NEW TECHNOLOGIES ENHANCE PATIENT SAFETY

LYNN WAGNER

At Broadview Multi-Care Center in Parma, Ohio, certified nurse assistants (CNAs) make their rounds with a hand-held computer called a PDA, and patients wear a wristband that unlocks their electronic medical record. The daily routine of clinical care documentation begins when CNAs enter a patient room and touch a button on the wristband to the PDA. The button houses a computer chip, and the connection brings up the menu of care needs for that patient on that shift, from bathing to vital signs, along with any special instructions from the nurse manager. If a patient has a fractured hip, for example, a note appears telling CNAs not to turn the individual on that side.

Real-Time Documentation

As CNAs make their way through the list of patient care tasks, they document what they do on the PDA by checking boxes on the touchscreen, responding to specific queries along the way. For example, the program asks how much fluid a patient consumed; whether they liked their meal; and, if a patient needed help transferring from a wheelchair, how much assistance was required. CNAs also have the ability to enter general observations. At the end of their shift, CNAs transfer data stored in their PDAs to a central server, where the information popu-

lates all relevant areas of patients' medical records. CNAs "took to the technology like ducks to water," says Lisa Conrad, director of nursing. They are "thrilled" and consider it a sign of "status that their employer cared enough about them to entrust them with a PDA, and that what they are doing is important enough to document," Conrad adds. Previously, CNAs did not make substantive contributions to patients' medical records. Now they do, she says.

Licensed nursing staff also do their documentation at the bedside on wireless computers that ride on medication and treatment carts equipped with cordless phones. The facility's electronic medical record (EMR) system, by OneTouch Technologies, incorporates patient assessments, care plans, routine care, nursing services, and the minimum data set (MDS).

The shift to computerized records, implemented in July 2002, has allowed Broadview to "re-engineer how care is delivered," says Deborah Carr, administrator of the 218-bed facility. Documentation is not only more efficient, it has freed nurses from nursing stations to become more engaged in patient care management and oversight, says Carr. In the facility's next renovation, nursing stations will be completely dismantled, she adds. Nurses are no longer "at the end of the hall with a desk as a barrier," Carr says. "They can direct, supervise, eval-

WHILE HIGH COSTS HAVE SLOWED THE
GROWTH OF TECHNOLOGY IN HEALTH CARE,
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uate, and teach," all of which contribute to better quality care. "The train has pulled into the station," Carr says of the EMR trend. Nursing facilities have only to decide "when they are going to buy their ticket."

Companywide Rollout

Medical Facilities of America (MFA), based in Roanoke, Va., is planning to roll out an activities of daily living (ADL) module of an EMR in all 30 of its facilities by next spring, says Brenda Moore, executive vice president of information systems. Currently, three facilities have implemented the system, produced by ADL Data Systems in Dobbs Ferry, N.Y. Patient data are entered into an electronic record by CNAs and licensed nursing staff using touchscreen wireless computers. The system includes patient assessments, care plans, the MDS, and ADL-related documentation. The company plans to add modules for nursing notes and vital signs and may even help ADL Data Systems finance the further development and refinement of its EMR products and serve as a pilot site for those products, Moore says.

MFA management believes in using technology that "reduces documentation time so we can provide more care and more quality care," she adds.

A growing number of long term care providers are turning to technology to help them improve care, streamline documentation, and stretch limited staffing resources. An EMR system is one of many technologies being deployed to advance those goals. But few, if any, technologies have drawn the same attention and interest from policymakers as EMRs.

The Institute of Medicine's (IOM) health care quality-related reports have for years recommended the broader use of EMRs to reduce medical errors and improve safety in the health care system. Now, observers say, the federal government is poised to give the technology an enormous boost, with initiatives to establish standards for elec-

Medical Facilities of America staff train on a new EMR system.

tronic documentation—aimed at ensuring a minimum content level and the transmissibility of data—and pilot programs in which providers who use information technology to improve clinical care are paid an additional amount under Medicare.

"We're going to see an explosion in EHRs [electronic health records] in the next few years," says Pat Wise, director of the EHR initiative at the Health Information and Management Systems Society in Chicago, "particularly if there's a payment model [under which] health care organizations can get paid more for using them."

"An EHR takes [the EMR] one step further" by building a patient record that is oriented to the "continuum of care, not just a single enterprise," says Donald Mon, vice president of practice leadership at the Chicago-based American Health Information Management Association (AHIMA).

EHRs Built For Data Sharing

Today's EMR systems are bound to individual provider settings, Mon says. A hospital, physician's office, or nursing facility collects what it needs without regard for what's important in other settings along the continuum of care. An EHR, however, will collect and store data in a way that ensures it can be transmitted among health care settings and that it contains the infor-

mation needed in those various settings, he adds.

The rising momentum behind EHR promotion is being driven by a long-standing belief, backed by research, that these systems can reduce medical errors by providing real-time data, generating extensive patient care and monitoring reports, and building in clinical alerts and best practices to help guide medical decision making.

"The power of an EHR is not just in the hardware and software, but in the clinical decision support and rules-based medicine" that can be built into the programs, says Wise.

IOM's support for electronic record-keeping goes back to a 1991 report, "The Computer-Based Patient Record: An Essential Technology for Health Care," which envisioned a paperless health care system in 10 years. But in that time, only a fraction of hospitals and an estimated 5 percent to 10 percent of outpatient settings have made the transition, according to a November 2003 IOM report on patient safety, in which IOM reiterated its call for computerized patient records and gave specific recommendations for achieving that goal.

Overcoming Cost Constraints

The barriers to achieving a paper-free health care system are varied, experts say, but the cost of launching and

IOM Report Calls For Health Information Infrastructure

An Institute of Medicine (IOM) report issued last fall called for a "national health information infrastructure" to improve patient safety and create a health care system "that both prevents errors and learns from them when they occur." This information infrastructure should "provide immediate access to complete patient information and decision-support tools for clinicians and their patients" and "capture patient safety information as a byproduct of care and use this information to design even safer delivery systems," IOM said. To achieve an adequate health information infrastructure, IOM recommended that:

■ All health care organizations, including nursing facilities, make patient safety a standard of care and establish comprehensive patient safety systems that provide immediate access to complete patient information and decision-support tools, such as alerts and reminders, and capture information on adverse events and near misses for use in designing safer delivery systems;

■ The federal government provide financial support and standards for health information systems;

■ Health care providers invest in electronic health record systems with the capabilities needed to provide safe, effective care;

■ Congress and various federal agencies provide leadership, direction, and financial support for the development of national data standards;

■ After giving providers time to comply with data standards, federal health programs incorporate the standards into contractual and regulatory requirements; and

■ The federal government develop a common report format for reporting adverse events and near misses to a national patient safety database.

collected in an EHR is important because without it there can be no common understanding of what constitutes an EHR, says AHIMA's Mon.

AHIMA is part of a group, the EHR Collaborative, that is helping HL7 gather input from health care stakeholders on the EHR standard. HL7 members vote on standards before they are finalized, and each ballot typically goes through several versions, incorporating concerns and modifications of members and in the case of the EHR standard, outside stakeholders, before it's adopted.

HL7 members are expected to vote on the second version of a draft EHR standard this month. If approved, compliance will be voluntary, and HL7 will continue to fine-tune the model in response to health professionals' feedback for a two-year period, Mon says.

The standard-setting initiative has stirred concerns, even among supporters, about whether the end product will advance or hinder the development and implementation of EHRs.

"Standards need to be done right, or it's worse than not doing them at all," says Waller. Standards that stipulate the use of a particular technology can become obsolete by the time they become mandatory, she adds.

Ultimately, the EHR standard should balance the need for a baseline of data and functionality with flexibility, says Wise. In other words, the standard should give providers reassurance that any system they purchase will include certain capabilities, without being overly prescriptive in how those functions are achieved.

"If you ask a real estate agent to show you a house, you expect it have a roof, walls, windows, a bathroom, lighting. Those are implied standards and are expected no matter who the builder is," Wise says. The number of bathrooms, bedrooms, floors, and layout of the home are features that should be selected based on need and budget. "A $12 million house is spiffy, but we can't all afford it," she says.

maintaining electronic patient records tops the list of impediments. In long term care, for example, an average-sized nursing facility with 120 beds can plan on spending about $50,000 in hardware, software, and training costs for an ADL documentation module, says MFA's Moore.

With heightened attention to patient safety and escalating health care costs, lawmakers are stepping up efforts to overcome implementation barriers. Support is also fueled by a rising concern about bioterrorism and the critical role that electronic records could play in the surveillance needed to detect and manage such a threat, observers say.

Federal leadership has been missing from past efforts at building a national health care information infrastructure, says Adele Waller, a Chicago-based

information technology attorney who wrote the legal appendix to the 1991 IOM report. But the Bush administration is now making that leap.

"By computerizing health records, we can avoid dangerous medical mistakes, reduce costs, and improve care," President Bush told the nation in his Jan. 20 State of the Union address.

Developing EHR Standards

Last summer, Health and Human Services (HHS) Secretary Tommy Thompson launched an initiative to develop EHR standards that will define the content and functionality of these systems. HHS has tapped federal agencies and private-sector organizations to contribute to the effort, including Health Level 7 (HL7), an international standards-setting group.

Establishing a standard for the data

"That doesn't mean we can't be happy in a house that costs significantly less."

For example, an EHR should be capable of collecting patient demographics and handling medication management; allow input and order-entry from physicians, nurses, and other providers; and comply with the privacy and security requirements of the Health Insurance Portability and Accountability Act, Wise says. How a system accomplishes those objectives "is not what we want to be spelling out."

Reimbursement: The Missing Link

The standardization of EHRs could be a critical first step toward helping providers fund information technology, experts say. Federal officials have signaled their willingness and intent to offer financial incentives to providers that computerize clinical records, but

'TECHNOLOGY IS THE KEY TO EFFICIENCIES ON THE CLINICAL SIDE.'

not without some understanding of the adequacy of the system they are subsidizing, Mon says.

Before the Centers for Medicare & Medicaid Services (CMS) agrees to pay additional reimbursement to providers who use an EHR, it needs a "standard against which it can say, 'We're evaluating your implementation, and if it meets the standard we will reimburse you for the use of an EHR,'" Mon adds.

The Medicare prescription drug bill includes a three-year "pay-for-performance" demonstration project that represents the first step toward offering providers a financial incentive to adopt clinical information technology. Under the measure, physicians who implement health information technology and evidence-based outcome measures to manage and improve patient care will be eligible for additional Medicare reimbursement.

The statute doesn't stipulate that health information technology means an EHR, because a standard definition of EHRs hasn't been developed yet, Mon says.

The demonstration projects seek to "show the value of information technology and, specifically, EHRs and how they relate to quality," Mon says. He expects this to be CMS' first step toward "paying for quality" and mitigating a "key stumbling block" to EHRs.

Broadview is one of a handful of long term care providers that have become early adopters of EMRs in an

effort to improve care, streamline documentation, and stretch limited staffing resources. The venture has not been inexpensive, but Carr says the return on investment is tangible.

"I see technology as being a cost saver," she says. "It helps control costs and expenses and improve processes. It is the key to efficiencies on the clinical side and improving labor costs." It's not possible to hasten hands-on tasks, such as making a bed, giving a bath, or dispensing medication, Carr says. But documentation is "out of control," and the "only way to get your arms around it is with technology."

When the facility first considered an EMR, Carr says she weighed cost of the system against the clinical and financial risks associated with a paper-based system. She calculated the significant staff overtime costs attributable to documentation tasks and the advantages of having real-time data at her fingertips.

In the past five years, the number of admissions to the facility has doubled, due principally to payer demands for shorter lengths of stay. Yet Broadview has met that demand without adding staff, in part because technology has facilitated the streamlining of care processes and re-engineering of nursing staff.

MDS nurses, who now don't spend as much time on paperwork related to MDS completion, have been redeployed as case managers on each unit, responsible for restorative nursing, plans of care, and managing patients' changes in conditions.

"We catch a lot more changes in condition on the MDS," says Conrad, "because the MDS nurse [previously] didn't know the patient's strengths and weaknesses, what's normal [for that patient] and what's not."

The process of completing the MDS has been streamlined because so much of the information is already in the patient's record, Conrad says. As a result, MDS nurses "are not chained to a desk. They are more hands-on, and

the MDS is more accurate than in the past."

Risk management has also improved, Carr says. The system "allows me a complete documentation trail, which I can look at on my screen." If a patient falls, nursing staff prepare the incident report in the room, and by the time they leave the report is done and logged in the system. Previously, it might have taken a day to complete the report, then someone had to locate it, Carr says.

MFA's Moore agrees that EMRs are a boon to risk-management efforts. In the event of a lawsuit, facilities with EMRs "will have the documentation to prove you've given the care," Moore says. "Rather than sitting down and filling out sheets by hand, you can enter information more quickly and spend time providing care, not writing everything out."

One of the advantages of Broadview's EMR system is that it automatically logs the time that care was provided. As a result, the facility can create a specific timeline for adverse events and interventions. This makes it possible to produce evidence of conscientious care and avoid legal repercussions, even when things go wrong, Carr says. In a paper environment, it's nearly impossible to reconstruct the timeline, she adds.

Carr also sees computerization as key to getting adequate reimbursement for care.

"The MDS is your bill for services delivered," she says. "The only way you can capture that is from how much assistance you give with ADLs [activities of daily living]" and other needs, Carr adds. "To get credit for services delivered, you have to capture them at a moment in time, when services are provided, or the opportunity is lost."

Care That's Not Hands-On
Long term care providers are also turning to advances in communications and monitoring technology to improve the quality of care available to patients in remote areas and those who have difficulty managing chronic illnesses.

The Good Samaritan Communities of Windom (Minn.), whose long term care campus includes a 91-bed nursing facility, 24 assisted living units, independent and congregate care apartments, and a Medicare-certified home health agency, operates a program that places video monitors and video phones in seniors' homes.

The program started two years ago with a $120,000 Bush Foundation grant, administered by the state, says
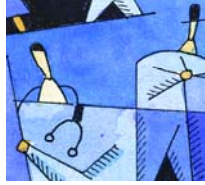
Joyce Doughty, home care director. The objective was to provide "virtual assisted living" in unique settings, and "we chose to do that in a person's home with telemoniters connected to a phone line," Doughty says.

Individuals connect themselves to in-home monitors capable of monitoring all or some of a variety of vital signs and important medical indicators: blood pressure, pulse, heart and lung functions, weight, and blood sugar. A Good Samaritan nurse makes a call to the home from the program's office, or "base station," says Doughty. When the individual answers, the nurse hits a button and the monitor acts as a speaker phone. The nurse then makes the video connection so that the patient sees the nurse and the nurse sees the patient. The video phone allows the nurse to see whether a patient is wearing clean clothes, has shaved, and has put in his dentures, all of which can be indicators of well-being, says Doughty, and to walk a patient through the process of connecting to the monitor. For example, blood pressure is measured by a cuff, and weight is monitored with a scale attached to a finger clip that transmits the data.

How The System Is Used

"Some people don't need a real-time connection," says Doughty. "They do [the monitor connections] on their own." But the video phone is also valuable for patients who can benefit from medication reminders and who are "unstable or unsteady," she adds. "We get a look at how they are doing."

One patient, for example, has congestive heart failure and has been monitored since last June. In the previous year, he had been hospitalized 11 times. Since the monitoring began, he has only been hospitalized once, and that was in the first month, while adjustments were still being made to set appropriate parameters for his monitoring, Doughty says.

Typically, Good Samaritan connects with patients being home-monitored twice a week. A nurse is dispatched to the home every other week, and an aide visits twice a week to help with bathing, Doughty says.

The technology is useful for people with chronic illnesses such as congestive heart failure, diabetes, or any kind of lung problems, she adds. "Those are the [patients] you can really see a difference in," she says. "If you catch symptoms early enough, you can prevent hospitalization."

Medicare's home care benefit covers the cost of video monitoring performed during the first 60 days of an episode of care. But Doughty says the cost of equipment beyond that time is a barrier to its broader use.
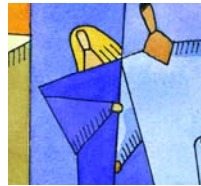
"I'm hoping we're on the cutting edge of a fast-grow-

ing industry," she says. "The biggest thing that hinders people using it is cost. It is very costly."

Good Samaritan's initial grant, which expired this year, allowed it to purchase five telemonitors and 11 video phones. The program is expanding this year with a $404,000 grant from the Department of Agriculture. The funds will buy 100 video phones and 75 telemonitors. The equipment will be used by four Good Samaritan home health agencies.

Ultimately, Good Samaritan hopes to use monitors in assisted living and congregate units to check residents' vital signs daily, says Doughty.

This type of monitoring service goes by the name of telemedicine or telehealth, terms that can be used interchangeably, says Jon Linkous, executive director of the American Telemedicine Association in Washington, D.C.

"This is still a fairly new field," but it is growing rapidly, he says. As a result, "it's hard now to get a handle on the exact size of the market because there are so many different niches involved."

Long Term Care Applications

In the long term care arena, remote monitoring is a "logical, cost-effective" way to support health services, particularly at a time when the population is aging faster than the number of health professionals available to care for seniors, Linkous says. Remote monitoring can also help curb the high cost of emergency visits by reading vital signs and providing "initial triage" to help determine who really needs emergency care, he adds.

At Michigan State University (MSU), a $1.2 million grant from the Department of Commerce is supporting a different kind of telemedicine, says Pamela Whitten, associate professor in MSU's Department of Telecommunication.

Funds will be used to establish a wireless network between an MSU teaching nursing facility and three rural nursing facilities. The connection will allow geriatric specialists to "visit" patients in remote facilities who would not otherwise be able to access such care, Whitten says.

Health professionals at the rural locations will consult with MSU doctors and nurses using a battery-powered computer the size of a legal pad, with a touch screen and a camera that allow participants to see one another, Whitten says. "Clinicians with special geriatric skills will also be brought
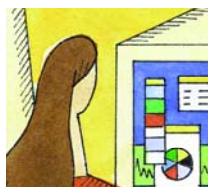
online for consultations," Whitten says.

How The Funds Will Be Used

Grant funds will cover the cost of hardware and telecommunication equipment. Clinical services will be supported largely through "in-kind matches" from providers. MSU will evaluate the impact of the linkage and attempt to answer several research questions, including the range of clinical services that can be delivered in this mode, whether the technology gives patients access to more services, the impact on emergency room visits and hospitalizations, the average cost to provide the service and potential cost savings, and the kinds of procedures and protocols needed to ensure the effective delivery of telemedicine.

MSU is in the process of gathering bids for the equipment and conducting focus groups with providers, patients, and families or other patient representatives to gather their input and prepare them for the new service, Whitten says. MSU is developing protocols for a remote visit referral to help identify the type of patients who can benefit from a connection with a specialist. Utilization will be "on demand," Whitten says. The program is expected to go live this month.

Like funding for remote monitoring, video consultations receive limited Medicare funding, in limited areas (rural), by limited providers (hospitals).

The new Medicare prescription drug bill, however, may expand coverage to include telehealth services originating from nursing facilities. The statute directs the HHS secretary to evaluate skilled nursing facility telehealth demonstration projects and report in January 2005 on their efficacy. If the report finds that telehealth services do not substitute for in-person visits by a physician or other health professional, the secretary may "deem a skilled nursing facility to be an originating site," eligible for telehealth reimbursement, the measure says.

As the population with chronic illnesses grows, there will be a "huge amount of interest" in telehealth, says Linkous, who hopes for expanded reimbursement in the next couple of years. If telehealth ultimately proves to add to the cost of health care, getting reimbursement will be problematic, he adds.

But if it proves to reduce costs in other areas, such as hospital and emergency room care, "then we are talking

about rapid approval," he says.

Extreme Monitoring

A system capable of minute-by-minute monitoring of patients in hospital intensive care units (ICUs) takes remote monitoring and care to an even higher level. The system, produced by VISICU in Baltimore, is designed to reduce the number of errors and mortality rate of ICU patients by providing round-the-clock coverage by physicians who specialize in ICU care from a remote monitoring station.

Care by so-called "intensivists" has been shown to improve patient outcomes, "but there's a shortage of these professionals," says Frank Sample, chief executive officer of VISICU. The company's eICU® system leverages limited professional resources by setting up a base station staffed 24 hours a day by intensivists who monitor patients' vital signs, drug responses, and other critical indicators. VISICU's software program reviews all monitored information, and when data on a particular patient "gets into a risky area," an alarm sounds, Sample says. Cameras and audio equipment in the patient's room allow the remote specialty care team to examine and converse with the patient and ICU nurses and identify appropriate interventions, which are provided by in-house doctors and nurses.

Weighing Costs And Benefits

While the systems are costly, ranging from $1.5 million to $2 million for initial implementation, hospitals recoup their investment by reducing ICU lengths of stay and increasing admissions to those units, Sample says. The eICU solution increases staffing costs, as hospitals must fund the intensivist coverage in the remote monitoring center. But the ability to intervene quickly when a patient enters a danger zone reduces complications and mortality rates, he adds.

Some of VISICU's hospital clients are considering the application of eICU technology to other settings, such as the emergency room and "step-down" units for patients discharged from the ICU, Sample says.

"This technology could be used any-where," including nursing facilities, he adds. "There's no reason the technology couldn't be used in a nursing home." The company just "hasn't gone there yet." ∎

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