Medical Devices Meet Electronic Records

Some provider organizations are starting to explore integration's new frontier.

By Joseph Goedert, News Editor

Two years ago, Riverdale Family Practice went live with electronic medical records software from Amicore Inc., Andover, Mass. Early this year, the six-physician practice integrated the application with a portable electrocardiograph—a medical device that measures a heart's electronic signals—from Quinton Cardiology Systems Inc., Bothell, Wash.

The EKG device is plugged into a port on a physician's Tablet PC. Cardiac data can be viewed on-screen and then downloaded "straight into the patient chart," says Frank Maselli, M.D., managing partner. "I can print it out, look at it on screen, whatever I want."

Bronx, N.Y.-based Riverdale also purchased from Quinton a spirometer—which measures lung function—and integrated it with the EKG device and electronic medical records system. The practice previously referred patients elsewhere for the $110 tests; it now conducts them in-house three to five times a week.

The electronic record/medical device integration has delivered clinical and financial benefits, but it's also brought home how the lack of such integration is holding Riverdale back, Maselli says.

The practice still must scan or manually enter information from other medical devices into its electronic records system, a task that's time-consuming, expensive and risky in terms of patient safety. Maselli is trying to get Amicore to integrate with the practice's CBC, or complete blood count, machine. Right now, blood count results are printed and scanned into the electronic record.

"One of the problems with electronic records is that scanning is very cumbersome," Maselli says. "The less scanning you have to do, the better."

Integration has been an ongoing concern as health care organizations make strides toward automation. Many integration efforts have focused on tying in large applications—such as laboratory and hospital information systems—with electronic records that are designed to be a receptacle for clinical, administrative and financial data.

There has been less attention—and less time and resources—devoted to linking electronic records to medical devices, the literal fingers on the pulse of the care delivery process.

Old practice, new adherents

Integration of medical devices with clinical information systems isn't a new idea. San Diego-based Sharp HealthCare nearly two decades ago integrated heart monitors with electronic records software from CliniComp International. At the time, Sharp HealthCare was a developmental partner with San Diego-based CliniComp.

What's new is the growing number of medical devices that are becoming computerized enough to support integration with electronic records, says William Spooner, senior vice president and CIO at Sharp HealthCare.

The delivery system, for example, has started a project to integrate glucometers, devices that measure blood sugar for diabetics—with the CliniComp software, automatically capturing data and storing it in the patient record. "That offers huge advantages in terms of accuracy and timeliness," Spooner says.

As the possibilities for electronic record/medical device integration increase, however, roadblocks arise. While there is an emerging awareness among some providers of the value of such integration, not every provider shares the same level of enthusiasm, says Peggy Congin, R.N., a nursing informatics consultant with Beacon Partners Inc., Weymouth, Mass.

"Medical device integration may be very important to a gastrointestinal specialist, but a cardiologist may not have any use for it," Congin says.

In addition, integration is never an easy task, and integrating electronic records and medical devices is made harder by the fact that health care software and medical device vendors often cannot—or will not—provide much help. But there are ways to ease the task of integrating electronic record systems and medical devices, experts say.

Providers embarking on an integration effort would be wise to start with medical devices that display only numeric data because they generally are easier to integrate, Congin counsels. A vital signs monitor, for instance, gives numeric readings of such functions as pulse rate, blood pressure and respiration rate.

Eyes on the monitor

For Edward Hospital & Health System in Naperville, Ill., integration was all in the numbers. The delivery system began its electronic records/medical device integration efforts by linking patient monitors from Orlando, Fla.-based Invivo Research Inc. and Bothell, Wash.-based Philips Medical Systems to its records system from Medical Information Technology Inc. of Westwood, Mass., known as Meditech.

The hospital has since integrated glucometers and a laboratory information system from Misys Healthcare Systems, Raleigh, N.C. The Misys system, in turn, is integrated with the records system.

As a result, patient values, including blood pressure, respiratory rate, pulse rate, blood oxygen levels and blood sugar levels, automatically feed into an electronic medical record that physicians can easily access.

"You have electronic information that used to be on a chart at the end of the patient's bed," says Mary Mars, director of software applications, delivery and support. "The physician formerly had to call the nurse or visit the patients to get the information."

Another effective strategy for electronic records/device interfacing projects is emerging in critical care areas, says Kimberly Van Duyse, R.N., director of clinical systems at Prince William Health System, Manassas, Va. That's because physicians and nurses in those areas will more easily accept the technology.

"Clinicians in non-critical areas have a different outlook on this," she explains. "They don't need to capture vital signs data as often. So they get it in their heads that when they need to collect vital signs, they want to do it themselves."

Anesthesiologists at the University of Miami/Jackson Memorial Hospital understand better than most the importance of linking electronic records and medical devices, says David Lubarsky, M.D., chair of the anesthesia department.

"We're monitoring 50 variables in complex cases," Lubarsky says. The anesthesiologists used to write down data from the devices and enter the information into CareSuite, an anesthesia information system from Picis Inc., Wakefield, Mass., that includes a perioperative electronic record.

To eliminate the risks associated with manual entry, the hospital integrated the perioperative record with a number of patient monitoring systems. Patient information such as pulse rate, blood pressure, respiratory volume and rate, blood oxygen level, and brain wave data—which helps determine how sedated a patient is—now automatically populate the CareSuite database.

The integration cuts down on overall manual data entry, which in turn trims the potential for error, Lubarsky says.

However, monitoring systems in the intensive care and recovery units at the hospital don't integrate with CareSuite, making the electronic perioperative record incomplete. "We need a single, integrated record," Lubarsky says. "Not only do the devices not talk to each other, but they use totally different databases so we can't track things easily."

Further, even when integration is technologically plausible, it can be financially daunting, Lubarsky says. "We would like laboratory data to automatically populate the CareSuite database," he says. "We can do that, but don't have the $30,000 for the interface."

So easy, yet so hard

Some providers who have integrated medical devices to electronic medical records say it isn't technologically tough. "Once we got the resources it was relatively easy," says Van Duyse at Prince William Health System. The delivery system in February 2004 integrated bedside patient monitors in pediatrics, intensive care and critical care with an electronic records system from Meditech.

Even if the interfacing work is fairly straightforward, such projects are time-consuming, says Mars at Edward Hospital. "Each vendor has its own interface specifications," she notes. "There's no out-of-the-box product. It isn't that it's hard—the technology is there. But you have to devote the time and resources."

Other providers have had a tougher time with the integration. "It's not plug-and-play, as if you want to link a printer with two computers in your house," Lubarsky says. "It remains a pain to get it all done."

Another challenge is working with clinicians on how integration changes workflow, adds Vincent Vitali, administrative director of program management at Edward Hospital. With "smart," or programmable, infusion pumps, for instance, "You have to understand how the data is important to the care process," he says. "It's not a technology issue at all."

Prince William Health System hasn't faced insurmountable I.T. hurdles, but it is having problems getting I.T. vendors to lend a hand with its integration efforts, Van Duyse says.

The delivery system wants to link its electronic records system with medical devices in its operating room, recovery room and emergency departments. But the organization has been frustrated trying to get help from software vendors serving the departments, Van Duyse says.

“Vendors don’t have the interfaces developed for these modules,” she says. “They don’t have the code written to interface with devices. Organizations should put pressure on their vendors to get this going because it works.”

Nor are medical device vendors getting better at building their products to integrate easily, Lubarsky contends. “The more proprietary the devices, the more difficult the integration,” he says. “There are no standardized interfaces.”

Come together

One byproduct of integrating medical devices with electronic records is a closer relationship between a facility’s biomedical department—which maintains the devices—and the I.T. department.

“Integration is changing the work of biomedical and I.T. and making us closer,” says Mars at Edward Hospital. “Improved communication will ease the task going forward.”

What’s happening, adds Spooner of Sharp HealthCare, is both departments are realizing “they must become much stronger friends.”

That’s especially important for providers, like Sharp HealthCare, that have plans to increase connectivity between medical devices and electronic records. “You need to expand your circle of friends,” Spooner says. “Decisions can’t be made by the same narrow group of individuals who were making them a decade ago.”

The delivery system, for example, now has a medical device committee to identify opportunities for standardization across the organization. The committee helps ensure that devices bought in one department are compatible with devices and clinical software used elsewhere. “It works a lot better if that happens up front,” Spooner says.

Sharp HealthCare is implementing electronic medical records for its ambulatory practices from Allscripts Healthcare Solutions, Libertyville, Ill. It envisions home-based patient monitors—such as cardiac devices—integrating with the Allscripts system, populating the patient record and letting physicians check for changes in health status. “This will bring the value of telehealth to ambulatory care,” Spooner says.

Edward Hospital expects late this year or early in 2006 to integrate its EKG monitors from Waukesha, Wis.-based GE Healthcare with it’s electronic records system from Meditech, Vitali says.

The hospital also is considering migrating to smart pumps that are wirelessly connected and integrated with the records system, but Vitali suspects enhancements to its wireless network will be necessary to support that and other needs.

Slow growth

Despite the benefits of integrating medical devices with electronic medical records, providers will be slow to embark on such initiatives, predicts Congin, the consultant at Beacon Partners.

Hospital budgets aren’t getting any bigger, many facilities still are struggling to implement electronic records, and plenty of other projects are fighting for priority, she notes.

“Integration will occur when a hospital decides it provides enough benefits to justify moving it up the priority list,” Congin says.

"In a cardiac hospital, there's no debate. But a general hospital will have to deal with the I.T. priorities of a number of specialties." •

Sidebar

Making a wireless connection

As wireless technology matures, provider organizations are coming up with new ways to use the platform to link medical devices and clinical software.

Sharp HealthCare, for instance, has implemented "smart," or programmable, infusion pumps that link wirelessly to computerized medication treatment guidelines. The pumps are from Alaris Medical Systems, San Diego, a unit of Cardinal Health Inc., Dublin, Ohio. Administrators also can download "experience data" from the smart pumps that shows the number of times a guideline or threshold is exceeded.

That's a start, says William Spooner, senior vice president and CIO at the San Diego-based delivery system. Eventually, administrators want to wirelessly capture information from the smart pumps and transfer it to an electronic medical record—from CliniComp International—to provide better treatment and analysis.

"We want more granularity to the data, things like the administration rate and the time a dose started and stopped," Spooner explains. That way, if a physician orders a particular medication administered four times a day, data will show if the drug actually was given every six hours.

Gaining trust

Late this summer, Prince William Hospital, the flagship of Prince William Health System in Manassas, Va., expects to migrate patient monitoring devices in its emergency department to a wireless network.

Clinicians in much of the hospital already use the network to access clinical data via Tablet PCs, notebooks and PDAs. But the wireless network—developed in-house—had growing pains that hurt acceptance.

"Some clinicians remember being in the middle of documentation and losing connectivity, so they began to distrust the network," says Kimberly Van Duyse, R.N., director of clinical systems for the integrated delivery system. As a result, Prince William is bringing in consultants to provide additional expertise for the emergency department wireless project.

Edward Hospital & Health Services in Naperville, Ill., a year ago integrated patient monitoring devices from Philips Medical Systems, Bothell, Wash., with mobile phones connected to its wireless network. The hospital used middleware software from Emergent Corp., now part of Boston-based Keane Inc., to link the monitors with the phones, from SpectraLink Corp., Boulder, Colo.

The mobile phones improve overall clinician communication throughout the facility, says Mary Mars, director of software applications, delivery and support. The monitoring devices also transmit alarms to nurses via the phones, which speeds the response to patients who may be in trouble.

"A nurse may be in another room with another patient and not hear the alarm," Mars says.

The hospital initially used pagers rather than mobile phones, but found nurses did not like them. The mobile phones also provide two-way communication, Mars adds.

Compatibility issues

Helping providers move medical devices to a wireless platform is an effort by device manufacturers to make their products more network friendly, Spooner says.

“They’ve all figured out that the best way to communicate is to jump on a facility’s existing wired or wireless network. Before, each device wanted to be its own network.”

Still, Sharp HealthCare faces compatibility issues in linking smart pumps to its wireless network. “There’s been some tweaking,” Spooner says. “We’re in a good place, but not at the end stage.”

The delivery system primarily uses wireless network technology from Cisco Systems Inc., San Jose, Calif. It hasn’t yet adopted short-range Bluetooth wireless technology for use with medical devices, but it could play a future role, Spooner says. For instance,

Bluetooth technology could link a device to a PC acting as a server and then to the Cisco network, he adds. Wireless connectivity between medical devices and information systems may be safer than wired connectivity, Mars believes, because nurses don’t have to re-plug devices as patients move from room to room. “You won’t have to make the nurse remember, ‘What am I plugging this device into?’ ” •