Health Data Management

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Working Together: I.T. and Evidence-based Medicine

Information technology is linking a growing number of clinicians with the latest in best practices data.

By Bill Briggs, Senior Editor

Until very recently, the most reliable source clinicians had for current best practices was the medical textbook, in which publishers distilled information from medical research and case studies published in medical journals or presented at academic and medical society meetings. But publishing cycles ranging from months to years meant that textbook data was less than fresh.

For physicians like Beth Potter, there's a new game in town that gives her access to the latest in best medical practices from around the country—or the world. She now has instant access to the most current information on best practices via her PDA or office PC. And that means fresh data.

"In the past when I wanted information, I would pull a textbook," says Potter, an assistant professor at the Madison-based University of Wisconsin department of family medicine and a practitioner in the school's family practice clinic. "There was one textbook I relied on and I had to assume that was the most recent information."

Another option was to do a topic search on the National Library of Medicine's MEDLINE database, she adds, which is time consuming and seldom feasible during a patient visit.

Today, however, Potter and other clinicians striving to practice evidence-based medicine gain instant access to a mountain of information on best practices through information technology. And provider organizations are using I.T. to mine their own data and access external clinical evidence-based guidelines from a range of data sources.

Their goal is to get current information into the hands of clinicians where they need it most: at the point of care, where patient treatment decisions are made. The payoffs, many experts say, include reduced medical errors, greater operating efficiency and improved patient care. Sooner or later, higher reimbursement levels might be tied to evidence-based medicine as well.

Evidence-based medicine is a means of evaluating the current best clinical practices and applying that information to the care of individual patients. The practice is enabled by I.T. In fact, it might be impossible without it, experts say, as clinicians face the hopeless task of reading all current literature on a given disease or condition.

I.T.-enabled evidence-based medicine can help sort through the vast fields of data and is poised to improve patient safety. But it also might become a necessary part of the reimbursement process, says Patty O'Brien, M.D., a consultant in the health care practice of Chicago-based Accenture.

"For a lot of reasons, there is a push to tie payments to clinical outcomes," she explains. Factors include the federal government tracking the outcomes of Medicare test programs that

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use best practices to treat patients and payers hinging full payment on providers' track records of following best practices.

These efforts represent a shift back to quality-based medicine, says David Trace, M.D., strategic director at The Kennedy Group, a Chicago-based health care I.T. consulting firm. "In the last decade there was a focus on health care cost," he says. "Now it's on quality and we're seeing greater interest in evidence-based medicine. It's driven by the notion that people need to understand quality as they watch the health care dollar. Everyone is looking for value, and value is quality divided by cost."

I.T. applied to outcomes

As the federal government runs I.T. demo sites and tests payment based on performance, payer organizations also want to understand outcomes, Trace adds. "In years past much of I.T. was administrative and used for looking at costs," he says. "Now health care organizations are using it to understand outcomes."

Getting a handle on outcomes is tricky, he adds, because they are tied to severity of illness and in some cases multiple diseases may be at work in one patient. I.T., though, can help sort it all out.

Although some providers have been at it long enough to show real progress, the number of those that have embarked on the quest for electronically accessible best practice data is small. Few, if any, have mastered the process, experts say.

Still, the numbers are growing, and there are many hospitals and delivery systems actively exploring the possibilities, says Bob Williams, M.D., principal in New York-based Cap Gemini Ernst & Young's health consulting practice.

"Every organization we're working with that's implementing advanced clinical information systems with CPOE is including an approach to embedding leading practices supported by evidence-based literature in the systems," he says. Information technology is playing a key role in evidence-based medicine.

Data on best practices and other research is being mined internally and accessed externally via the Internet from many sites. The challenge for provider organizations is how to put global data in context and apply it to the individual patient.

Won't follow recipe

Most physicians favor embedding such data-gathering steps into their clinical information systems, Williams says, with one caveat. "They like the idea of doing it, but don't want it to get in the way," he explains. "And they don't want to practice 'cookbook medicine.' Once they get beyond that fear and get the whole picture, then they're usually off and running."

Getting physicians on board means designing the "physician experience" by including electronic tools to tap into data resources. This is accomplished with tools that support clinical decision making and order entry, Williams says.

"Developing ordering processes and using rules and alerts in the order sets are key," he adds, which is where provider organizations are embedding the contents of leading best practice information.

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For example, if a hospital emergency department patient comes in with symptoms indicating a pre-heart attack condition, an embedded lead practice would "suggest" getting aspirin into the patient's system quickly, Williams says. "Or it might offer options in selecting a cost-effective beta blocker. It's a way to remind physicians to do things quickly but also to support lead practices of outside organizations or medical societies."

Evidence-based medicine requires merging data from external sources along with that of patient-specific data residing locally in multiple information systems, including electronic medical records and computerized physician order entry. All are necessary to feed information on a given situation to hardwired or mobile computers to support clinicians' decisions at—or near—the point of care.

Research skills

At the University of Wisconsin, medical students learn research skills, which they use as residents to help them locate evidence-based information, says Potter, the assistant professor. All clinicians don't embrace the practice of evidence-based medicine in the university's health care system, but there is interest in every department, she says.

Getting the most current information is a challenge. One source Potter uses is guidelines from the Agency for Healthcare Research and Quality, Rockville, Md. AHRQ, a part of the U.S. Department of Health and Human Services, runs the National Guideline Clearinghouse.

The clearinghouse is a free database of evidence-based clinical practice guidelines and related documents.

Potter also uses InfoRetriever, a database of current literature that features brief summaries of articles. It was established by a group of family practitioners to help colleagues with information mastery, she says. The database is part of InfoPOEMs.com, the latter part of which stands for "patient oriented evidence that matters."

Software from InfoRetriever resides on Potter's PC and PDA. She also can access point-of-care medical reference material from Dynamic Medical Information Systems, Columbia, Mo.

Formal approach

Clinicians like Potter have taken the initiative to pursue evidence-based medicine on their own. One organization with a more formalized approached is Vanderbilt University Medical Center.

The Nashville, Tenn.-based organization includes medical and nursing schools and acute care and specialty hospitals. It's use of automated clinical pathways tools dates back to the early 1990s, says William Stead, M.D., associate vice chancellor for health affairs and director of the informatics center.

The organization's history has given it a significant perspective on evidence-based medicine, which Stead notes means different things to different people.

VUMC offers its physicians a range of resources, which taken together represent a broad sampling of how information technology helps advance the practice of evidence-based medicine.

"The first thing we do is make sure that PubMed, the National Library of Medicine's index to biomedical literature, is available at all workstations throughout Vanderbilt University Hospital

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and Clinic," Stead says. "The key is to make sure it's very easy for clinicians to get at the medical literature from wherever they practice."

Vanderbilt also has a clinical I.T. consulting service staffed by people "who are next-generation medical librarians," Stead says. "They are expert in both searching and filtering information, and they round with clinical teams."

When teaming with intensive care unit staff, for example, the consulting staff will pursue answers to more complex questions that arise during rounds. Researchers identify the range of opinions on the question and whittle them down to the best article representing each opinion. Then the "domain" expert reviews the articles and determines what course to follow.

Another tool enables physician groups to look at data about their own practice patterns, Stead says, to identify any variability within a team. "At first look, variability tends to be pretty high," he explains. "Then we give them tools to determine what best practices should be. The group then creates collaborative care pathways."

Another weapon in Vanderbilt's evidence-based medicine arsenal is a homegrown decision support information system that's part of its CPOE system. The application brings decision support to clinicians at the patient level, available across the enterprise. The system also is licensed to San Francisco-based McKesson and marketed as Horizon Expert Orders.

Staying on track

Yet another tool is Vanderbilt's own patient tracking system that monitors outpatient services and notifies physicians electronically if any patients are seen in the organization for treatment related to existing conditions. It tracks diabetes patients, for example, and alerts physicians if the patients aren't meeting their treatment goals. The final tool is a disease management application with "explicitly actionable guidelines," Stead says.

Vanderbilt was a lead partner in forming a company called EBM Solutions, in conjunction with a group that included Duke, Oregon and Washington universities and New York's Mount Sinai Medical Center. The EBM Solutions application was written both for practitioners and patients, Stead says, and was recently sold to HealthGate Data Corp., a Burlington, Mass.-based publisher of evidence-based medicine resources.

For all its progress in the pursuit of evidence-based medicine, Vanderbilt's clinicians aren't using the tools as much as they could. "We don't have the kind of penetration we'd like to have with some of the tools," Stead says. "For instance, we are not yet using the disease management guidelines as a patient education tool. Our clinicians have extracted pieces from our offerings, but that might be all we ever do. The question is how to best fit the evidence into the workflow."

Some organizations take a different view of best practices and apply information technology to mine data on a more local level. At California Pacific Medical Center in San Francisco, the obstetrics and gynecology department studies health care with one dominant outcome, says Elliott K. Main, M.D., department chair.

"The baby is the 'outcome,' " he says. "If you're running a nursery you're interested in what caused the baby to get here. The 'drivers' are all in the mother, and in normal outcomes studies you're limited to one or the other."

Separated at birth

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The medical center is part of Sacramento-based Sutter Health and performs more than 5,800 deliveries annually. Ten years ago California Pacific managers wanted to separate birth data stored in the medical center's information systems and start mining it.

To do so, they chose clinical and financial peri/neonatal software from Site of Care Systems, San Francisco. The relationship evolved to an agreement with Sutter Health to provide medical reporting capabilities and outcome analysis.

The application enables analysis of Sutter Health's 40,000 births per year. It's at the heart of the organization's first pregnancies study, designed to improve outcomes for first-time mothers.

"We use the system to measure how we do at all hospitals," Main says. "We can benchmark against each other by linking together and identifying first pregnancies."

Information technology enables management to gather data enterprisewide, analyze it, and feed it back to clinicians to help change processes and refine best practices. "We have done a lot of work trying to change physicians' practices over the last 10 years," Main says. "The most powerful tools don't show what the consensus opinion is in the next state. You need to see that the principles in literature apply locally, to your facility. If you can show data locally you can get people to take notice that this might be applicable."

Providers like California Pacific Medical Center have been pursuing evidence-based medicine for many years. It typically reflects organizations with a longstanding use of I.T.

At Providence, R.I.-based Lifespan, a long-term goal has been providing information to clinicians wherever they are, says Nancy Barrett, director of systems integration and development at Lifespan, a delivery system with five hospitals and 2,400 affiliated physicians.

"It's been our philosophy from the early days," she says, "to provide clinicians whatever they need." That goal meant investing in a wide area network infrastructure to enable physicians to access data from their homes and the addition of a wireless network to enable mobile access within the organization's facilities.

The commitment to data access extends to external sources of best practice research. "We were challenged with coming up with a structure to provide easy access to information, including reference data," Barrett says.

As a result, clinicians enterprisewide have access to resources from such organizations as Uptodate.com, Micromedex, Harrison's Online and Ovid.

More recently, Lifespan implemented a decision support system from McKesson. Rolled out in spring 2003, the Interqual system enables data retrieval and exchange along with utilization review measurements of clinical processes at Lifespan's Newport (R.I.) Hospital.

System integration has been one of the greatest tests of Lifespan's I.T.-oriented mission. Interfacing the McKesson system with core information systems from Siemens Medical Solutions Health Services, Malvern, Pa., required substantial integration work, Barrett says. Resulting data is available to clinicians via Lifespan's intranet.

Evidence-based medicine also has been a long-term goal for Mid America Heart Institute and its parent, Saint Luke's Health System, both in Kansas City, Mo. The Mid America Heart Institute has tracked patients for 15 years and built a 200,000 patient database, says John Wade, vice president and CIO of Saint Luke's.

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Not good enough

The heart institute's goal is long-range patient tracking. To that end, the institute conducts periodic follow-up surveys of patients to monitor their condition, Wade says. "It's not like we wait for the patient to come back in. The fact that you measure the patient when they are part of the inpatient organization is not good enough. Unless you maintain contact with the patient through multiple episodes of care, even if they are not in your discipline, you're really not practicing evidence-based medicine."

One of the more recent projects of the nine-hospital delivery system is standardization of clinical protocols. "From an electronic standpoint we have about 300 protocols fleshed out and being automated and stored to track outcomes," Wade says. "We are committed to getting to evidence-based medicine. Measurable outcomes enable us to alter processes as outcomes data changes." •

Sidebar

Growth in the offing, but how far off?

Many health care organization executives extol the virtues of evidence-based medicine, but few expect a provider stampede any time soon. Many agree that much of evidence-based medicine's future is shackled by the lack of order entry and electronic medical records systems.

Some consultants see increasing numbers of provider organizations designing information systems to support evidence-based medicine. "We see a lot of system design and implementation efforts," says Bob Williams, M.D., principal in New York-based Cap Gemini Ernst & Young's health consulting practice.

Williams estimates five or six evidence-based medicine "go-lives" in the first half of 2004 and predicts a "couple of hundred" more nationwide later in the year.

"Momentum is building and I expect we'll see a lot more of it," he says, "as long as there are not a lot of failures. Many look good, but are they going to work? They should, but we'll have to wait and see."

Academic institutions rode the first wave of evidence-based medicine programs and implemented the first information systems to support them.

But new players come from a variety of delivery systems and community hospitals, says Patty O'Brien, M.D., a consultant in the health care practice of Chicago-based Accenture.

"A lot of community hospitals are moving quickly now and at least getting evidence-based medicine programs off the ground," she says. Many of them had a head start, so the concept isn't necessarily new. "It all started 10 to 12 years ago with the development of clinical protocols."

Words of caution

Not everyone is as optimistic. At least one executive with an organization often held up as a bellwether for evidence-based medicine preaches caution regarding expectations.

William Stead, M.D., is associate vice chancellor for health affairs and director of the informatics center at Vanderbilt University Medical Center, Nashville, Tenn. He doesn't believe http://www.healthdatamanagement.com/html/current/PastIssueStory.cfm?PostID=16744&PastMonth=January&PastYear=2004

his organization is tapping evidence-based medicine technology well enough. Nor does the industry at large have the tools in place to perform evidence-based medicine.

"I don't think the average physician here or elsewhere really knows when they are following the evidence and when they are not," Stead contends. "Nor are they aware of the frequency at which they are not following the evidence. I don't think Vanderbilt or anyone else is practicing evidence-based medicine to the degree we need to."

There exists a "ton" of room for educating physicians to the point they understand the gap between what they are doing and what the evidence suggests, Stead says.

"Vanderbilt has done an excellent job of linking individual pieces of evidence into workflow that makes it easy for physicians to act on. We are ahead of most of the world in our ability to do that. For the things where we've worked out content, we do a good job," he explains. "There's just a whole lot going on that's simply not yet covered because it has not yet culturally penetrated that this should be the highest thing on physicians' radar screens."

Many observers agree that after cultural issues such as physician acceptance and use of new tools, cost issues are the greatest obstacles to widespread growth of evidence-based medicine. And much of those costs will be associated with building I.T. infrastructure.

"Until provider organizations get computer-based patient records and real-time decision support, they can't do evidence-based medicine," says David Trace, M.D., strategic director at The Kennedy Group, a Chicago-based health care I.T. consulting firm.

"Many are trying to integrate disparate databases into one clinical repository. One way is with standard vocabularies, like SNOMED. Then a database can form queries to look at standards of care. It's different from real-time decision support but it may be the first step many organizations can take."

Still, Trace has high hopes. "Maybe not within the next two to four years, but at some point in time there will be a compelling reason for clinicians to adopt electronic records and I.T. in general, and that will start a cascading of events leading to evidence-based medicine." •

Sidebar

Evidence on the go

Physicians who are practicing evidence-based medicine are finding mobile technology is improving their access to information. Like other mobile applications, the technology's beauty is in the hand of the beholder.

For Beth Potter, M.D., who is an assistant professor at the Madison-based University of Wisconsin department of family medicine and a practitioner at the school's family practice clinic, a PDA keeps her in touch. Potter uses an iPAQ from Hewlett-Packard, Palo Alto, Calif.

Hand-held devices weren't always much help in accessing best practice data, though. "Earlier versions were a little clunky," she says. "They needed improved processor speed to get through large databases. But they have become more efficient."

For now, Potter is downloading data from InfoPOEMS.com via software called InfoRetriever. She uses the database to review diagnosis, prognosis and treatment data. She hopes to access such data in real time via wireless network in the near future.

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At Lifespan, a Providence, R.I.-based delivery system with five hospitals, clinicians can access best practice data from a variety of sources using a range of mobile devices, says Nancy Barrett, director of systems integration and development.

The list includes PDAs, Tablet PCs and cart-based laptops. Lifespan makes the range of computers available to encourage use. "You have to support a variety of physician preferences," she says.

Preference is driven by practicality in most organizations. At Vanderbilt University Medical Center, Nashville, Tenn., clinicians access electronic patient chart information on mobile computers. Their use is limited only by screen size, says William Stead, M.D., associate vice chancellor for health affairs and director of the informatics center.

"Some other data is accessible via mobile devices," he says, "but there are screen real estate limits. Technically, clinicians can access most things once they are made Web-accessible. The question is screen."

Many physicians use laptops when on the Vanderbilt medical campus, Stead explains. "Hand-helds aren't used a lot in our clinics and hospitals. We now have flat screen monitors in all exam rooms." •

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Additional reference on EBM supplied by S.L. Priest:

1. http://www.cebm.utoronto.ca/
2. http://www.himss.org/content/files/proceedings/2003/Sessions/session134_slides.pdf