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Knowledge Management: Leveraging IT to Support Best Practices

EXECUTIVE SUMMARY

Knowledge management is a discipline that's been largely ignored in healthcare as a kind of intellectual sideshow with its own arcane language and concepts. That is changing, however, as delivery systems begin moving beyond IT infrastructure concerns and grapple with how to make their investments in clinical applications like CPOE and EMRs work.

The need to deliver knowledge such as best clinical practices to clinicians at the point of care or decision demands a disciplined methodology—and knowledge management provides such a framework. Also, the call for national standards of data and clinical nomenclature by the most recent Institute of Medicine report is helping drive the continued need for disciplined thinking on the subject.

As a result, knowledge management is gradually shedding its image as just another name for something obvious—the management and dissemination of information in an organization—into a useful method of conceptualizing and addressing the increasing information demands of healthcare providers.

In exploring the newly emerging role of knowledge management in healthcare in this issue of Information Edge, we interviewed experts from leading integrated delivery systems like Partners HealthCare in Boston, U.T.M.D. Anderson Cancer Center in Houston, CHRISTUS Health in Dallas, HealthPartners in Minnesota and Malvern, Pa.-based Siemens Medical Solutions, a Scottsdale Institute Program Partner.

One lesson on which all the experts agree: Technology alone cannot and will not evoke change. It must be done in the context of change in business and clinical processes. Knowledge management in healthcare provides the clearest example yet of that precept.

Guerilla war

At its heart, the goal of knowledge management in healthcare is to disseminate best practices to caregivers. Not surprisingly, the first and perhaps biggest obstacle to doing this is the culprit of variability.

"Best practices can range all over the map," says John Glaser, VP and CIO at Partners HealthCare System in Boston. Besides variability, an even more difficult challenge is that physicians view the implementation of best practices as just one more roadblock to their efficiency, he says.

What typically facilitates distribution of best practices, says Glaser, is a combination of leadership, a set of benchmark data, managed care pay for performance and at

times a sentinel event following something such as a failure to follow up on a mammogram. The dissemination of best practices requires great political skill and timing. "At the end of the day, it's a form of guerilla war," he says.

John Glaser, VP & CIO, Partners HealthCare System, Boston

"Even when presented with the best practices as accepted by a national professional body, physicians often say, 'I hear you, but my experience is different,'" says Glaser. "Medicine is more of an art and less of a science than we think, so what you get is the collective experience of everyone at the table. There is no right or wrong. You still have to come up with a consensus that is local, where adoption is optional," he says.

Embryonic discipline

Despite the challenges, Partners is seeking to get its arms around the knowledge and best practices it already has by institutionalizing the role of knowledge management. "As a discipline, it's still very embryonic," acknowledges Glaser, but the organization views it as important enough that it recently hired Tonya Hongsermeier, MD, as its first corporate director of knowledge management, perhaps the first in healthcare.

Tonya Hongsermeier, MD, Corporate Director of Knowledge Management, Partners HealthCare System, Boston

"I tend to view healthcare as a big knowledge-management process," she says. After practicing as an internist for several years, Hongsermeier pursued an MBA in the mid-1990s as a way to help her determine how to make quality "tangible" in healthcare. She also worked for a clinical guideline firm, a stint that made her realize how punitive and time-consuming the task of translating clinical guidelines and protocols could be if IT wasn't used to integrate them into the workflow.

"Many of us in medicine had guidelines sitting on shelves in our offices but we didn't have time to refer to them unless we were desperate for an answer. It was a fly-by-the-seat-of-your-pants model," she says.

Typically a vendor will provide a set of tools to install a clinical database and ways to process orders, relying on the client to build into the system a set of strategic goals related to how the knowledge in the system was to be managed.

Institutionalizing KM

Rare organizations like Partners have many years' experience in managing clinical knowledge but have traditionally relied on research staff to input content into their EMR. However, says Hongsermeier, "to really make it work" on the scale of a large delivery system requires a corporate focus on aligning business strategy with the people who design the clinical systems on the granular scale of software applications. Partners brought her on board to lead that effort of "infrastructuring" knowledge management.

"How do you use knowledge to improve care?" she asks. "Rules and reminders, order sets, dashboards—there are a million ways to display knowledge, but it requires a strategic focus to invest in people and process, not just the technology."

WELCOME NEW MEMBER

The Scottsdale Institute is proud to welcome new member University of Miami Medical Group (UMMG), based in Miami, Fla.

UMMG is the physician faculty practice of the University of Miami School of Medicine. Comprised of over 750 physicians and other healthcare professionals, UMMG diligently pursues support of the multiple missions of the School of Medicine, including education, research, patient care and community outreach.

UMMG provides state-of-the-art medical services at over a dozen South Florida locations. It is part of an integrated healthcare delivery system including the University of Miami's world-renowned Sylvester Comprehensive Cancer Center, the Miami Project to Cure Paralysis, the Diabetes Research Institute and the Bascom Palmer Eye Institute. UMMG shares its main location with, and maintains many internationally recognized clinical programs at Jackson Memorial Hospital, ranked as one of the top hospitals in the nation and the largest in the southeastern United States.

Welcome CEO Minor Anderson and the entire UMMG team.

Vendors typically install their systems at the "plumbing level" leaving provider organizations to struggle with how to put content into the pipes. "It's very common for clients to license a Cadillac system and then ask why they can't get payback for it. Vendors even sell you tools such as knowledge editors but they assume clients know what to do with them in terms of quality and patient safety." What we don't know how to do is how to build this best-practices focus into existing clinical care delivery systems.

Hongsermeier defines knowledge management as a three-cycle process:

1. *Knowledge Application*—The commonly accepted practice standards in medicine that computers do better than physicians remembering such things as making sure that a diabetic receives an annual foot exam or the congestive heart failure patient on digoxin has stable electrolyte balance;
2. *Knowledge Discovery*—Measuring the impact on care, understanding clinical and business performance; learning how to improve performance;
3. *Knowledge Asset Management*—Collaboratively updating and maintaining the embedded content for continuous improvement and making sure that this knowledge is visible to everyone.

Portal on the future

One of Hongsermeier's first initiatives since arriving at Partners has been to build a knowledge-management portal that allows users to view and share knowledge that is embedded in clinical systems such as decision support rules, medication safety databases, order sets and documentation templates. She is also working with corporate quality agenda leaders (executives), clinical system designers (those who work at the detail level and know how to optimize an EMR) and software developers to help them collaborate more effectively—three groups who traditionally work in silos.

Partners will be evaluating commercially available software-collaboration tools that will support virtual collaboration, version tracking and management—what's called content management—so the collaborative teams will be able to identify sources of EMR content, what needs updating and other important factors.

Providers typically organize implementation of their clinical IT—orders, documentation, clinical data repository—in silos, without the benefit of cross-functional experts. Hongsermeier's goal is to approach clinical IT and content from the strategic level rather than this functional level alone. For example, instead of knowledge engineers focused on just orders or rules, Partners will have knowledge engineering teams focused on cross functional topics such as medication safety and health maintenance. She's building a team that will develop the necessary infrastructure to facilitate this view of integrated knowledge flow.

Asynchronicity is a good thing

"The challenge for most healthcare organizations," Hongsermeier says, "is to achieve this strategic approach to clinical systems implementation in the absence of tools that support collaboration." Such tools would allow team members to work in a virtual asynchronous manner. That could mean, for example, serving on a panel that works together largely via email instead of the more unwieldy committee method of onsite meetings or conference calls.

WELCOME NEW MEMBER

The Scottsdale Institute is proud to welcome new member Methodist Healthcare, based in Memphis, Tennessee.

Serving the communities of West Tennessee, Eastern Arkansas and North Mississippi, Methodist Healthcare operates eight hospitals, several outpatient clinics, surgery centers and a home health agency. With approximately 10,249 Associates and 1,805 licensed beds, Methodist is the second-largest private employer in Memphis.

Founded in 1918 by The United Methodist Church to help meet the growing needs for quality healthcare in the Mid-South, Methodist Healthcare has grown from one hospital into a multi-hospital comprehensive health care system. Methodist's Memphis hospital, which consists of five facilities licensed as one hospital, is the second-largest hospital in the country based on admissions. Methodist Healthcare offers a full range of services, with special emphasis in the areas of neuroscience, cancer, transplants and pediatrics.

Welcome Gary S. Shorb, President and CEO, Cameron J. Welton, Executive Vice President and COO, Donna Abney, Executive Vice President, and the entire Methodist Healthcare team.

Hongsermeier says that most commercially available knowledge management tools are document-management systems that fail to support collaboration among non-technically savvy experts, database management, or address a key knowledge-management issue: "meta knowledge," or knowledge about knowledge. This includes the who, what, when, where, why and how about translating clinical guidelines into effective decision support that adds to quality of life for caregivers as well as quality care. At its most basic, meta knowledge involves sophisticated management of all the varied databases that hold an organization's knowledge.

"True knowledge-management systems are not yet available in healthcare. Most clinical systems vendors sell a software editor that barely supports the need to translate knowledge into best practices," Hongsermeier says, adding that while previously employed at an EMR vendor, she helped lead an initiative to build a portal that aggregated best practices. The central question is how to help healthcare delivery systems become organizationally effective by leveraging knowledge.

Now Hongsermeier sees a valuable opportunity at Partners to harvest knowledge gained from the organization's rich experience in building clinical decision support systems that prevent adverse drug events.

Key barriers to overcome

Knowledge management requires a proactive mindset. Even the advanced alerts that Partners has developed for medication dosing errors are not the end goal. "Physicians tell us: don't wait till after I do a dumb thing to tell me about it. It doesn't have to be a pretty web front; *it needs to get into the workflow.* We have a very aggressive goal to make Partners a knowledge-driven organization."

She agrees that there are no off-the-shelf best practices—that each organization must roll up its sleeves and undertake the tough job of tailoring best practices and clinical standards to its own setting. "Even if you can take the boilerplate off a medical association's website you still have to vet it and make it your own," notes Hongsermeier. That's largely because the vetting process helps build usability for and trust by clinicians using the system. In addition, there can be significant *variability in clinical nomenclatures even within a complex delivery system with numerous vendor or legacy applications.* "It's challenging to compare congestive heart failure admission order sets from multiple sites and multiple order entry applications using conventional knowledge editor tools." she says.

Also, *lack of IT interoperability* makes adoption of data standards associated with best practices difficult. Beyond that, any comparative evaluation of quality or cost savings from best practices at the care-site level requires seamless interoperability. Even the same vendor typically builds their system for a client with different clinical data definitions—depending on the site, says Hongsermeier.

"It's several years away," she says referring to standards for interoperability in knowledge management. First, the healthcare industry has to agree on standards for knowledge representation, followed by software vendors agreeing to incorporate those standards into their products.

Building KM into products

Some systems vendors say they are moving in the knowledge-management direction.

"We're very much in synch with Partners' thinking," says Sam Brandt, MD, VP and

WELCOME NEW MEMBER

The Scottsdale Institute is proud to welcome new member New York-Presbyterian Hospital, based in New York, N.Y., and serving patients in the tri-state region of New York, New Jersey and Connecticut.

New York-Presbyterian Hospital is one of the most comprehensive university hospitals in the world, with leading specialists in every field of medicine. It is composed of two renowned medical centers, New York-Presbyterian/ Columbia and New York-Presbyterian/ Weill Cornell, which have academic affiliations with two Ivy League medical institutions, Columbia University College of Physicians & Surgeons and Weill Medical College of Cornell University.

The Hospital has 2,395 beds, 4,717 physicians, and 13,304 employees.

The Hospital is also the hub of the New York-Presbyterian Healthcare System, which comprises 34 general acute-care hospital sites in New York State, New Jersey, and Connecticut; 15 long-term-care facilities; and other ambulatory and specialty providers. The System constitutes the largest private (non-public) employer in New York City—and accounts for 1 of every 4 inpatient discharges in the New York metropolitan area.

New York-Presbyterian Hospital is ranked higher in more specialties than any other hospital in the New York area by *U.S. News & World Report*—and more physicians from New York-Presbyterian were named in the America's Top Doctors survey than from any other hospital in the nation.

Welcome Herbert Pardes, MD, President and CEO; Michael A. Berman, MD, Executive Vice President & Hospital Director; Steven J. Corwin, MD, Senior Vice President & CMO; Aurelia Boyer, CIO; Mary R. Cooper, MD, CQO; and the entire New York-Presbyterian team.

chief medical informatics officer at Siemens Medical Solutions. He says that best practices can take a number of forms:

Sam Brandt, MD, VP & Chief Medical Informatics Officer, Siemers Medical Solutions, Malvern, PA

1. Feedback such as alerts and reminders concerning drug-drug interaction and other factors, all of which vendors support today;
2. Evidence-based order-sets content;
3. Instantaneous links to referential content like the latest literature on a particular diagnosis;
4. Still-emerging knowledge models that can combine abstract and specific knowledge to offer clinicians choices of treatment.

Fighter cockpit

The latter is the direction Siemens is moving in, says Brandt, and it requires standardization and coordination of all the knowledge components: vocabularies, ontologies and knowledge modeling. "You have to have the language or structure and the knowledge to place in that structure," he says, adding that Siemens has such a framework under development. "It's a pretty complex undertaking that requires a generational change" as a result of its scope, he says.

Brandt says that the only way physicians will use such systems, whether they involve CPOE, online clinical documentation or knowledge management, is to make it as easy to use as scribbling on a paper pad. "I can scribble 15 to 20 orders fairly quickly," he says. Consider that there are something like 1,400 different potential orders each with three to seven distinct parameters with hundreds of valid values for each parameter (to which unit patient should be admitted and what their vital signs are, for example) and it's clear how complex a knowledge management system must be. Add to that the need to enhance the clinician workflow.

"If the system understands that I'm treating someone with congestive heart failure who also has diabetes and can make it easier for me to treat that individual," then it helps physicians do their work, says Brandt. It should also display this knowledge "like the heads-up display in a fighter cockpit," so that it's very easy to read.

Texas Palms

Ergonomics and easy access to information were big factors for Dallas-based CHRISTUS Health, in its initial phases to disseminate clinical best practices. "We started with a Palm Pilot that presents 'just the facts,'" says Elmore Rigamer, MD, MPA, system medical director. The system uses Patient Keeper, a rounding tool for physicians that keeps lists of patients with basic information about each like demographics, current medications, allergies, laboratory tests, radiology reports, charge capture and an e-prescribing tool.

The project has signed on 60 physicians. "It lets them wet their feet in technology. It's very hard for physicians with no exposure to technology to go right into CPOE," says Rigamer. He believes any workable knowledge management system must have the following components:

- The "form factor" (device) must be simple;

Upcoming Events

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April 7, "Supply Chain Savings: Premier Health Partners case study" Supply chain, which represents a third of a hospital's budget, presents enormous opportunities to reduce costs and increase efficiencies. Join Judy Rowe, Neoforma Vice President of Customer Success, and Jeff Solarek, Director of Material Management at Premier Health Partners, Dayton, OH, as they share best practices in implementing, measuring and tracking supply chain management initiatives that result in significant savings and cost avoidance, including $1.36 million at Premier Health Partners alone. (Supply Chain and Revenue Cycle Interest Groups)

April 7, "CPOE Utilization Rates: Developing a Common Definition" David W. Bates, MD, MSc, and Chief, General Medicine Division, Brigham and Women's Hospital, Medical Director, Clinical and Quality Analysis, Partners HealthCare System, Inc., Professor of Medicine, Harvard Medical School and Chair, CPOE Advisory Group, Leapfrog Group, and Barbara Rudolph, PhD, Director, Leaps and Measures, Leapfrog Group, will host a discussion regarding potential standards for determining the extent of utilization of CPOE in hospital settings with the intent of achieving greater reliability in measurement across hospitals and consistency across standard setting bodies. (CPOE and Patient Safety Interest Groups)

more events on next page

- Information must be easily accessed; and
- It must reflect the consensus of practice in the community.

He notes that it takes 20 years for evidence-based medicine to filter down into mainstream practice. "The main question is, once we accept the evidence and modify the standards to reflect it, how do we bring it into the workflow?" notes Rigamer. Achieving consensus among physicians is difficult enough, but the tools must also be easy and appealing to use. The Palm Pilot seems to fill the need of fitting into the physician workflow.

"Before you even get out of the gate the technology has to be squeaky clean," he says. As a result, it's necessary to work out all the infrastructure and architecture so it's "like switching on a light. Don't even talk to physicians before that's in place. They want it to be fast."

Lack of motivation

Even a cancer center known for applying research knowledge to patient care struggles with the issue of knowledge management for operations.

"We're not good at knowledge management," acknowledges Sherry Martin, associate VP for quality management, at U.T.M.D. Anderson Cancer Center in Houston. "It's a big challenge to figure out." She says IT is part of the solution, including the use of numerous websites with quality tools and best practices, but the problem is one of motivation.

"People do not access information unless they need it and only when they need it," Martin says. "We've reminded people about these resources—and databases are important—but you have to create avenues beyond that." As a result, Martin is helping to create half-day to one-day "Solution Sessions" to bring employees together who share similar problems and demonstrate the knowledge resources to solve those issues.

Solution Sessions can bring together, for example, the analysts who conduct root-cause analysis of an incident face-to-face with the clinicians who work on the floor where the incident occurred.

On a larger scale, M.D. Anderson conducts "Create Solutions," platforms aimed at all 14,000 employees that highlight process-improvement solutions. Once a year, the top 20 of those solutions are featured in the week-long "Celebrate Solutions" event at the cancer center.

Learning then transfers through vehicles like interactive story-board sessions. The organization also uses classic strategies like requiring employees to get passports stamped at various sessions.

Scaring people into sharing at GE

Martin says that GE is the classic corporate knowledge-management success story. However, former GE Chairman Jack Welch had employees "scared to death" of the consequences if they didn't share best practices and good ideas across the company. Fear, however, is not the way most organizations in healthcare operate.

So the challenge remains: how to positively compel people to adopt best practices. "Websites, chat rooms and databases are easy to build," says Martin. "The hardest thing is to meet the motivational need."

Part of that challenge arises from the time-sensitive nature of most process-related problems. When most people experience a problem, they go directly to the most

Upcoming Events continued

April 8, "Allina on Transforming the Revenue Cycle: A Case Study" Tom Gavinski, Vice President, Allina Revenue Cycle, Allina Hospitals and Clinics, Minneapolis, MN, presents their revenue cycle transformation work and the dramatic bottom line results achieved. He discusses an assessment approach, refining A/R processes, utilization of IT, operationalizing your vision, and demonstrating value / measuring results. (Revenue Cycle Interest Group)

April 14-16, "Meeting the Future: The Role of IT and Process Improvement" Scottsdale Institute Spring Conference, Scottsdale, AZ

April 20, "ICU Medication Reconciliation" Wayne Sparkes, Senior Project Administrator, Center for Innovation in Quality Patient Care, and Mandalyn Schwarz, NCIIE charge nurse, Johns Hopkins University School of Medicine and Hospital, Baltimore, MD, describe Hopkins' Comprehensive Unit-based Safety Program. CUSP provides the framework for projects focused on patient safety and enhances the understanding and development of a culture of safety. Specifically they review the ICU Medication Reconciliation project: the comparison of pre-hospital medication lists, newly prescribed ICU medication lists and transfer orders. This system catches and corrects discrepancies from the omission of pre-hospital beta-blockers or cardiac medications to wrong dosages or frequencies on transfer. Using this system, Hopkins has decreased potential transfer med errors to nearly 0%. (Patient Safety Interest Group)

more events on next page

readily available help and "in my experience that's a human voice," she says.

Build the infrastructure first

Knowledge management, defined as leveraging IT to support best practices, "is part and parcel of our whole response to the challenge from the 'Crossing the Quality Chasm' report from the IOM," says Alan Abramson, PhD, senior VP and CIO at HealthPartners, in Bloomington, Minn.

The organization is fully committed to establishing a common IT infrastructure as the first step in managing knowledge for quality purposes. "We're really betting on information integration," he says, and that involves first a technical infrastructure, including a network backbone, hardware, database and operating system. On top of that go software applications like the EMR from Epic Systems.

The point, Abramson says, is that the system is a unified whole. Health Partners used to have four different email systems and disparate phone systems. Now they're all consolidated.

Lacking that integration, knowledge management is much more difficult to execute. Costs increase for sending and receiving data and an organization is in a constant mode of maintenance.

Transformational vision

But the real driving reason behind having such an infrastructure is to achieve a vision of "knowledge management" that Abramson witnessed at one of his EMR pilot sites: A physician at a swivel computer terminal typing in his password and then sharing the screen with his patient, discussing their last visit and what progress the patient had made in carrying out therapy.

"This is a transformational idea: the patient and physician in consultation together, rather than the doctor peering at a manila folder and the patient wondering what he is looking at," he says.

Abramson acknowledges that even with the right network backbone and applications in place, physicians take about a year on average to learn such systems. Some specialists move more quickly because of the specificity of the information, while general practitioners may take longer because of the breadth of knowledge they require.

"We're at work on a process to fully automate and translate medical knowledge into more standardized and machine-based language. The question is how you code all medical knowledge because most is in text," says Abramson. The first step includes adopting a standard lexicon of medical knowledge like SNOMED, which the government has licensed for use by physicians.

Patient-centered model

However, the challenge to codify and standardize clinical knowledge is a huge undertaking. "Automation at the point of care is one thing, but we're not going to successfully exploit it until we can encode, capture and put in machine logic our medical knowledge. It could take 10 years to do that," he notes. "Unlike billing systems, we don't have it mapped out."

And that's just the technical part. The real paradigm shift for HealthPartners comes with placing the patient at the center of a knowledge-management model featuring Prepared Practice Teams, including primary care physician, radiologist, nurses, care manager and therapists. "We draw a diagram differently than the traditional hierarchical one that looks like a mini-organizational chart," says Abramson.

Upcoming Events continued

April 21, "SI Overview Teleconference" Learn how to make the most of your organization's membership in SI by utilizing the information that's already available, ensuring that you are informed of sessions that are most relevant to you. Learn who should participate in what sessions and how to get them involved, and how you can have input into the development of our programs. (All members)

April 22, "Options for Procuring Software and IT Services" James W. Noga, CIO, Massachusetts General Hospital and the Massachusetts General Physicians Organization, Partners HealthCare System, Boston MA, and William L. Wellman, VP, First Consulting Group, Long Beach, CA, review their published work on this topic. They describe various approaches to software acquisition: outsourcing, building, buying, using an application services provider and building new applications by mining legacy systems. Included is a case study demonstrating the importance of coupling an integration strategy with the software acquisition process, and the necessity of developing an acquisition process that provides for an analysis of each approach. They also cover the necessity for software acquisition decisions to be made with the long view in mind—as they influence the value, flexibility, agility, and cost of the IT function, and there is substantive disruption and cost associated with changing that direction. (IT Management, IT Value Interest Group and CFO's)

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Conclusion

Organizations like HealthPartners, U.T.M.D. Anderson Cancer Center, CHRISTUS Health, Partners HealthCare and Siemens have realized that knowledge management in healthcare is nothing if not a different way of viewing care.

"The biggest advantage of the IOM reports is that helped us think in terms of systems rather than individuals," says CHRISTUS' Rigamer. "A knowledge-management approach makes you more aware of how to make the system help individuals do a better job."

He says a key question is defining the role of technology. "Most mistakes made in medicine are caused by not having enough information at the point of care. The human brain cannot deal with more than seven factors simultaneously and there are clearly more than seven factors in a clinical decision," he says.

"This is an information-rich kind of profession. You're processing a lot of knowledge simultaneously. You can't do that with paper or in your head."

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