Health Information Exchanges
Why an HIE is in Your Future

EXECUTIVE SUMMARY What a difference a month makes. While this was being written, the President signed into law the most historic healthcare reform legislation since Medicare, making the theme of Scottsdale Institute's 2010 Spring Conference ("Healthcare Leaders Embrace Reform") and the topic of this issue of Inside Edge—health information exchanges (HIEs)—more timely than ever. It's the most exciting time of our lives to be in healthcare. IT has helped us get here and will play an even more significant role going forward. HIEs will emerge as a key IT enabler in this transformation.

HIEs are networks that allow healthcare information to be shared across organizations within a region, community or hospital system. Most of the HIE's forebears—in the early 1990s, community health information networks (CHINs) and in the early 2000s, regional health information organizations (RHIOs)—failed for lack of sustainable business models or poor technology choices. Today, however, government incentives under HITECH favor interoperability and community-based health information exchange. Also, the technology is here and health systems are seeing increasing alignment with community physicians (see our 2010 CEO Outlook issue of Inside Edge), which favors the HIE concept.

We talked to HIE experts from SI-sponsors Microsoft and Deloitte as well as leading executives at the Santa Cruz HIE, the Taconic Health Information Network and Communities (THINC) and New York Clinical Information Exchange (NYCLIX). It just may be that the third time's a charm.

Microsoft Amalga for HIE

You can't say that Ed Barthell, MD, director of Connected Health at Microsoft, doesn't come by his title honorably. As an emergency physician in urban and suburban Milwaukee for 20 years he became acutely aware of "the lack of fluidity of data" in the care system and set out to do something about it.

Barthell launched a large-scale research project funded by local providers and the State of Wisconsin Medicaid program that led to the formation of one of the earliest and still-successful RHIOs, the Wisconsin Health Information Exchange (WHIE) which linked up providers in the southeast part of the state. He then took what he had learned running WHIE to our nation's capital and helped launch the DC RHIO Project.

Both initiatives use Microsoft Amalga, software for aggregating healthcare data from disparate systems into a unified data platform. Barthell, who joined Microsoft a year ago to head up the company's connectivity initiatives, says HIEs are having a rebirth for several reasons. First, of course, is that the federal government has endorsed the concept with over half a billion dollars for state-led HIE efforts.

Other factors are the ever-increasing pressures on healthcare systems to decrease

cost, the availability of new technology—that didn't exist in the early 1990s when CHIN initiatives peaked—and the willingness of the public to allow electronic exchange of their data—to allow their credit cards, for example, to be used online.

Simple value proposition

Now is the time, Barthell says, for the HIE concept to thrive. "The value proposition is pretty simple. If we have free-flowing data and can share patient information when it's needed, leading to a decrease in redundant tests, we can save $50 to $150 per person at a cost of $3 per person a year. We are beginning to accumulate empiric data that proves this."

In Wisconsin, for example, ED physicians using the WHIE automatically receive a patient's medical summary "as soon as the clerk hits the registration button," he says. The clinician either views it right next to triage notes on the screen or, more often, auto-prints the summary because most EDs are still paper–based. The point is that "they do it routinely on every patient encounter. We wanted to get an automatic process in place. If there's one thing we've learned it's that if you leave it as a voluntary process, most physicians won't take the time to do it," Barthell says.

According to preliminary results derived from a survey tool, doctors declared that the HIE report affected their clinical decisions on more than 40 percent of the patient encounters. Overall, fewer labs, x-rays and medications were ordered for patients, clinicians spent less time seeking patient information, and patient throughput was enhanced by the availability of the regional data. "Our conclusion is that the HIE improves quality and cost efficiency," says Barthell.

To whom those savings accrue depends on the type of patient. It turns out that if most of the population is uninsured then hospitals gain financially. So it follows, Barthell says, that hospitals should help support the HIE. However, if the patients are covered by insurance, it follows that payers—whether commercial insurers or Medicaid—will benefit and therefore should help support the HIE.

Ed Barthell, MD, director, Connected Health, Microsoft

While he's not overly optimistic hospitals and insurers will consistently fund HIEs, it does indeed occur. Back in Wisconsin, Humana has agreed to provide a WHIE-administered incentive to providers for utilization of the WHIE, and other payers are exploring a similar approach.

First on the block

"The tricky part of getting payers to volunteer to contribute funding is that the ones to do so pay, and the ones that do not potentially get a free ride, creating a first-mover disadvantage," says Barthell. In Vermont, the state passed legislation that creates a mechanism to add a small fee to each claim paid by health insurers that gets pooled to support state-based HIE. "It could be that model or one in which providers pay into a pool but then those providers get paid by the payers, or some other variant, that will prevail, depending on the state," he says.

Another big trend is that providers, especially hospitals, are seeing the benefits of HIEs, driven by the familiar pressures to improve quality and cut costs. "At the same time, hospitals need to bond with the physicians who refer patients to them. So we're seeing increasing interest

in private enterprise HIE, especially by IDNs. They're saying to physicians, 'We'll put in this infrastructure to help you improve quality and decrease cost—and meet meaningful use,' and in the process the hospitals ensure these physicians will continue to refer patients to them. So, we're seeing both state and regional efforts as well as these enterprise efforts. I don't think the models are mutually exclusive, they need to interoperate with one another," says Barthell.

Microsoft is backing the HIE movement. "We believe that much of the benefit of the HIE will come from data aggregation and analytics across cohorts in the healthcare-delivery system, and these benefits will not be realized if HIE is limited to one-to-one or point-to-point communication. If all I'm really trying to do is transmit test results to a provider I can do that with a nice fax machine," says Barthell.

"Aggregating data and learning from it—that's how we're going to transform care. For example, I'm a primary care physician and have a panel of 5,000 patients, 500 of whom are diabetic. I should be able to do filters and sorts to identify those diabetic patients and have my nurse contact the 10 at highest risk to come in for visits in the next week," he says.

Another example, from public health: In 1993, Milwaukee's water supply experienced an outbreak of crypytosporidium, the worst water-borne disease outbreak in documented U.S. history. About 400,000 people got sick with diarrhea and a few of the most vulnerable died. Without the ability to view comprehensive real time data related to all patients in Milwaukee presenting with diarrhea, it was extremely difficult to identify the public health crisis in a timely manner. Now that the HIE is implemented in the region, when a big storm hit the area last year, public health officials were able to use a tool in

Amalga to determine in real-time that no action was necessary because there was no change in the prevalence of symptoms to suggest an unusual outbreak. "That's a really powerful benefit, but you have to have the infrastructure in place," says Barthell.

Deloitte model

"Two types of HIEs have been given new life," says Patrick Rossignol, New York-based partner for IT consulting at Deloitte. He breaks HIEs into four categories: the National Health Information Network (NHIN); state-level HIEs; Community HIEs; and Hospital-sponsored HIEs.

The NHIN remains at a dead standstill, he says, fundamentally for lack of a real business need. The second category, the state-level HIEs, is claiming a lot of the spotlight lately. There is an inherent logic in their rise: states are both large employers and large payers; they are performing a population management function that can greatly benefit from an HIE; and they typically can effectively convene regional/community stakeholders. Furthermore, the Obama administration is funding them to foster HIE deployment.

"Federal funding will be released to all states," says Rossignol, based on a cooperative agreement defined between each state and the Office of the National Coordinator (ONC). The main challenge will be for the stakeholders within each state to agree on an HIE service offering they are willing to pay for. "A self-sustainable financial model cannot be an afterthought, each state-level HIE must provide specific services of such value that its intended users will agree to finance its ongoing operations after ONC's initial funding".

Community HIEs have had a tough go. Although they are logical constructs that align geographically with medical trading

areas where most patient data exchanges take place, it's been difficult for them to establish a workable governance, and to deploy an offering rich enough, fast enough to set up a self-sustainable financial model. "Most community HIEs have relied on grants, but once the grant evaporates, so do they," he says.

HIEs of One

The HIE type he's putting his money on is what Rossignol dubs the "HIEs-of-One," which are hospital-sponsored HIEs whose purpose is to support a referral network that links the sponsoring hospital to community physicians and community hospitals.

Deloitte.

Patrick Rossignol, partner, Deloitte

These HIEs-of-One appeared as the HIE technology became more mature and the relaxation of the Stark provisions created a vehicle for hospitals to support the provision of connected EHRs to community physicians. Yet, physicians did not show much interest in those EHRs, he says, until the stimulus. "When you add HITECH, the dynamic changes completely," says Rossignol. "The fear of not meeting meaningful use and a feeling of inevitability have made community physicians much more amenable to a hospital-provided EHR and its complementary HIE. HITECH has generated a tsunami of interest in these HIEs-of-One." Part of this unanticipated interest is also that sponsoring hospitals see these private HIEs in a way that goes far beyond referring revenues.

Five phases

"What is happening is the realization that HIEs—even if they bring tremendous benefits by themselves—are essentially a technical commodity. Their real usefulness is as a supporting platform to population management and community-wide chronic disease management," says Rossignol. Deloitte has constructed a five-phase model for the deployment of these HIEs-of-One:

1. Hospital-sponsored community physician EHR programs;
2. Test-results exchanges: the one-way push of patient clinical data from the sponsoring hospital to the community;
3. Community HIE: the two-way, real-time exchange of patient data;
4. Community-wide Population Management: Community wellness management though monitoring quality measures with analytics on top of a community-wide data warehouse of de-identified patient data; and
5. Community-wide Health Management: Community-wide chronic disease management with analytics on top of a data warehouse of identified patient data (for those patients registered in a community-wide disease management program).

This final phase is linked to both the Medical Home and Accountable Care Organization (ACO) concepts. It creates a virtual care coordination zone within the HIE between the chronic disease patient, her PCP, and her care team of specialists. Why the focus on chronic diseases? "Because it is both where the business case is the easiest to establish and concerns about data privacy are the lowest, as these patients are the most likely to appreciate the clinical benefits of data exchange and care coordination. The combination of the HIE's transaction layer and community analytics is when real benefits starts showing up on your HIE financial model,"

he says. An HIE-enabled Medical Home: that's absolutely where we are going," predicts Rossignol.

Accountable Care Organization

If the clinical side of the HIE is the Medical Home, its financial face is the ACO. The HIE-enabled Medical Home is PCP-centric. But to function financially and administratively a hospital-sponsored ACO is needed in one form or another to help engineer new reimbursement models with CMS, payers and employers. Though individual physicians could theoretically do it, they do not have the negotiating clout and experience of a hospital. Technically, the ACO will be adding new tools on top of the HIE-of-One platform. Patient navigation tools (a mix of call centers, scheduling systems, referral systems and customer relationship systems) will particularly become an important feature of the ACO because "I need to make it as convenient as possible for you the patient to stay in my digital network so I can control costs and outcomes," he says. For instance, chronic patients can report their vital signs from home with remote monitoring devices, or be reminded to take their prescriptions or follow a diet plan with a smart personal health record.

ACO development will occur one community at a time and hospitals will be in the driver's seat. Hospitals will be the only entities large enough to invest in the technology for patient management on a community level. "As a hospital I'm going to approach physicians in the community and say 'I've got the tools to manage these patients but we can't do it ourselves. You need to. We need to restructure the system to incentivize evidence-based quality measures," says Rossignol.

"I don't think we can have an ACO without the Medical Home, and vice versa. The two

need each other," he says. The PCP will play a major role in the referral network as an anchor of the care coordination zone. The problem is that the PCP is not organized well enough to create the ACO. The medical home concept is driven by the PCP, and the ACO is driven by the hospital.

"The morphing of hospital-sponsored HIE-of-Ones into ACOs follows a well established U.S. pattern," chuckles Rossignol. "It has happened many times in U.S. healthcare: the initial impulse of healthcare reform is initiated at the federal level but it is actually implemented at the community level, at the grass-roots level; often in a pretty different shape. That's what HITECH has done, it is pushing hospitals and physicians to become serious about automation and cooperation, to automate the parts (EHRs) and the pipes (HIEs), but also to experiment with pretty advanced models in anticipation of health care reform. We could be at a major intersection."

[For more information on HIEs, register for SI's teleconference on May 11 with Patrick Rossignol.]

Surf City HIE

Maybe it's no surprise that Santa Cruz, Calif., a laid back city with a collegial culture, claims to have the longest running successful HIE in the United States. Spearheaded in 1996 by Physicians Medical Group of Santa Cruz County (PMG), a large independent physician association, the Santa Cruz HIE uses a virtual clinical network to connect 80 percent of the region's physicians and staff as well as competing hospitals, labs, radiology centers, Safety Net Clinics, county health clinics and other healthcare entities.

"In 1993," recalls Robert Keet, MD, "I was medical director of our IPA and we had so much administrative money left that we decided to use it for connectivity and electronic medical records. We took the email model for business and made a business decision to tie all the docs and providers together."

SCH E
Santa Cruz Health Information Exchange

Eventually Keet, who practices internal medicine and geriatrics at the Dominican Medical Foundation, a 35-physician multi-specialty group in Santa Cruz, and his IPA contracted with San Jose, Calif.-based Axolotl Corp. to build the software necessary to connect the laboratory services, radiology offices and hospitals with which the group contracted.

Robert Keet, MD, FACP, Dominican Medical Foundation

"All the providers agreed to build the network, pay for it and become data suppliers," he says. "In 1995 we went live and started getting all the data delivered. Over the years it grew. In 1999 we added prescription writing. It grew to add automation. So people began to use EMRs."

Not an EMR fan

Keet also serves as Axolotl's CMO, although the role is informal. "The reason I've stayed involved," he says, "is because I totally believe in the HIE vision. I'm not an EMR fan because the EMR and its tools tend to create silos. We need a whole new nomenclature because the ability to get the data will depend on the interoperability of the network. What you're seeing in the HIE is that some people view it as an

EMR and it meets meaningful use. Every doc participating in the Santa Cruz HIE already meets most of the anticipated HIE meaningful-use criteria."

Dominican Medical Foundation is now owned by San Francisco-based Catholic Healthcare West, which uses Allscripts as an ambulatory EMR. "What's happening in Santa Cruz," he says, "is that our HIE has bi-directional full interfaces. When I do a note in Allscripts it goes directly into the HIE."

HIEs offer a new level of IT functionality. "HIEs are like the telephone system. EMRs are these big fancy things you attach to them. It's all going toward electronic data exchange management. Opthalmologists and other specialists will put whatever tool they need onto the HIE. The electronic infrastructure is the key. With ASPs [Application Service Providers, third-parties that provide software from a central location to customers in other locations] all you need is the Web. You'll see EMRs go away and get replaced by automation tools that support workflows and frameworks like the Medical Home," says Keet.

That's especially true because ambulatory care constitutes the bulk of care and the momentum has shifted there. When the Santa Cruz HIE was launched in the mid-1990s there were 77 separate physician practices, ranging from a top of 30 doctors down to single practitioners. Participating doctors pay a yearly fee. "I see the HIE as the system that brings them all together," says Keet, and the Santa Cruz HIE model has worked. "I believe we're one of the few HIEs that has never gotten a grant."

Keet acknowledges the Santa Cruz region is amenable to an HIE. "There are a lot of reasons it worked. We're lucky because we're isolated and we're a very collegial community. We also made some good deci-

sions early such as to use push technology rather than pull," he says. Push technology is easier because a physician who sends results or other information to the HIE does it willingly by definition, whereas pull technology queries the HIE for information and raises complicated issues of data ownership and release.

"The thing that kills HIEs is they start with pull technology," asserts Keet.

THINC about it

Travel nearly 3,000 miles due east from Santa Cruz and the "Left Coast" and you'll arrive at another HIE that is self-sustaining, albeit with a slightly different funding mix. Based in Fishkill, N.Y., the Taconic Health Information Network and Community (THINC) serves a region equally colorful, the Hudson River Valley region of New York.

THINC
Taconic Health Information Network and Community

Like Santa Cruz, THINC was incubated in a physician organization, the Taconic IPA, which launched it in 2005. "What the IPA was looking for was to spur physician adoption of IT,

Susan Stuard, executive director, THINC

and specifically electronic health records, as a means to improve quality and control costs," says Susan Stuard, who joined THINC as executive director in 2008. "The imprint of that vision has stayed with THINC and its board."

Also like Santa Cruz, THINC has started with a "push" model that also allows clinicians to perform direct ordering out of their EHRs of laboratory tests and get the results automatically back in their EHRs. In 2010 the HIE will add clinical summary exchange based on the CCD or Continuity of Care Document.

THINC rejects being categorized as a RHIO because, "we're taking on more than just data interchange. Our footprint was to work on EHR adoption and we've stayed true to that," says Stuard. That strategy's ultimate goal is quality and care coordination. THINC is winding up phase one of a pilot focused on the Patient-Centered Medical Home (PCMH) with 237 primary care providers and six commercial health plans.

"One of the reasons for our sustained success is that we very much view the PCMH as a natural extension of the work we do," says Stuard. Under the PCMH pilot, health plans make incentive payments to physicians who meet quality metrics established by the National Committee for Quality Assurance (NCQA). It turns out that after only one year all 237 physicians have achieved Level 3, NCQA's highest level of the PCMH.

HEAL thy HIE

A big contributing factor she says is that all primary care physicians participating in the Medical Home project had stable EHRs acquired independently or through THINC's program, which was funded by the New York State Dept. of Health under the first cycle of the Health Care Efficiency and Affordability Law for New Yorkers (HEAL NY) program, a goal of which is to provide HIT grants to support quality care. To date, THINC has implemented 336 EHRs in the Hudson River Valley and expects to raise the figure to nearly 600 in the next six months.

THINC contracts with MedAllies, a health information service provider based in the Hudson Valley, to conduct EHR implementations, including practice assessments, workflow design, training and ongoing

help desk support. Currently, the THINC EHR program supports vendors eClinical Works and NextGen but is planning to broaden the number of vendors soon.

"You need to have an organization in the community provide these services. It happened to be THINC in the Hudson River Valley. In other communities a hospital may take the lead," says Stuard. THINC is working under an $11-million HEAL 5 grant aimed at building local exchanges according to state-determined specifications. "We're a local node for seven counties," she says.

Clearly, THINC was fortunate to be well positioned to leverage a robust and visionary program like HEAL, whose funds have helped sustain the HIE. But THINC has legs of its own. Stuard believes THINC's success arises from a combination of two factors, the first of which was the decision not to be the operator of the IT. "THINC needed to be a community collaborative so we're outsourcing the IT to a vendor. That's allowed THINC to maintain a streamlined organization. We're a surprisingly small shop."

THINC garners operating income not only from grants but also from MedAllies and the fees paid by providers for ongoing EHR maintenance and support. "It's very much run as a business. We have to sponsor services inside the HIE that have value," she says.

New York HIE Life

Following the historic Hudson River Valley south takes the traveler out of the Catskill Mountains of THINC and into the tunnels and streets of Manhattan and the New York Clinical Information Exchange or NYCLIX. Many people travel this commute daily, and that's one of the challenges in building an HIE in the country's densest urban area.

"Manhattan has some unique qualities," says Gil Kuperman, MD, board chair and executive director of the NYCLIX, in a clear understatement. "It has a population of 1.3 million people and the number of daytime commuters who come in from outside is 1.4 million people. The flux in and out of Manhattan is mind-boggling. Having a RHIO that covers just Manhattan doesn't begin to cover the needs of the people who may receive some portion of their care here."

Gil Kuperman, MD, chair and executive director, NYCLIX

Despite the challenges, NYCLIX, which emerged in 2004 from conversations that began at the Greater New York Hospital Association in 2004, is just beginning to exchange clinical information. Like its country cousin THINC, NYCLIX is significantly driven by the state's HEAL program, from which it received half its total $4.7 million funding in 2005. The goals of NYCLIX's HEAL project were:

- Build a technical infrastructure interconnecting the participants
- Implement data exchange in the ED setting
- Support public health activities like reporting
- Evaluate the impact on cost, quality and safety
- Create an extensibility plan

Current participants include seven Manhattan hospitals: Bellevue, Beth Israel, Mount Sinai, NewYork-Presbyterian, NYU Medical Center, St. Luke's-Roosevelt and St. Vincent's. Hospitals outside Manhattan include Kings County Hospital, Staten

"The flux in and out of Manhattan is mind-boggling. Having a RHIO that covers just Manhattan doesn't begin to cover the needs of the people who may receive some portion of their care here."

Gil Kuperman, MD

Island University Hospital and SUNY Downstate Medical Center. NYCLIX also includes ambulatory and homecare agencies, a health plan and nursing homes. Allied organizations on the board of directors include the New York Business Group on Health, IPRO, Pfizer and North Shore-Long Island Jewish Health System.

Not a traditional community

Clearly, with Manhattan as the primary service area, even these big names have their work cut out for them. "We're a geographic region but we're not exactly a community in the traditional sense," says Kuperman. People are as likely to travel outside the island for care as seek it in Manhattan. Part of the reason for the fragmented approach is that the HEAL program's goal was to fund a variety of efforts with less attention to the way they would all eventually fit together, he says. "So, there's a bit of rework to be done."

NYCLIX's technical architecture employs a federated database with a central master patient index (MPI) that relies on a statistical algorithm to match the patient's records across the various members. Clinical data is held in "edge servers" to eliminate the need for one big database. "This is the most common infrastructure for an HIE," notes Kuperman.

With the technical platform running, eight organizations are contributing data involving 80 logical feeds across 42 physical interfaces. The MPI is linking patients across sites and users have access to a clinical results viewer. "We started from a blank slate and after the registration feeds began our MPI started to fill up. We now have 2.5 million patients in the MPI," he says. "These are very busy hospitals and the growth of the MPI reflects the movement of patients through these facilities."

Even in its fledgling state the figures begin to reflect the HIE's scope (except for one clinic, all sites are hospitals):

- 160,000 or 8 percent of patients in the MPI have been to two sites
- 17,600 or about 1 percent have been to three sites
- 500 had been to more than three sites

Movement among patients who visit the ED is striking: on average, nearly 20 percent of the patients who walk into an ED have data elsewhere, meaning they had been seen somewhere else. "The extent of movement is a validation of the HIE," says Kuperman.

Conclusion

There's an intuitive quality about the HIE that has made it easy to support since it was a CHIN in the early 1990s or a RHIO five years ago. It's the idea that communities are built on a foundation of sharing for the public good. Water and power utilities are good examples. Healthcare should fall into the same category. There's no higher good than community health and that is why community health information exchange, whether it's called a CHIN, a RHIO or an HIE never really went away. It was just waiting in the wings for the right moment.

Clinical data is held in 'edge servers' to eliminate the need for one big database. "This is the most common infrastructure for an HIE."

Gil Kuperman, MD

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