Achieving INTEROPERABILITY

What’s Happening Out There?

Jill Schlabig Williams

Interoperability is a popular word in the world of medical devices, and many believe it is the answer to some of healthcare’s thorniest problems. This article takes a close look at what three healthcare facilities are doing today with one very important piece of the interoperability puzzle: the integration of device data into electronic medical records (EMRs). Their stories make it clear that what seemed impossible only a few years ago is now becoming commonplace.
The current EMR push is in response to one very important development: The federal government has promised $19 billion to hospitals and physicians who can demonstrate “meaningful use” of EMRs through the Health Information Technology for Economic and Clinical Health (HITECH) Act, part of the American Recovery and Reinvestment Act of 2009. Feeding device data directly into EMRs is seen by most as a key part of this effort.

As hospitals rush to achieve meaningful use, clinicians are starting to see real benefits from the faster availability of more accurate data in medical records. Yet the path to full interoperability is not smooth. Those pushing the boundaries of what’s possible often find themselves stuck in a quagmire of poorly defined standards, incompatible systems, infrastructure problems, and vendors who sometimes spend more time pointing fingers at other vendors than they spend resolving problems. As projects flounder, no arbitrator is available to resolve disputes. And even more significantly, very real patient safety concerns are raised about the foundations of interoperability.

How can healthcare organizations achieve the promise of interoperability and avoid the pitfalls? These case studies offer some important hints:

- **Start small.** Lessons learned from pilot projects of limited scope will help you establish relationships, learn about your systems, and solve foundational problems before moving to larger, more complicated projects.
- **Involve both clinical engineering and information technology professionals.** Both skill sets are essential to success.
- **Use quality systems and risk management tools to evaluate safety issues caused by building systems of systems.**
- **Test, test, and test some more**—before, during, and after project implementation.
- **Consider pre-existing vendor relationships carefully.** Particular EMR vendors have different relationships with medical device vendors; the effectiveness of those relationships will have a huge impact on the success of your project.

Above all, these case studies demonstrate that the benefits of integrating device data into EMRs for clinician workflow and patient safety are real, but so are the risks.

### CASE STUDY 1

**Good Planning Leads to Smooth Integration of Bedside Monitor Data**

The story of device integration at the two-hospital, 900-bed Gainesville campus of Shands HealthCare at the University of Florida is a smooth one so far. Within seven months, the clinical engineering (CE) and information systems (IS) departments successfully integrated data from 560 bedside monitors into a new electronic medical record system at minimal cost and with remarkably few problems. Their secret? Good technology choices made years before. However, with only the first phases of an anticipated five-year integration project underway, they are already looking to bigger challenges ahead.

Bedside monitor data integration efforts at the campus formally began in 2010, but the foundation for the effort was laid several years ago. The CE department began working with information systems developers to build a foundation for integrated bedside monitor data across the entire Frostburg campus. The CE department also formed an integration task force to design the architecture for the data, regardless of the developer's preferences.

As hospitals rush to achieve meaningful use, clinicians are starting to see real benefits from the faster availability of more accurate data in medical records. Yet the path to full interoperability is not smooth.
In 2002, Craig Bakuzonis, director of the 21-person CE department of the Gainesville campus, took part in an effort to build a new pediatric intensive care unit. Both physicians and nurses involved in the project wanted to look at moving the facility toward electronic records. “We were planning a new intensive care unit and wanted connectivity options,” he says. “At that time, connectivity was viewed as something coming near-term. We did some research and confirmed with our vendors that HL7 was the standard to use for data interchange, and we used that standard to guide our technology purchases.”

Health Level Seven, or HL7, is a framework and set of standards for the exchange, integration, sharing, and retrieval of electronic health information. It permits medical devices to send data to EMRs.

“The IS department and I saw that at some point the hospital would want to do electronic documentation of vital signs data from bedside monitors,” says Bakuzonis. They chose to purchase the Philips Intellivue architecture and also purchased the related gateways as an option up front. These gateways collect and store data from a group of monitors and allow forwarding of that data to EMRs.

“The price per bed was very reasonable. For a 24-bed ICU, connectivity costs totaled less than one percent,” says Bakuzonis. “I was very comfortable that we would see a big return on a small investment.”

Renaming monitors was one of the first challenges they faced. Each bedside monitor would need a unique “name” so that patients could be associated with that monitor, allowing data to flow from the monitor into the correct patient record in the EMR.

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For the next several years, Bakuzonis and his team gradually replaced earlier-generation Philips monitors with the integration-ready newer models. By 2010, their entire inventory had been replaced. “By the time our EMR vendor was chosen, all of the pieces were in place to integrate the monitor system data directly into the EMR,” says Bakuzonis. “We did not have to back-fit connectivity to any legacy monitors.”

The Project
In November 2009, Epic was selected as the EMR vendor of choice. Installation began in January 2010, and by May they went live with bedside monitor integration.

Bakuzonis was able to draw from some earlier experience with data integration for this project. He had been involved with installing electronic documentation in an anesthesia department in 2005 when the hospital opened a new outpatient surgery center. “They wanted the documentation to be entirely electronic, and decided to use GE Centricity as their preferred intraoperative anesthesia system,” he says. “It’s still in use today, but that may change eventually.”

As a first step for the bedside monitor integration, the IS and CE departments formed a device integration subcommittee comprised of experts from each group. This team worked to gather data on bedside device models and locations, plan data export, and map parameters to the Epic system. IS took the lead on interfacing, applications, and parameter mapping. Some cabling infrastructure upgrades were required. The CE team worked closely with Philips to understand the gateway system, assign IP addresses, configure central stations for HL7 export, and rename monitors.

Renaming monitors was one of the first challenges they faced. Each bedside monitor would need a unique “name” so that patients could be associated with that monitor, allowing data to flow from the monitor into the correct patient record in the EMR. The Philips system limited them to only 6 characters, so they came up with a 6-digit numbering scheme to name each monitor by facility and room number. The CE group had to “touch” 150 monitors, manually setting up those unique names. Nursing staff were trained to use the numbering scheme as one part of their larger Epic training.

“Nurses have to understand that numbering scheme, as they are responsible for associating the patient with the monitor in the system,” says Bakuzonis. “As we grow, that 6-digit limit may need to be modified.”

Configuring the Philips export engine was also a challenge. “It’s not an ideal export engine, and it took time to figure out the system,” says Bakuzonis. He worked with the vendor, read the documentation, worked with IS, and relied on his previous experience with the anesthesia information system to figure out
how to do it. He and Philips trained six CE staff members. “We handled the programming and configuring of the Philips gateways, as we were viewed as the people who knew the system best.” Monitoring was also the CE group’s responsibility. IS took over at the point where data exited the gateway system.

Another challenge involved choosing which parameters to map into the Epic system out of the 100 or so that are available from the Philips monitors. That piece of the project was handled by IS. “Parameter mapping was painful,” says Pedro Hernandez, an application support analyst with the IS group. “We had to go through a process of trying to get everyone to agree and to align nursing practices.” Nursing leadership had to standardize the use of parameter labels and trim back the number of parameters that should be mapped from the hundreds that were available. “It took about two months to do the data mapping,” says Hernandez.

In the process, they discovered a problematic limitation: a 30-parameter limit with the Philips HL7 export engine. This affects data to both Epic and the GE Centricity system. “We don’t like those restrictions and would like to be able to document more parameters,” says Bakuzonis. “For complex open heart procedures or neurosurgery, we find that we’re exceeding that parameter count. For now we’re making an attempt to get the most important 30 parameters, but we would like to eliminate the problem. We’re actively working with Philips to expand that 30-parameter limit.”

Extensive testing was conducted on the system prior to go-live. “We had a good comfort level that data labels were correct,” says Bakuzonis. “IS ran tests on random bedsides to confirm connectivity. Go-live was the ultimate test, and we were able to confirm that we had successfully matched patient data between systems.”

Bakuzonis reports that the go-live was relatively smooth. “Everyone had to remember their training,” he said. “There were a few hiccups, but within 48 hours it was clear that the system would work.” Once the system was running, he says, not a lot of support was needed.

**Results**

Today, Phase I of the project is complete. All 560 monitored beds feed their respective systems every day. The seven-month implementation required intense cooperation between IS and CE, and set the stage for the next phases of the planned five-year project. (See the sidebar on this page for more information on the next phases.)

Most importantly, they achieved their goal of fewer transcription errors and timelier entry of patient vital signs data. “People rely heavily on the monitors documenting directly into Epic,” says Bakuzonis. “It saves clinicians a lot of time. It’s become a huge tool for the nurses, and we hear complaints quickly when it goes down.”

Future challenges for the team at Shands Gainesville include improving network management ability. “We realize that now, entire systems are used for data export and that the entire system needs to be reliable,” says Bakuzonis. He is also looking ahead to networking stand-alone devices like ventilators, cardiac output monitors and other legacy devices and installing wireless infusion pumps.

All in all, the group at Shands Gainesville is very happy with the success of the project. “Integration happened because we made a plan to have integration options,” says Bakuzonis. “Our initial plan with Epic was that if devices had the opportunity to connect to Epic without significant additional cost, we would connect them. There was no big study, no hospital-wide effort. We all knew the potential and took the next, natural step to connect devices.”

**‘Parameter mapping was painful. We had to go through a process of trying to get everyone to agree and to align nursing practices.’”**

—Pedro Hernandez, Shands HealthCare

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**CASE STUDY 2**

**Using Integrated Data to Improve Patient Care**

Indiana University Health (IUH) started its journey to device integration in 2001 when it partnered with Cerner to develop an EMR that was completely integrated. “We wanted all patient information in one medical record,” says R. Renee Johnson, RN, MBA, the IT clinical project manager and critical care nurse.

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**EMR Implementation Project**

**Phases at Shands**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Description</th>
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<tr>
<td>1 (complete): Epic electronic chart for all inpatient care areas (acute, ICU, labor and delivery), inpatient pharmacy, CPOE, HIRM documentation tracking</td>
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<tr>
<td>2 (ongoing) – Scheduling, ADT, billing/coding, outpatient clinic charting, patient customer information access</td>
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<tr>
<td>3 (2012): Radiology and oncology ancillary departments</td>
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<tr>
<td>4 (2013): Home health, cardiology, transplant, and OR/ anesthesia ancillary departments</td>
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<td>5 (2014): Lab and outpatient pharmacy ancillary departments</td>
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There may be additional device integration projects with the outpatient clinics and the other ancillary departments, says Craig Bakuzonis, director of the Clinical Engineering Department at Shands.

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**Related Story**

See the “IT World” column on page 64 for a look at how safety concerns can limit functionality when it comes to the integration of patient data.
A nurse checks the flow of data into the electronic record at the bedside at IUH.

A NURSE’S PERSPECTIVE

R. Renee Johnson’s career path from critical care nurse to IT project manager at IUH has given her some useful insights on how to introduce these new integrated technologies to clinicians. “When we first introduced these technologies, the message was that technology would speed things up and make documenting easier. That is not necessarily true. Things certainly are not easier in the beginning or in a critical care environment where data have to be captured frequently. It’s only easier in the long run, once you get used to it. Nurses always have an initial transition period.”

With most integrated systems, data flows continually to a gateway server which collects the data and stores it, often for 12 hours before it is deleted. When a nurse wants to record vital signs data for a patient, she must first go into an association screen and associate a location identifier and the devices with the patient. The data are then associated with the patient, but still not recorded in the chart. The nurse picks the data to save and validate, and that validated data then flows into the patient’s record.

Rather than focusing on time savings, Johnson tries to teach a new workflow. She says, “Acknowledge that it’s not easy at first, but emphasize that it will get easier. Highlight the benefits to nurses: it allows them to care for patients first, then they can catch up on missed vital signs. Data are more accurate. Paperwork doesn’t get lost. There is more continuity of care. Things are less likely to be misread since we’re not relying on handwriting. They will see improvements in care because of timeliness, wider availability of data.”

“Keep in mind that no one is eager for change,” she adds. “Try your best to ease and validate their fears up front. The more training you can offer, the better.” To entice nurses to attend training, Johnson has offered food and candy at training sessions and even prizes, along with daily newsletters to staff during go-live to keep them informed of project status.

that assists with the integration efforts at the 20+ hospital system based in Indianapolis.

The health system was responding to patient safety concerns raised in To Err is Human, the landmark 1999 Institute of Medicine Report which estimated that between 48,000 and 99,000 patients die each year due to preventable medical errors. There were other problems as well: “We were seeing fewer physicians and nurses, rapid population growth, and financial constraints,” says Johnson.

IUH turned to technology as one answer. “Our goal was to use technology to leverage the experience of our doctors and nurses, decrease the length of stay, decrease variations in practice, and implement best practices,” she says. “We hoped that integrating device data into the EMR would allow us to reduce documentation errors, increase patient safety, decrease communication errors, increase quality, improve workflows, reduce redundancy, and fully integrate the patient records into one place.”

Device-EMR Integration Key

To improve safety, the health system developed a Virtual Care Center, an in-patient remote monitoring center and tele-ICU launched in 2005 that monitors 305 beds at four hospitals.
The center was designed as a second-layer safety and quality net, and offers real-time vital signs, audio and visual capabilities, alerts and trends, call buttons in rooms, and cameras. “It allows our intensivists to go home after hours because physicians in the bunker help monitor their patients. Also, it gives nurses someone to call for a second opinion.”

Device data integration was seen as key to the ongoing success of the center. In 2005, the first biomedical device integration (BMDI) team was formed to find a way to feed data directly from devices into the EMR and to the virtual center. In 2007, the team tried to go live with nursing clinical documentation, but encountered multiple performance and adoption issues. The team tried again in 2008 and achieved success at a downtown hospital. As of September 2011, all facilities are live feeding device data in the Cerner Millennium EMR system.

**Multipronged Integration Effort**

Unlike Shands in Gainesville, IUH has multiple devices connecting to the EMR in multiple ways. Both stand-alone and networked devices feed into the EMR. “We connect using a variety of different methods,” says Jeff Lane, the team leader for BMDI services. They have gateway feeds that come from vendor-specific device networks. They also use a third-party, (device vendor-neutral) gateway, and Cerner’s new iBus product (Cerner’s version of a gateway) to connect devices that do not use vendor gateways such as anesthesia machines, ventilators, cardiac output monitors, and others. A team of four BMDI employees support day-to-day operations and all projects.

The process of connecting all of those devices was anything but smooth, says Lane: “Where devices are networked, we normally get an HL7 feed from a gateway. For legacy devices, we had to get upgrades, purchase gateways, and/or purchase servers to connect them all together.”

“The installation process varies depending on the equipment,” says Lane. For monitors, the vendor installs the system while the BMDI group advises on naming conventions, tests data flow, and sets up equipment. The third-party, device vendor-neutral gateway or iBus products help them connect legacy devices. Lane reports that the iBus system is newer and that in some instances they have chosen to stay with the third-party vendor-neutral solution to maintain desired capabilities.

Lane’s BMDI team works closely with both the IS department’s desktop service group and with the biomed department. “We’ve had a close relationship with biomed since we implemented device data integration in the first facility, and I’m often in close contact with them,” says Lane. “We split responsibilities for this equipment: biomed handles clinical equipment, and BMDI takes care of items from the serial port out. But still, there’s a gray area there. Where should clinicians report problems first?”

Cross training and cross staffing have helped cooperation between the two groups. A clinical engineer joined the BMDI team; biomed has been trained on cabling, and IS staff is cross-trained to troubleshoot equipment. “We maintain separate areas of expertise, but we often attack issues as a team,” says Lane. “It is critical to build a relationship with biomed right from the start.”

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—R. Renee Johnson, Indiana University Health

Device data integration has been key to the success of Indiana University Health’s Virtual Care Center, an in-patient remote monitoring and tele-ICU launched in 2005 that monitors 305 beds at four hospitals.
Lessons Learned at IUH

• Develop a partnership between IS and biomed. When integrating devices, the two areas have a lot to offer each other. Both need to understand what roles they need to play.

• Remember that nurses need to be able to use all of this equipment, the devices as well as the interface and the EMR. For example, consider placement of monitors; if the connectors are too high, nurses can’t ensure good connections to get data to flow properly.

• CE needs to understand implications of new device purchases on connectivity. Standardize on just a few device vendors; consider the existing infrastructure.

• Assess the clinicians’ culture – how well will a particular unit adapt to automation? Keep in mind that the right leadership is needed to help drive the effort forward.

• When building new facilities, understand that device installation has to occur much earlier in the process in order to test device interfaces.

• Name devices with something that makes sense so that clinicians can identify the device and the room and associate it properly with the patient.

The health system has faced a long list of challenges in its integration efforts, including funding; integrating disparate devices and networking legacy equipment; solving patient association problems; ensuring that time stamps are correct; mapping parameters and developing a data dictionary; changing culture and encouraging adoption; keeping up with technology changes; lack of vendor-neutral hardware; latency of data; too much data and not enough information; and infrastructure problems. The biggest items on their wish list are medical devices with native HL7 outputs so they can hook devices directly to the network.

Integration Benefits Huge

While the implementation process may be rocky, the benefits of a successful implementation are huge. “There are many clinicians in the workplace now who have only documented electronically so when the system goes down, they have to revert to paper which can be a hardship,” says Johnson.

“We have found that as we add integrated technologies to new areas of hospitals, BMDI seems to be a deal breaker. If they can’t use BMDI, they don’t want to perform any upgrades,” says Lane. “Clinicians have come to rely on that data being available. It also most seems to cause them hardships when it is down for any reason. BMDI is a product that just seems to work. It is usually very reliable. When it breaks, it’s usually because of a larger problem.”

Despite its progress at automating patient records, IUH is a hybrid, still using some paper records. Implementation efforts are ongoing. And looking ahead, the health system is considering adding devices that would assist with tracking, perhaps badge scanners that identify staff when entering patient rooms. They’re also looking at infusion management or integrated smart pumps with bidirectional interfaces, alarms development, contextual passing, alerts maturation, and decision support.

“The sky’s the limit,” says Johnson. She is currently working on a project to create a dashboard screen of the most critical information. “We’re in a data-rich, information-poor environment,” says Johnson. “We have lots of data, but it’s not always where you need it. We’re looking at ways to improve that.”

CASE STUDY 3

Device Integration Promise and Pitfalls

Children’s National Medical Center, a 306-bed freestanding children’s hospital located in Washington, DC, is fortunate to have excellent resources at its disposal, with access to some of the leading medical and technology experts in the country. Its financial strength allows it to apply the latest cutting-edge technologies to improve care and save children’s lives.

The team at Children’s was successful early on at integrating device data into its EMR and achieving significant improvements in patient care as a result. Yet, as they have moved beyond the early stages of implementation and into more complex projects, the integration experts at Children’s have run into several dead ends that have resulted in wasted money, underutilized systems, and untapped potential. The team is learning first-hand about the brave new world of device integration where systems conflict, software upgrades destroy data flow, and vendors talk rather than solve problems.

The Promise of Integration

In 2004, Children’s began looking at ways to use technology to improve patient safety. “We decided that the biggest bang for the buck was in avoiding medication errors,” says Brian Jacobs, MD, the hospital’s chief medical information officer. They began looking at the benefits of EMRs in terms of computerized physician order entry (CPOE), nurse documentation, and digital radiology. “The literature and our experience suggested the greatest risk of medication errors is in the prescribing process due to illegible or incomplete orders, no signatures, and pharmacists having to speak with clinicians to clarify orders.”

So, in 2005, the hospital started off with CPOE and electronic medication administration records (eMAR) systems. Around the same time, the hospital chose to move forward with Cerner as its EMR, and committed to partner with them on using Cerner I-View as the intensive care charting portion for vital signs. By 2008, they began roll-out of a full electronic medical record system, including integration of
device data into the EMR. “Our goal was to feed data from four units: the pediatric, neonatal, and cardiac intensive care units (ICUs), and the heart-kidney unit,” says Jeff Hooper, the clinical engineering director for Children’s.

Hooper and his colleagues in the IT Department began to form a team around the implementation of the EMR. One clinical engineer, Virginia Amendola, moved into the IT Department for the implementation process and now manages ongoing integration projects from within the CE Department.

They encountered and overcame several obstacles in the implementation process, including learning the system, choosing parameters, mapping the data, and a testing process that Amendola describes as “physically and mentally draining.” But by May 2008, the project was up and running to rave reviews.

LaTasha Burns, a nurse and clinical informatics manager, says that the project went well. “It was probably one of our biggest wins,” she says. “Clinicians appreciate anything that can save them time, and we can build on this foundation.”

**New Challenges**
The success of the initial project helped the team—and the clinicians—recognize the value in integrating device data into the EMR. So they wanted more: integration of two types of ventilators and also cerebral oxygen monitors. And alarm integration. And infusion pumps. And with every new implementation, new challenges had to be faced.

In one case, the team upgraded to a new system that didn’t work and had to backtrack to the original system just before go-live. They had initially integrated the ventilator and cerebral oxygen monitor data by using a Philips ViewLink device. When they wanted to bypass the ViewLink device in order to free it up for alarm management and data storage, they purchased a new CareAware device interface from Cerner. In testing, they noticed that they were getting fewer parameters through the CareAware device feed.

“We discovered that we had to write a separate driver to access all of the data we had been getting previously. We just couldn’t do it at that point, and had to go back to the ViewLink device. We spent the extra money, bought extra devices, and were not getting even as much data as we were getting before,” Amendola says.

In another case, the lack of standards and interoperability in device data feeds is limiting their capabilities. Brian Jacobs came up with the idea of detecting ventilator malfunctions and adverse events through the EMR. “When there’s a problem with a device being used on a

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**A DOCTOR’S PERSPECTIVE**

*Brian Jacobs, MD, CMIO, Children’s National Medical Center*

Device interoperability is important, and efficiency and accuracy of data flow is especially important in a pediatric environment. Neonatal, pediatric, and cardiac intensive care units (ICUs) include a lot of very sick kids, with intense data flow. We can have up to 11 infusions going on one patient.

Before data integration, nurses or respiratory therapists were going in every 15 minutes and hand charting several parameters on a four-page spreadsheet. These handwritten sheets could be illegible and often included transcription/math errors. At the end of the day, the nurses would enter a long spreadsheet of data into the computer for each patient.

As a critical care doc, I would come in at the change of shift and want to know what’s going on with my patients. Under the old system, the data were not available until the nurse finished charting. Often, I’d be waiting for data that a nurse hadn’t even had a chance to add up.

Now, I can pull up complete, legible information quickly and conveniently without having to wait for the signout process. Integration eliminates all of data entry and waiting. Instead, the nurse selects a column which autopopulates, the nurse validates that the data is correct, and it feeds into the EMR where everyone who needs it can see it. There is a huge efficiency gain and accuracy gain.
Children’s National Medical Center began rolling out a full electronic medical record system in 2008, including integration of device data into the EMR for four clinical units.

Patient and it has to be changed out, the device ID changes. That would indicate that a ventilator has malfunctioned,” he says. “We wanted to use the act of changing a ventilator ID as a proxy for ‘an adverse event may have occurred.’”

While that sounds easy, it turns out that ventilators do not send out a device ID with their data feed, meaning that no device ID change would be documented in the EMR. To get around the problem, they’ve asked nurses to enter the six-digit biomedical device tracking number into the system, which involved a training effort, policy changes, and action on the part of the nurses.

Amendola tells of a software upgrade to the CICU monitors that knocked out certain parameters that had previously been flowing into the EMR. “The software upgrade tweaked BMDI codes for only a few parameters. The nurses noticed the lost parameters and complained. We discovered the vendor had implemented new codes with its software upgrade. To solve the problem, we took all monitors back to the same software revision that worked. Now, we must downgrade all devices to Revision F; we are missing Revisions G and H. And we discovered that the HL7 coding doesn’t come from the database server, but rather is generated in the monitor itself.”

Hooper says that they’d like to integrate their 800 infusion pumps into the EMR but can’t seem to do it without buying a $2 million wireless upgrade from the manufacturer. “Specifically, the syringe pumps we use no longer have an ‘output’ or RS232 port. Vendors seem to be moving in the direction of a server-based or networked approach, which is difficult since it requires you to purchase the networked solution and in this case a bedside connection, which leads to involvement of another vendor and more hardware to connect, further relationship and connection issues, and higher costs. It’s led to months of high-level meetings between the device vendor and the EMR company with no resolution.”

“There are some devices with only one or two parameters that we’d love to integrate but it’s just not worth spending a year and a half to do it,” he says. “We’ve therefore found ourselves unwilling to integrate new devices. That’s a long road for only one or two devices; we hope it becomes easier.”

Jacobs agrees. “Budget is less an issue in resolving problems, and it’s more a problem of...”
the time required. We need to dedicate a team of biomed staff, IT staff, vendors, and Cerner to resolve every problem.”

In some cases, the medical device vendors and the EMR companies find themselves in competition. Jacobs offers an example: “One device vendor wants a robust reporting function, but the EMR has that already. Therefore, they compete over who will set standards for interoperability. We need to get developers to work together. These problems get into complex intellectual property issues, and can take months to resolve.”

Other problems they’ve encountered include unavailability of transport data and inability to send waveforms to the EMR. Plus, the hospital’s status as a pediatric facility creates challenging issues, as certain parameters unique to children are not even included in the EMRs. “This issue is unique to children’s hospitals and the vendors have not integrated those parameters as often because the need is not as great across the board,” says Hooper. As a result, Burns says, “We have to tweak the values for the pediatric population, and do more customization for pediatrics.”

Hooper and his colleges at Children’s would like to see uniform device IDs as part of the data flow for all devices; an automated patient/provider/location association; better time stamps; and data feeds available from all devices. “The goal is plug-and-play,” says Hooper.

Lessons Learned at Children’s National Medical Center

• The choice of an EMR system, once in place, drives everything. It is a significant long-term relationship. Choose wisely.

• A hospital needs to make sure there is a match between their EMR vendor and medical devices vendors. It is important that the two are aligned in their vision of interoperability.

• Do site visits with both vendors to see that the system works. Device vendors and EMR vendors are in various stages of their relationship; do your homework around that before committing to a purchase.

• Don’t just buy and implement new systems; think about the kind of value you want to derive from these investments and the metrics you’re trying to achieve up front.

• Test things before you make purchases, using exactly the same setup you plan to use live. Even if you have great relations with your vendor, you will not be able to understand the full capabilities without testing.

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