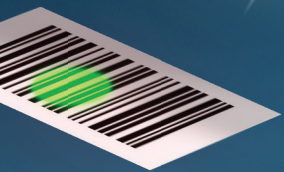
Rochester RHIO had a unique start in that its original CEO, Lustick's predecessor, was from Exellus Bluecross Blueshield and saw HIE as a positive benefit to the community, and thus, played a leadership role from the beginning.

"In Rochester one of the things the RHIO has done is develop a really sophisticated system of metrics to enable them to both do their own quality improvement projects and demonstrate the value in the community in a very quantitative way," Berry says. "But they also have that metric system in place so they can support specific quality improvement projects that the purchasers want them to do."

Getting payer support isn't always easy. Ideally, HealthInfoNet (HIN), Maine's statewide HIE based in Portland, would like to get one-third of its total fees to come from payers, but there has been a lack of interest until recently. Executive Director Dev Culver says that his organization plans to get MaineCare, the state's Medicaid

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program, interested in the HIE by addressing a key issue in the state, high utilization of the emergency room (ER) for non-emergent reasons. HIN would develop a notification system to alert care managers to ER visits for one of 14 different diagnoses. The care managers would then provide the patient with education and recommend appropriate follow-up to avoid future ER visits.

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Lately, Culver says that conversations with other insurers have been promising. With accountable care organization (ACO) legislation looming, which could possibly create some competition, payers are looking for alternate ways to bring value to their customers. An idea for HIN to appeal to payers would be to offer them population analytics, showing their members in the context of predicted cost and outcome, all with the benefit of clinical data.

INNOVATIVE REVENUE STREAMS

Many of today's experienced HIEs are evolving their services beyond just clinical information exchange and creating value-added services to benefit stakeholders and build new revenue streams for the HIE. These new financial opportunities include many revenue generators, including analytics, ACO support services, and patient portals.

Rochester and HIN are both planning patient portals. Rochester's portal allows patients to submit informed consents online, upload advance direc-

tives like living wills, and request an audit of access to their EHR. Next steps include creating a PHR gateway that establishes two-way connectivity to the HIE from the patient's untethered personal health record (PHR), like Microsoft's HealthVault.

Culver says that HIN is finishing due diligence on its robust patient portal to be completed early next year. The same product is currently being used

by McGill University Health Centre in Montreal. The portal will have significant functionality not only to allow patients access to their health information in easy-to-understand language, but also to permit them to self-document, which will then be coded into medical taxonomy so it can be used for interpretation purposes. "Then there's a really interesting and significant introduction of social media within the PHR and the opportunity that it creates for building groups [of patients] by like condition or introducing product lines that support these types of conditions," he says. "[For example], there's a huge market that tries to support those people who are actually caregivers for Alzheimer's patients."

HIN, a nonprofit, is also pondering the creation of a for-profit subsidiary for particular ventures like licensing intellectual property. In working with its patient portal partner, HIN will be used as a test case for regional extension centers (RECs) and HIEs nationwide, and what HIN adds in intellectual property, it will be able to profit from. "So anytime we can do something

that is saleable outside the borders of Maine," says Culver, "we will need a vehicle to help manage that process that is not in our direct mission as an exchange."

Another revenue stream that HIN is building is a statewide medical images repository to house its average of 1.8 million studies a year. The exchange is in the process of reviewing the seven vendors that have responded to its request for proposal. HIN will set a per-study fee, which will benefit healthcare organizations, Culver says, by driving cost down because of the benefit of volume. Culver adds that there will be other direct economic benefits including organizations having access to Digital Imaging and Communications in Medicine (DICOM) standardization in a vendor-neutral architecture, which will aid access and give organizations a more holistic patient view.

Down the east coast in Florida, Availity is in the process of coming up with a suite of services to serve up relevant clinical information when providers check eligibility. In the short-term, Availity is focusing on creating tools for today's demands that include the 5010 transaction standard and the ICD-10 migration. Later down the line, Availity will develop tools like an identity management service that identifies the patient and provider properly throughout the care process, as well as other tools like single sign-on, secure messaging, and mobile device access.

"Availity is in the information business," Lustick says. "So for us it's how do we serve up our information in a seamless, user-friendly way through private independent applications, through our portal, through our practice management and EHR vendor partners—wherever and however the physician works. We have to be able to meet their information needs." ♦

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Reference: 1. Ford D, Luttrell N. Leadership in patient safety: IV pump auto-programming. Presented at Cerner Health Conference; October 2009.

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P11-3131F-Aug., 11

Making the HIE Connection

VENDORS TRY TO MEET GROWING DEMAND IN A RAPIDLY EXPANDING SECTOR BY RICHARD R. ROGOSKI

As the number of health information exchanges (HIEs) increases across the country, vendors that supply connectivity solutions are scrambling to meet the demand.

According to “Health Information Exchanges: Rapid Growth in an Evolving Market,” a report published in June 2011 by the Orem, Utah-based KLAS (www.KLASresearch.com), the number of live HIEs successfully exchanging data more than doubled between 2009 and 2010, and several hundred more are now in development.

One of the report’s most surprising findings is the ratio of public to private HIEs, says Mark Allphin, clinical research director for health information at KLAS. “While the number of live public HIEs that KLAS was able to validate increased from 37 last year to 67 this year, the number of private HIEs that KLAS validated exploded from 52 to 160,” he says.

The report is based on interviews with 239 providers associated with 227 live HIEs; it does not include HIEs that were under development. The number of validated HIEs for each vendor should not be interpreted as that vendor’s market share.

A vendor must have at least six validated live HIEs reporting to receive a performance score. On the other hand, to receive a ranking, the organization’s product has to meet the minimum “KLAS Konfidence” criteria, Allphin explains. “We will not give a product a ranking until we talk to 15 organizations that use it.”

RISING TO THE TOP

Allphin observes that although there is a wide array of vendors serving this market, the cream is beginning to rise to the top.

KLAS ranks Medicity Novo Grid as No. 1 in the private HIE sector, with an overall performance score of 84.3 out of 100. In the No. 2 spot is RelayHealth Virtual Information Exchange (79.0), followed by Cerner Hub, with a score of 70.8.

Two vendors that are well-regarded by those working predominately in a Cerner or Epic environment are Cerner, which has seen rapid growth in the private HIE market,

with 21 validated HIEs, and Epic, which has 26 private HIE customers, and whose Care Everywhere scored a 92.9. Both companies are currently working on ways to connect to other vendors’ systems, Allphin says.

In the public HIE solution space, Axolotl (OptumInsight) Elysium Exchange receives a performance score of 83.8, while Orion Concerto Exchange scores an 85.5. These two, however, are not ranked because they don’t meet minimum KLAS Konfidence levels, Allphin says.

Medicity’s rise to the top in this year’s report reflects the attributes that providers say they need. “Medicity Novo Grid has simple architecture and is easy to plug in,” Allphin explains. The report also notes that Medicity has been in the HIE business longer than most vendors, and continues to be a market leader with 33 live private HIEs and five live public HIEs that are validated by KLAS. However, the recent acquisition of Medicity by Aetna has some customers concerned about the entry of payers into the HIE market, Allphin adds.

RelayHealth has grown from eight KLAS-validated live HIEs last year to 24 this year. The report’s authors note that: “RelayHealth has seen substantial growth in the past year as they continue to leverage their portal/personal health record solution to help customers build viable HIEs. While some providers report some frustrations with interfacing and unmet expectations, others feel RelayHealth is a strong partner that is working hard to improve.”

The purchase of Medicity by Aetna is not the only indication that payers are now entering the HIE marketplace. UnitedHealth/Ingenix recently purchased Axolotl and renamed the company OptumInsight. Regardless, the newly branded vendor has 14 live public HIEs, more than any of its competitors, and is making a deep penetration into the private HIE market as well, with eight validated private HIEs, Allphin says.

CREATING A MEDICAL NEIGHBORHOOD

Dick Thompson, executive director and CEO of Grand Junction, Colo.-based Quality Health Network (QHN), has been satisfied with Axolotl’s product and its customer/technical sup-

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KLAS OVERALL PERFORMANCE SCORES

RANK	PRIVATE HIE VENDOR/PRODUCT	PERFORMANCE SCORE	1-YEAR TREND
1	Medicity Novo Grid	84.3	
2	RelayHealth Virtual Information Exchange	79.0	
3	Cerner Hub	70.8	
NA	Epic Care Everywhere (Epic to Epic only)	92.9	
NA	Axolotl (OptumInsight) Elysium Exchange	76.4*	
NA	eClinicalWorks Electronic Health eXchange	78.9*	
NA	Medicity ProAccess	78.8*	
NA	MobileMD 4DX	94.5*	
NA	NextGen Health Information Exchange	83.0*	--
RANK	PUBLIC HIE VENDOR/PRODUCT	PERFORMANCE SCORE	1-YEAR TREND
NA	Axolotl (OptumInsight) Elysium Exchange	83.8*	
NA	Orion Health Concerto Exchange	85.5*	

Positive Trend – Performance score increase of 3 or more points above previous score.

No Significant Change – Performance score is within 3 points of previous score.

Negative Trend – Performance score decrease of 3 or more points below previous score.

*Data does not meet minimum KLAS Konfidence level.

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port. He hopes that does not change because of the buyout, but, he does believe the jury is still out.

Going live in October 2005, QHN now connects 640 active providers, and has more than 2,500 online users. Five hospitals are already connected, and two more are in the process of being added within the next 45 days, Thompson says, adding that four more hospitals have agreed to connect, with completion expected by early 2012.

The area served by QHN includes western Colorado and eastern Utah and it will eventually be connected to both statewide networks, Thompson says. But even after that happens, QHN’s focus will remain local, he stresses: “Our founding organizations envisioned an all-inclusive non-profit, apolitical network focused on improving quality. Our focus was to create a medical neighborhood. The best return on investment is to create a locally driven HIE. I think that’s the key, because healthcare is largely local.”

Driven mainly by physicians, a non-profit health plan, and acute-care facilities in the area that have contributed the initial \$2.75 million in private funding, QHN chose

Axolotl for its connectivity solution. “At the time, there wasn’t anyone else that had proven they could do this work,” Thompson says.

According to Allphin, most HIEs still need to work on making their systems physician-friendly, both in ease of use and in delivering data where it’s needed. “Among the live HIEs that KLAS validated for this report, only 43 percent were delivering patient data directly into physicians’ electronic medical records [EMRs],” he says.

But that’s not the case with QHN. “There are many EMRs that we interface with,” Thompson says, noting that participating providers can also use Axolotl’s lite-version EMR, which does not include billing and scheduling, or opt for another vendor’s “full-blown” EMR.

Although Thompson says that Axolotl’s connectivity solution was “a great way to start,” and he values the system’s ability to connect disparate systems, he acknowledges that his HIE is outgrowing its capabilities. “We’re now moving more extensively into data warehousing and data mining, and this system is somewhat limited as it stands today,” he

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says. “We are in the process of soliciting for a ‘data layer’ that we can plug into the existing clinical messaging system so we can do more comprehensive analytics.”

QHN is not alone in seeking another vendor to add more layers of operability to its HIE. Among the findings of the KLAS study was that many HIE vendors still cannot offer every piece of technology that is needed, so providers often turn to vendors that can supply them with pieces like an enterprise master patient index, patient record locator, or central data repository.

MEETING CHALLENGES

While the need to expand a system’s offerings is a logical step in the growth of an HIE whose mission is to share as much patient data as possible, not being able to transmit data directly to an EMR has become a major challenge, Allphin says.

The cost of interfaces is the biggest barrier, according to the KLAS report. In some cases, neither the provider nor the HIE is able nor willing to pay the high price demanded by EMR vendors.

Chris Henkenius, president of the Healthcare Technology

EVERYONE WANTS CONNECTIVITY AND THE SHARING OF MEDICAL RECORDS. BUT THE BIGGEST COMPLAINT IS ALWAYS THE COST TO THE CLINIC OR INDEPENDENT PRACTITIONER TO CONNECT TO THE HIE. —CHRIS HENKENIUS

Center at the Omaha, Neb.-based Bass & Associates Inc., is familiar with this challenge. His firm has assisted more than 30 states in building their HIEs and, by working with various vendors, has been involved in the implementation of private HIEs throughout the country. “Everyone wants the same thing: connectivity and the sharing of medical records,” he says. “But the biggest complaint is always the cost to the clinic or independent practitioner to connect to the HIE.”

The second biggest barrier, according to the KLAS report, is that despite incentives available under meaningful use criteria, many clinics have not yet installed an EMR, so they have not had to deal with the challenges of interfacing with an HIE.

Many that do have an EMR are concerned about the integrity of data—including diagnoses—that can be pushed directly into that EMR by the HIE. “Some clinics want only certain types of data to be pushed in, while others want to keep HIE data completely separated from their own records,” the KLAS report states.

Getting physicians on board continues to be another

major hurdle. Henkenius says that the faster you can get an HIE to the pilot stage, the better your chances for success. “As you begin to show value, others will come on board.”

Thompson likens the process to nuclear fission. “You have to have critical mass [of senders and receivers] coming together to sustain an HIE,” he says. Interestingly, the KLAS report found that among the providers interviewed, 37 percent said they measure the success of their HIE by the number of physicians that actually use the data.

In addition to getting data into an EMR, a recurring problem has been the disruption of physicians’ workflow. “With that challenge in mind, more HIEs are striving for ways to deliver useful data to physicians without requiring them to leave their normal workflow, but so far progress has been slow,” the report states. Allphin adds that: “What we’re told over and over is that if it’s not put into the physician’s workflow, it’s harder to get adapted.” Thompson agrees: “It’s all about clinical workflow,” he says. “It’s about being able to adapt technology to enhance clinical workflow.”

The KLAS study also found that while many providers plan to eventually exchange data using continuity of care

document (CCD) or continuity of care record (CCR) formats, most are a long way from achieving

that goal. “In the 164 HIEs that KLAS validated for this study, 81 percent of the data was still being exchanged through basic Health Level [HL]7 interfaces, while only 12 percent was being exchanged using CCD/CCR,” Allphin says.

Thompson says that his HIE is still primarily using HL7-standardized interfaces, but is currently in the testing phase of parsing the CCD format.

With daunting challenges facing HIEs, dozens of large and small vendors have entered the market. Some may not survive, Allphin says. “There are a lot of small vendors, but how viable are they going to be in the long term? I don’t know how the market can support 40 or 50 vendors.”

While HIEs in general are struggling to get usage up, the KLAS report concludes on a positive note: “If nothing else, the events of the past year seem to have established one thing: HIEs are not going away. As the U.S. healthcare market continues to evolve, HIEs will likely only increase in importance.” ♦

Richard R. Rogoski is a freelance writer based in Durham, N.C.



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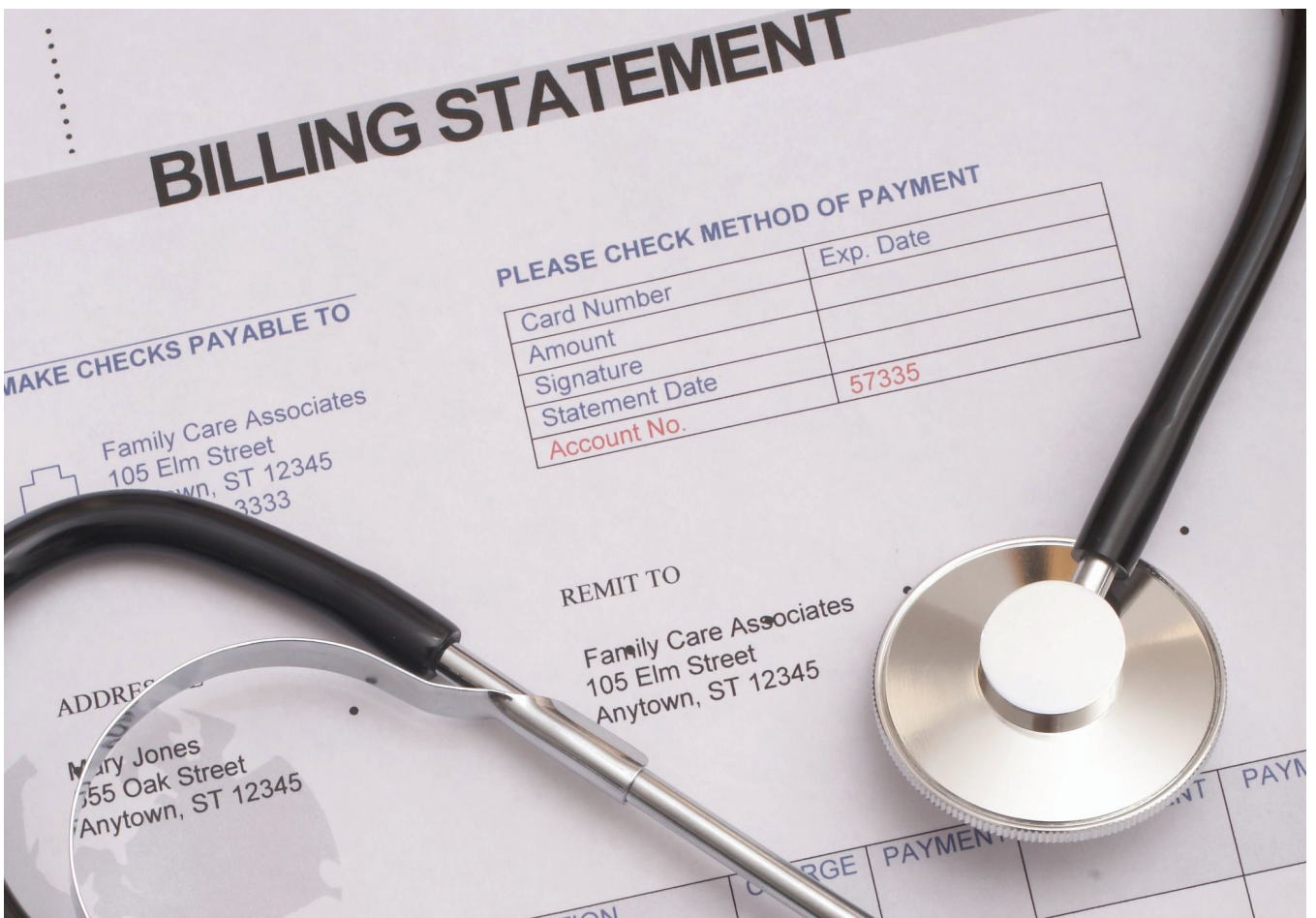
A NEW CSC REPORT LOOKS AT MAJOR MEDICARE HOSPITAL REIMBURSEMENT CHANGES ON THE HORIZON **BY MARK HAGLAND**

On April 18, the federal Centers for Medicare & Medicaid Services (CMS) created a proposed rule for the Medicare Hospital Inpatient Prospective Payment System (IPPS) that encompasses a number of important changes.

Among other elements, the proposed rule will require, beginning in fiscal year 2014, that hospitals report performance data in order to avoid losing 2 percent of their annual market basket adjustment to Medicare IPPS rates. Meanwhile, the fi-

nal rule for the value-based purchasing (VBP) program, which will affect reimbursement for hospital discharges beginning in fiscal year 2013, came out earlier this year. For the second program year (FY 2014), a new domain for performance measurement is proposed to be added around efficiency.

In addition, the proposed IPPS rule lays out many basic aspects of the Hospital Readmissions Reduction Program, specifying what constitutes a readmission and helping hospitals to





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begin calculating excess readmissions. The new proposed rule also provides additional details for the Hospital Acquired Condition (HAC) program, effectively expanding that program's scope and potentially introducing financial penalties for hospital-acquired conditions, beginning in November 2014.

There are many levels of details involved in all these changes and potential changes, but the bottom line is clear: hospital reimbursement under Medicare (and, inevitably, under private health insurers as well, as they eventually copy some of Medicare's payment innovations) will increasingly be tied to performance, on numerous levels and in numerous areas.

Given all of the actual and anticipated changes involved, researchers at the Waltham, Mass.-based Global Institute for Emerging Healthcare Practices, a division of the Falls Church, Va.-based CSC, have been producing a series of white papers and reports assessing the implications of all these changes for providers. Most recently, Caitlin Lorincz, research analyst, and Jane Metzger, principal researcher, at the Global Institute, produced a report, "Update on Performance-Based Reimbursement: The CMS-Proposed Rule for the Medicare Hospital Inpatient Prospective Payment System for Acute-Care Hospitals," which analyzes how the proposed changes will affect hospital leaders.

Metzger and Lorincz spoke recently with *HCI* Editor-in-Chief Mark Hagland regarding their report and its implications for healthcare and healthcare IT leaders.



Jane Metzger

HIGHER FINANCIAL RISK

Healthcare Informatics: What would your "elevator speech" be around the research you provided in your most recent report, in this area?

Jane Metzger: The first point is that this really isn't a surprise, but that our understanding [of the issues involved] is getting clearer. Part of what isn't a surprise is that this series of programs puts more and more of the revenues that hospitals receive from Medicare at financial risk. There are clearly going to be some losers, because every time they talk about how performance gets translated into money, there will be a high percentage of hospitals that will lose money. In fact, we kind of knew this was coming, because it had to be revenue-neutral.

The second point is that it's not really just a Medicare program. First of all, in terms of the measures, there are some claims-based measures that Medicare puts together; however, the bulk of the measures are what they call chart-abstracted, which means that the hospital has to do it—and in their sampling methodology, they want the sampling to be of all

patients. So even Medicare is now looking at all patients. The private payers are already moving forward; I was looking at a program in Minnesota the other day that looks an awful lot like value-based purchasing.

So regardless of what happens with the shared-savings program for accountable care organizations, this train is out of the station, and though I don't like the term paradigm shift, this surely is one. In our next white paper, we've built a little chart that looks at value-based purchasing as 1 percent of payment, and this other thing is 1 percent—but remember, a lot of hospitals in the U.S. are already operating in the red. Even in the so-called good old days, they never had much of a margin, so even though the percentages look low, this is a big deal. And some hospitals have huge Medicare volumes, and that's been a big part of their business. This is way beyond experimentation; and it's rolling out, and we've been expecting it. What these white papers talk about is, each time they issue a proposed or final rule, you learn more.

Part of what makes these rules and proposed rules complicated is that CMS sort of lays out their thoughts over three years. That's significant, because it gives you some advance warning of the measures that are coming; and they've adopted that practice for value-based purchasing, for the readmissions reduction program, and for the hospital-acquired conditions program. So this really is determining the externally mandated quality improvement agenda for hospitals.

PRESSURE TO REDUCE READMITS

HCI: Let's talk about readmissions.

Metzger: Yes, you know they used to call them peer review organizations, and now they're quality improvement organizations (QIOs); and there has already been in place a program to look at cases that CMS has flagged for potential non-payment. The measures have been in IQR [the Medicare Inpatient Quality Reporting program] for years. But the QIOs were given some extra responsibility for looking at Medicare patient readmissions, up to and including the ability to recommend non-payment. Well, what the readmission reduction program does, it says, if you're a bad performer on readmissions, we're also going to hit your DRG [diagnosis-related group] payments with a penalty; so it's like a pile-on, on readmissions.

HCI: So this new proposed rule just reinforces and intensifies the focus on readmissions?

Metzger: Yes, basically what they're going to do is to calculate a readmissions performance ratio relative to other

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hospitals to see where you sit, and they said that the people who have an excess level compared to all hospitals will lose up to 1 percent of their base payments. Now, they did talk about how they're going to calculate the readmissions ratio, but they haven't explained exactly how that gets translated into the payment reduction. At least we now know what the measures are.

HCI: And the areas they're looking at—heart failure and pneumonia—are the most obvious ones, right?

Metzger: Well, they're the areas with the highest rates of readmissions. They've said, however, that they'll be expanding the list; they're always expanding things in some direction. Now, one of the things most challenging for hospitals is that this covers readmission for any condition, and it can be for readmission to any hospital. I think the rationale is that if you had a significant enough condition the first time around, it should have been addressed. So it makes it hard for hospitals in that a patient could go across town, right?

PROBABLY ONE OF THE MOST DIFFICULT AREAS FOR HOSPITALS IS THAT PATIENT EXPERIENCE MEASURES ARE PART OF BOTH THE VALUE-BASED PURCHASING AND SHARED SAVINGS PROGRAMS.

However, this whole area around working harder on discharge planning and discharge instructions, and connecting a patient to a PCP [primary care physician] so they will get follow-up care, there's even a lot in the literature around this. But with all this pressure coming from the aging of the population and the increasing burden of chronic illness—and of course you see all that in Medicare—this becomes very significant.

HCI: What do you see as the biggest implications of all this on the healthcare IT front?

Metzger: There's a whole range of things you can do to work on readmissions in particular, to begin with. You can know what the risk factors are, a major one being previous readmissions. And once you have the data electronically, you can certainly flag patients that you know you'll need to pay special attention to. You can use order sets, documentation templates, and patient tracking protocols, so that you're looking at those patients. You can make sure the patient has a follow-up appointment, and you can make sure the patient and family know about it. The case manager can have a call list. All of these care interventions to reduce the risk of admission, work amazingly better when supported by information technology gathering the data you need, and making it available to the folks on the front lines.

HCI: And you need really good data warehouses and report-writing capabilities, right?

Metzger: This is a really good example of where, let's say there's a health system with multiple hospitals—it would be really advantageous to know, across hospitals, admission history and other medical record information about patients—when they present for care, and so on. What's harder is when they present outside your corporate boundaries. But you need to capture the data, and you need really good analytic skills. It's not that long ago in hospitals that, once the coding had been done on a discharge, the information about the stay would be archived. That's not terribly ancient history.

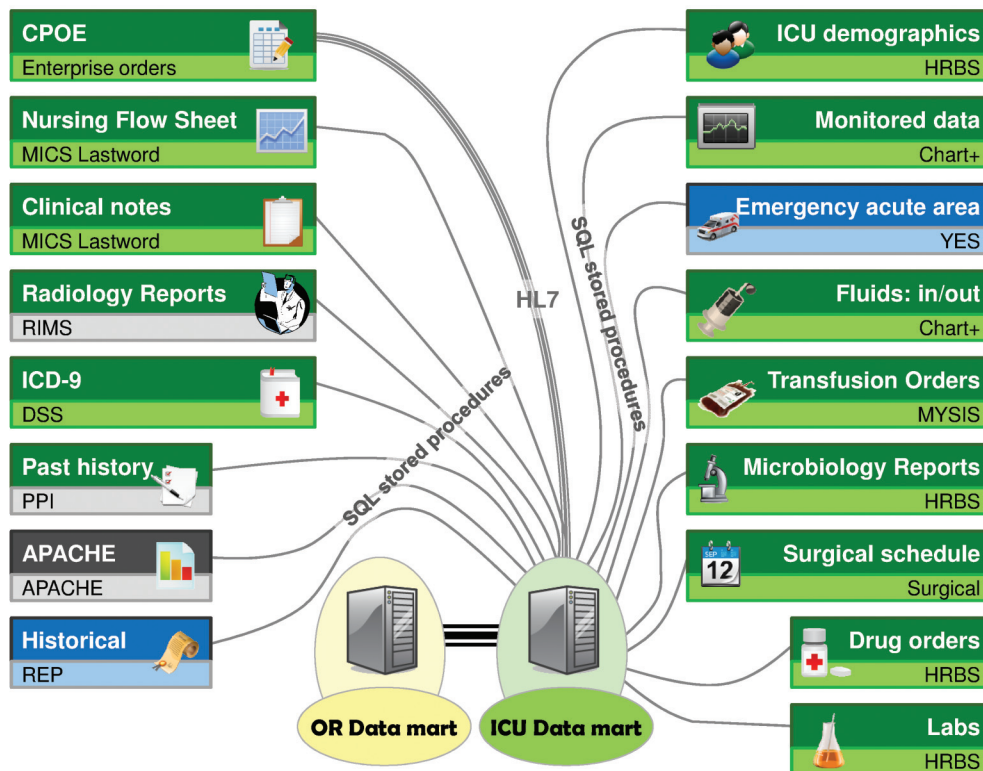
At a minimum, you need to know, for the patients who have been seen in this particular hospital, what their admissions history has been. But that's just the tip of the iceberg of what you'd really want to know about the patient to resolve issues, understand them all, and send the patient home well-equipped in terms of follow-up appointments, support, and information, to minimize readmission.

That's just one of these programs. The same is true for value-based purchasing: you've got these measures, you've got patient conditions that are targeted, and there are going to be more. By the way, these are all familiar measures. However, patient experience is in value-based purchasing; and probably one of the most difficult areas for hospitals is that patient experience measures are part of both the value-based purchasing and shared savings programs. Was I treated with adequate courtesy, was I well-informed about what was going on, and so forth. The rules talk about that there will be more HCAHPS-related content [HCAHPS is the Hospital Consumer Assessment of Healthcare Providers and Systems program, from CMS]. Those measures have all been a part of the Hospital Compare.

And if you look at where the hospital industry commented, there were a lot of concerns about how much control the hospital really has, with some people questioning the validity of HCAHPS. By the way, CMS had invested mega-money in HCAHPS, so it wasn't particularly thrilled with that feedback. There was some discussion about the different populations hospitals serve, and there will be some challenges in meeting all their needs, and what if they don't speak English, and that kind of thing. But CMS stuck by their guns in using HCAHPS in value-based purchasing, and there's a long explanation in that final rule about why they chose not to change their stance on that. It's pretty clear that this stuff is here to stay, and it's a whole domain in value-based purchasing. ♦

ICU Data Mart: A Non-IT Approach

A TEAM OF CLINICIANS, RESEARCHERS AND INFORMATICS PERSONNEL AT THE MAYO CLINIC HAVE TAKEN A HOMEGROWN APPROACH TO BUILDING AN ICU DATA MART BY VITALY HERASEVICH, DARYL J. KOR, MAN LI, AND BRIAN W. PICKERING



Schematic relationship of ICU and OR data marts to clinical systems. Source: Vitaly Herasevich

As technology consumers, we have come to expect a high level of functionality on the computerized systems we have come to depend on for our everyday tasks such as banking, tracking of parcels, and airline ticketing. Unfortunately, that same functionality that is typified by those systems does not extend into healthcare, which is often hobbled by technical problems such as fragmented source databases.

This is especially true of larger healthcare systems and ac-

ademic hospitals, where there is a general lack of integration between these multiple unique source databases. Indeed, most databases were built on legacy systems that are not designed to integrate with other software systems. While this lack of integration was initially the result of project-driven systems, the problem of “database silos” has remained, and continues largely because of commercial interests.

Recently, the concept of a fully integrated electronic med-

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ical record (EMR) has opened up the possibility of breaking down those silos. Underlying the idea of an integrated EMR is the need to address multiple unique medical informatics needs, all which strive to integrate the various source systems and technologies into a single-window EMR.

While these efforts have occasionally been quite successful, they almost always have been operation-oriented. As a result, these newly integrated systems generally still lack of reporting and research capabilities. These remaining problems are particularly important in time-sensitive data rich environments such as the operating room and intensive care unit, where the intensity of care is high and the needs for understanding both healthcare delivery processes and patient outcome are substantial. In this setting, a traditional data warehousing approach is inefficient to provide optimal results.

INTEGRATED DATABASE: A SPECIAL REQUEST

About five years ago, Ognjen Gajic, M.D., a critical care physician and researcher from Mayo Clinic, Rochester, Minn., had an important research question to be answered. Specifically, he was interested in evaluating the association between blood transfusion and a respiratory complication known as acute lung injury (ALI). In order for his research to move forward, he needed to be alerted about patients who had a blood transfusion order issued and who were at risk of ALI.

This seemingly straightforward task was complicated by the large number of transfusions administered at the participating institution. Moreover, the data needed to be extracted from multiple source databases to allow adjudication of the outcome of interest. Specifically, the detection of ALI required interrogation of the radiology reporting system, as well as laboratory results from the hospital's laboratory reporting system. Ultimately, the alert system required three separate data feeds from the EMR system. At that time, this was neither technically nor practically feasible.

The proposed solution to this study's unique informatics needs was a concept termed the "ICU data mart," which would be an integrated database where all pertinent data regarding critically ill patients would be stored in near real-time. In addition, the data within this ICU data mart would be able to be queried readily. The integrated nature of the data mart would allow complex queries, including data from multiple non-integrated source databases.

When this concept was proposed to a group of our information technology colleagues, their response was a rather straightforward: "Impossible." Soon after, we began to build this integrated relational database ourselves "one brick at a time." It has become a highly functional near real-time database servicing dozens of investigator-initiated data requests, quality improvement initiatives, and administrative needs. Moreover, it has been developed with minimal resources and at a very low cost.

We believe that the success of this project is in large part due to its "non-IT approach." This doesn't mean that we avoided the use of computers and databases. Quite the opposite, the ICU data mart is physically a Microsoft structured query language (SQL) database. However, our approach was based on three key concepts—Legos, UNIX, and Matrix—that often run contrary to traditional informatics approaches.

CONCEPT 1: 'LEGOS'

No, this doesn't imply that the database was built from our children's Lego sets. Rather, it is the concept of building a project one piece at a time while maintaining a vision of what the final project will look like and, equally importantly, what the next piece will add to the whole. An important benefit of this piece-by-piece approach was that it allowed the existing data to be used before the final version of the database was completed.

Our initial piece for the ICU data mart was the reference table based on admission and demographic information. This was an essential starting point, because it allowed us to define a specific event: the ICU length of stay. Indeed, without a defined time interval, everything else becomes a mess. We then used a combination of the patient identification number and admission time as key links to other tables of interest.

This was the start. We now had version 1.0! No beta versions, no releases. Of course, each new "piece" required careful testing and validation, which were performed by comparing our automated results to the actual EMRs on manual review of the medical records. This step was mandatory before moving the newly developed data elements to a production stage. Additional statistical controls were also used to assess for unanticipated gaps in the data, as well as potential data outliers.

Having moved the initial piece into a production phase, we immediately began working on the next data element. Since we needed to identify arterial blood gas results, our next focus was the source database housing laboratory data. Piece by piece, the database grew (and continues to grow). All the while, previously tested and validated data have been available to the end users. Without this approach, it would have taken years to realize a functional "fully integrated EMR/database." In contrast, this system was functional from the very beginning. Additional data are simply added to the existing database and the process continues to move forward.

CONCEPT 2: UNIX

While some people fondly remember the command line, most database end users prefer a Windows-based interface. Yet, although this works well when working on the standard office tasks, it is often inadequate when working with complex databases. Furthermore, the development of multiple

interfaces adds additional layers of complexity, cost, and potential errors.

Indeed, complex database solutions often require a custom-built query interface. This interface generally translates still algorithmic query language into SQL commands. Database end users must not only understand the interface, but they also must learn the interface query language. Moreover, the varied interfaces often require additional resources such as web-servers and a team that can develop, support, and improve the interface over time—an iterative, ongoing process.

For the ICU data mart, we chose to explore query building tools that reside in the statistical software. Most of these embedded query building tools have the ability to interrogate databases using open database connectivity (ODBC). Microsoft Excel is an example of one such tool.

For most of our analytic needs, we have found that JMP statistical software (from SAS Institute Inc., Cary, N.C.) was quite adequate. Embedded query tools require no additional interfaces and need for data export. The data are simply right there, residing within a powerful statistical program, and immediately available for the desired analyses. For those few circumstances where more robust analyses were needed, we used SAS Institute's SAS Data Management software.

CONCEPT 3: MATRIX

Do you remember the nice green-on-black screen from the Wachowski brothers' movie, *The Matrix*? How the data visually fell from out of one site to another? Beautiful, raw data! The concept of *The Matrix* is all about storing raw data—no pre-processing, no massaging, no normalizing. Only the original data are stored.

Don't get us wrong, data parsing, processing, and normalization are extremely important, but this process will vary depending on the specific data need. Moreover, pre-processing and normalization will result in an unnecessary loss of data. Often, this loss of data will prove to be a barrier when future data needs arise. In contrast, post-processing and normalization allows the end users (or applications) to tailor the data to their specific needs, while keeping the full complement of data elements available for future use.

Importantly, filtering data feeds may be necessary as you will likely not need (or want) to store all aspects of the technical data. Rather, what you really want to store are the meaningful data. We advise that you take some time to determine which data elements are meaningful or unnecessary and can be filtered out. Ultimately, when the meaningful raw data are available, it makes organizing, using, and summarizing the data far more powerful. For example, if report requirements change, it is much easier to modify existing code within the data mart than to modify the interfaces with the various source databases.

An additional key element regarding data acquisition is the timing of its availability. Due to the increasingly fast-paced nature of medicine, particularly in high-acuity environments such as the operating room and ICU, near real-time feeds are of increasing importance. However, real-time data feeds can come at a cost, particularly with regard to resource utilization and the stability of the source databases. Therefore, you must determine just how time-sensitive your data needs might be.

Generally, data requirements for quality initiatives, reports, and research do not require real-time data feeds. In most clinical systems, real-time data are not truly real-time; for example "real-time" clinical notes appear only after they are transcribed and finalized by the authoring clinicians. ICD-9 codes are generally assigned only after a patient was discharged. Are these data sources ever truly "real-time?" Often, the ability to choose an appropriate time interval for data retrieval can save significant resources without sacrificing a systems' usefulness.

In summary, our group of clinicians, researchers, and informatics personnel have developed an ICU data mart that contains a near real-time copy of pertinent ICU patient information on a population of 206 ICU beds, with an average of 15,000 ICU admissions per year. This includes historical data going back to 2003. Having been in existence now for almost five years, the approach taken by our team has proved efficient, adaptable, and very well-suited to time-sensitive environments such as the ICU.

The data elements within the ICU data mart relational database continue to expand, and now include details from the pre-ICU environment (e.g. emergency department and transportation), as well as post-ICU long-term outcomes. Due to the success of this effort, we have an effort underway to replicate this process in the perioperative environment as well.

While the OR data mart will clearly benefit from the approaches and experiences of the ICU data mart build, it will also serve as a valuable additional data source as the ICU data mart continues to grow. Ultimately, by securing detailed data from pre-ICU environments such as the ED and the OR, we believe systems such as this can help to find new ways to optimize healthcare delivery in the OR and ICU. Perhaps more importantly, technological strategies such as the ones described above may prevent patients from needing intensive care services in the first place. ♦

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Never Accept a Counteroffer

DECIDED THAT IT'S TIME TO MOVE ON? MAKE YOUR DECISION FINAL
BY TIM TOLAN



Tim Tolan

It's hard to come up with the best way to describe the feelings you have when it's time to call it quits and declare your intentions to those that count on you every day. Some can't sleep the night before or become physically ill during the days that lead up to a resignation. The mere thought of resigning and actually scripting the message to your boss is very painful to most, while others view it as another box to check on their daily calendar. Re-

gardless of which camp you fall into, my best advice is to make sure you are ready to resign without hesitation. This is no time to waffle or be tentative in the message you convey.

And...forget about counteroffers that might come your way. This needs to be it—Final Answer.

Counteroffers are served up to persuade you to change your mind or demonstrate the value the organization places on you and your leadership—all after you have resigned. Many organizations assume when a key executive resigns is always about the money and they are quick to create financial incentives to get you to stay.

Unfortunately, too many dynamics are already in play during a resignation and changing your mind and accepting a counteroffer is very dangerous and statistically not in your favor. You have already committed an organizational crime by not showing your loyalty and the mere act of a resignation will be a scar on your internal reputation in perpetuity. It's really hard to overcome.

Let's look at the downside:

Your counteroffer creates an unnatural change of compensation that was forced by you when you resign. These concessions were likely made only as a result of your leaving and made under duress and will always be remembered by those involved.

Your "resignation scar" will be with you forever and your up-

side in the same organization later on will likely be limited.

You cashed in your "loyalty chip" when you resign and there will always be questions about your trustworthiness going forward.

A whopping 80 percent of employees that accept a counteroffer and remain with the organization are gone within a year (or less) after they initially resign. Not great odds!

I've seen and heard it all and the reasons why people resign and then change their minds to stay. It all sounds the same to me each time I hear it. It could be a big implementation project you are leading or a major deliverable that the CEO tasked you with that has your DNA all over it. I get that. The reality is that there is usually never a good time to leave, as there will always be new projects and corporate initiatives that you are responsible for. That's true today and it will be true five years from now. Hopefully you have grown your people and have deep bench strength to give your IT organization continuity long after you've left.

Let's face it: you are the only person that knows when it's time to call it quits. Some of us just need and like change—that's a good thing. Others want a change in climate or geography and want to leave the hustle and bustle of a big city. Still others desire to be closer to family and friends over time. Perhaps you are seeking more challenges in your life or you want to scale to a different level or re-invent yourself. And then there are situations where you are vastly underpaid or just can't work for the current leadership in your organization. Most of these scenarios can't and won't be enhanced by declaring you are leaving.

My strongest advice to you is to think long and hard about all of the scenarios and reasons you plan to resign and once you declare—never change your mind. Leave with dignity and for the reasons that you decide are important to you. Nothing else matters.

It's your Super Bowl and you get to decide when to run the last play.

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