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Healthcare Turns To The Web

Medical groups view the Net as a way to cut medical mistakes

By LARRY STEVENS

Many healthcare organizations are hoping the Internet can play a role in curing what may be the fourth leading cause of death in this country: medical errors.

The news wasn't exactly a complete surprise to doctors, nurses and hospital administrators but many Americans were shocked last winter by a report from the National Academy of Sciences. The report says between 44,000 and 98,000 Americans die each year because of medical mistakes. Examples include being given the wrong medical procedure, medication or dosage; an incorrect diagnosis; or a delay in treatment. The report also says as many as three percent of hospital patients suffer injuries from treatment, roughly 50 percent of which are preventable.

Medical organizations are turning to the Web to solve these problems in a number of ways. The Internet can be used to maintain and disseminate patient information; send reminders and alerts when medications need to be changed; provide an efficient way to distribute recent medical findings and care guidelines; and let researchers access the data needed to create those guidelines.

"While the Net is not the only cure, it certainly has to potential to improve the quality of care," says Arthur Levin a member of the committee that released the National Academy report. "Things like electronic medical records can improve the speed of transmission and accuracy of patient data. It can also give patients access to their own information, allowing them to make corrections." So far, no single healthcare organization is doing it all. But many have instituted projects providing pieces of the healthcare quality improvement puzzle. They include:

- Electronic Medical Records/Extranets. Contain all the data normally found

Web Services Pipeline
Enterprise Applications Pipeline
Server Pipeline
Small Business Pipeline
IT Utility Pipeline
Business Intelligence Pipeline
Compliance Pipeline
Financial Technology Network
Wall Street & Technology
Bank Systems & Technology
Insurance & Technology
Commweb, The Telecom Pipeline
IT Pro Downloads
Intelligent Enterprise
Transform

Ad Info

on paper medical charts. But because they are in electronic form, the data can be accessed via a secure Internet connection by any authorized user, even by multiple users at the same time. Often take the form of an extranet.

- Portals. Offer a single site for hospital employees or clinicians who practice at the hospital to access information ranging from patient lab tests to duty rosters.

- Evidence Based Medicine. Delivers Web-based access to the most recent medical findings--usually at the point of care.

The common denominator to all these Internet technologies is they let information travel faster and further--and they help health-care professionals reduce errors.

For example, Massachusetts General Hospital in Boston uses a Web-based electronic medical records (EMR) system and clinical transaction monitoring systems as a substitute for having doctors and medical workers check for errors manually.

"We're not going to be able to eliminate all errors," says Bryan Bergeron, a doctor who practices medical informatics at Mass General. "But with the tools like EMRs and electronic prescribing systems, we can usually intercept most mistakes before they cause any harm. The advantage of EMR and other electronic tools is that they reduce errors transparently and without adding complexities that in themselves become the source of additional errors."

At Mass General, orders, medical histories, system reviews and patients' progress notes are all entered into the EMR system and can be scrutinized and compared by any authorized user at any location on or off campus through a secure extranet. The system checks the patient's records for prescriptions, and verifies that the drug selected is appropriate for the patient. The system also prompts the clinician to enter missing data and can even display a best-practice flow chart.

Finally, the data in the system is being used to help researchers determine best practices. For example, it compares outcomes to procedures and drugs to help evaluate which are most effective.

An EMR system represents a very high level of automation and requires major changes to hospital systems and workflows. Many organizations are not ready for that drastic an innovation. However, some hospitals are hoping that by making it easier for users to access the data already in electronic form, they can reduce errors and improve quality.

The problem at many hospitals is while data may be available, it is contained in multiple systems. For example, laboratory orders and results can be accessed through a lab system, patient demographics from the billing system, and drug information from the pharmacy system. In theory at least clinicians or administrators can access that information electronically. In practice few really do so.

Asking doctors to log on to several different systems, each with its own interface, is just not realistic, says Mark Newman, project leader for the Web development team at University of Pennsylvania Health Systems in Philadelphia. That's why Penn Health is rolling out a Web portal through which users can access most of the hospital's systems. The portal is based on roles, each of which can access different kinds of information. So people who are deemed "billing professionals" have access to billing information while doctors can view clinical information such as diagnoses, procedures, and lab results. People can have multiple roles. For example, someone may be a doctor and a member of a specific department. Members of each department will be able to access information specific to their department such as rosters, contact information, calendars of events or changes

in polices and procedures.

Newman says that while creating the portal's interface requires careful thought and a lot of consultation with end-users, the ultimate challenge will be integration. He says there are three types of systems in the hospital, each requiring a different integration strategy.

If the system already runs over Web technologies, such as the health care group's EKG system, the primary integration requirement is to identify the portal as an authorized user of the EKG system. If the system is on a relational database--for example, the ICU system is on an Oracle database--when the user makes a query, the application processes the request and sends it to the DBMS. The results of the query are used to draw a response in HTML, which is sent back to the user. And if the legacy system is proprietary, Newman's team will either create a data warehouse, which can be accessed like a relational database, or populate the portal fields through ad hoc reports.

While an integrated portal offers a comfortable place for healthcare professionals to access many different hospital systems, some organizations have a more basic need. They want to include off-campus physicians into the information loop. Overlake Hospital in Bellevue, Wash., is developing what it calls a "Community of Care" extranet as a way for doctors to access some of the hospital's clinical and financial systems from their offices--or even from their homes.

Doctors will be able to check on patient status, review information on recently discharged patients, check test results or check billing and insurance data. Fortunately, all the information is located in a single system from healthcare information systems vendor Medical Information Technology Inc. So doctors on or off campus can theoretically have access to the information before Web technologies are installed. But they'd have to have special client software. And providing and supporting that software, including ensuring doctors had the most recent versions, would have been difficult for both the hospital and the doctors.

"It was inconvenient enough to discourage most people from using it," says Jeff Bernstein, network engineer at Overlake Hospital. Once the system is finished--the goal is this summer--doctors will be able to access hospital information from any place they have Internet access.

The Evidence Is In

Access to clinical and financial data is only the first step. The other part is pinpointing the most promising treatment. To avoid medical errors and provide the best care, clinicians need to access the most recent research studies and findings. Of course, doctors often spend hours each week reading medical journals. But it's hard to remember information when there's no immediate need to apply it.

Instead, doctors need the information efficiently and closer to the time when it has to be applied to patient care. Evidence-based medicine is the conscientious use of the most up-to-date information for making decisions about patient care.

To practice evidence-based medicine, clinicians need an efficient way to access high-quality medical research close to where they see their patients. That way, if they see a patient with a condition they're not entirely familiar with, they can jump on the Web and read all the most recent research on diagnosis and treatment of the illness.

One Canadian pilot project aims at delivering evidence-based medicine to doctors on hospital wards. Robert Hayward, a physician and principal investigator of Canada's Centres of Health Evidence (CHE) project, says his group wants to make evidenced-based information as accessible as lab tests and patients' records. In fact, he expects the information ultimately will be accessed from the

same computers where the lab tests and patients records are displayed.

The project includes two small, specialized projects: One center in Edmonton covers adult health and is located in the General Internal Medicine and Emergency wards in the University of Alberta Hospital. In Winnipeg, the other CHE covers child health and is located in the Pediatrics ward of the Winnipeg Health Sciences Centre.

The CHE Difference

A CHE site differs from a standard Web site that contains journal articles in two ways. First, doctors access the site from the hospital rather than from their office or from a medical library. The second difference is the way information is chosen for inclusion.

Typical clinician Web sites, such as MedLine, are databases listing virtually all medical journal articles. In contrast, material in the CHE sites are carefully chosen by project staff that monitors literature from a variety of public and private sources. And they list only the highest quality material and that which presents the highest yield in terms of efficiently delivering practical advice.

Michael Narvey, a pediatrician at the Winnipeg Health Sciences Centre, says he uses the CHE regularly and finds it useful during his rounds. Narvey also says the CHE is "a good way to keep the staff up to date in terms of management and treatment issues."

"You tend to make fewer errors when you have literature supporting what you're doing," he says. Narvey believes when the CHE project is evaluated, researchers will find it resulted in shorter hospital stays.

While evidence-based medicine can help doctors decide which drugs to prescribe and when to change drugs, it can't remind doctors to do so. That's why Palmetto Richland Memorial Hospital in Columbia, S.C., installed Clinical Event Manager from Sunquest Information Systems, Inc.

CEM monitors lab results of in-hospital patients and if a problem is detected, alerts doctors so they can adjust the drug dosage, avoiding toxicity. For example, CEM monitors how intravenous nutrition solutions affect blood chemistry and sends an alert when changes in formulations are needed.

"Instead of spending considerable amounts of time trying to anticipate problems, with Clinical Event Manager the problems come to us," says David Amsden, a pharmacist in the Department of Pharmaceutical Services.

The organization configured CEM to send e-mail alerts to the pharmacists covering each floor. When an alert is received, the pharmacist looks at the patient, sees if meds need adjustment, and if so, contacts the patient's physician.

Amsden says during the first three months it was in use, CEM prompted 396 patient interventions that resulted in medication changes.

In addition to limiting medication errors and adverse drug reactions, CEM may act as a cost-saving tool in three ways, Amsden believes. It can indicate when it is appropriate to reduce the dosage, terminate the use of the medication or change from intravenous to less expensive oral medications.

Internet-based systems don't necessarily have to be as exotic as some of the above examples to improve care and reduce errors. The Seattle Prostate Institute has its patients use the Cancerfacts.com Web site from computers at the clinic. After patients have had a chance to read about their specific condition, doctors discuss what they've learned with them, Peter Grimm, an oncologist at the

Institute says.

"When doctors and patients look at the same material, you get a dialog that allows the patient input on his care," Grimm says. Patients, Grimm believes, can question physician actions, reducing the possibility of mistakes.

While medical errors are inevitable, the number of patients hurt by them each year is unacceptably high. Other industries such as banking and retail have proven that Web technology can greatly reduce errors while at the same time increase productivity. Healthcare organizations may have been a little slow in learning this lesson. But as the number of projects underway at hospitals and health care organizations shows, the medical industry is working hard to catch up.

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