

Blurring the Lines: The Shifting Relationship Between IT and Biomedical Departments

By JILL SCHLABIG WILLIAMS

Sitting in a box in Gregory Goll's office is a piece of the future. The box contains a component for a new telemetry system that will allow physicians to view patient data remotely.

Goll, a CBET and biomedical supervisor at Erlanger Health System in Chattanooga, TN, is responsible for getting new medical technologies like the telemetry system up and running in the 700-bed teaching hospital.

"This technology is a very positive thing from a patient care perspective," he says. However, technologies like this telemetry system open up a Pandora's box of issues related to the installation and maintenance of new medical devices.

Across the country, clinical engineering departments and information technology (IT) departments are working to answer these questions.

- How can such systems run securely over shared data networks?
- How can vendors be offered the system access they need to perform remote diagnostics, maintenance, and backups?
- How do you protect such systems from viruses?
- What about wireless technologies, and monitoring systems that are receiving real-time data 24 hours a day, 7 days a week?
- And, perhaps most importantly, who is in charge of figuring all this out?

While there seems to be no one-size-fits-all answer to the technology puzzle, new relationships are being formed and bridges built as IT and biomedical depart-



Gregory Goll



Barry Bruns

ments are forced to keep pace with new technologies that seem to be evolving at Internet speed.

Evolving Equipment Drives Changes

"Back in the 1980s, medical devices were rarely networked together," says Goll. "Then, hospitals started to tie their intensive care unit monitoring networks into nurse call systems. Now, most systems are networked together, sometimes over proprietary networks but often over a hospital's main information system. And, increasingly, physicians want the ability to view patient data from home or office."

Those who install and maintain the new computer-based, network-dependent medical devices must have a high level of expertise in both medical equipment and IT. Genesis Technology Partner's Barry Bruns, who serves as director of biomedical engineering at the six-hospital Health Alliance of Greater Cincinnati, has wrestled with technology issues from both sides of the fence—IT and biomedical departments. "Clinical systems are still specialized medical devices, but now these

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are being interfaced to computers, have attached databases, and hook into the hospitals network,” he says.

Traditionally, clinical engineering departments have handled medical equipment regulated by the Food & Drug Administration (FDA) that comes into contact with patients, and the computers connected to that equipment.

By contrast, IT departments—also called Information System (IS) departments—have traditionally maintained data and hospital networks and handled PC and network maintenance, web services, data warehousing, information systems, and applications development. But where do you draw the line on responsibilities when a medical device runs on a personal computer (PC) connected to the hospital’s information system?

“The lines between what biomed handles and what IS handles are getting much grayer,” agrees Hal Bledsoe, CBET, director of biomedical technology at St. Claire Regional Medical Center, a 160-bed hospital in Kentucky. “When it comes to a diagnostic remote read station that allows Internet access, or monitoring equipment that IS sees as a data tool and biomed sees as a medical device, or a telemetry network that sends data images over a regular hospital network, how do you decide who’s responsible for what?” Sometimes, he admits, when it comes to drawing lines for responsibilities, “you get the coin out and toss.”

These blurring lines can create occasional breakdowns in how things work. “Medical devices often look like personal computers now, which of course they often are,” says Bledsoe. “Operators have trouble distinguishing what is what.”

How are device users supposed to know whom to call when there’s a problem with a device? While most hospitals have one help line for biomedical issues and another for IT issues, Goll’s hospital gives its users one help line to call. The dispatcher then routes the call to the appropriate department. Bledsoe’s department has put stickers on equipment to identify who should be called for service.

Then there is the issue of repairs being completed correctly on time, with appropriate documentation. And that often comes down to a question of the differences in culture and training between IT and biomedical departments.

Two Different Worlds

In some ways, there is a basic clash between the cultures and training of biomedical and IT departments. Mark Prell, CBET, who works with Bruns at the Health Alliance of Greater Cincinnati as manager of clinical information systems, explains, “Typically, clinical engineers and biomed don’t have experience in computer information systems or networks, and folks in IS have no experience in patient care. As clinical equipment migrates to PCs and becomes increasingly dependent on software and networks, most of the issues that arise are classic IS issues. But, the IS department doesn’t know or want responsibility for clinical equipment.”

Responding to medical device problems requires a different knowledge base and response framework. When a piece of clinical equipment is down, the hospital is losing money. Worse, a patient’s life could be in danger. Biomedical departments are accustomed to

responding rapidly to patient care issues. IS departments, on the other hand, have rarely been involved in life-and-death situations, and operate on a different timetable.

Plus, the FDA, Joint Commission (JCAHO), and other agencies heavily regulate medical devices. Biomed are trained to consider these regulations and document all services performed on medical devices, maintaining risk histories; IT technicians are not. These different knowledge bases mean that IT folks are often not equipped to solve problems with clinical equipment.

“As a result, biomed have had to become computer experts,” says Chris Baker, CBET, director of biomedical engineering at the



Hal Bledsoe



Mark Prell

200-bed Concord Hospital in New Hampshire. “We have always been good on the hardware end, but now we’re learning networking.”

Baker’s staff has been picking up the networking skills by job shadowing with IT technicians; teaching themselves; and attending the network training that medical vendors are starting to offer. “Previously, we never had enough volume to really need to know networking. Now, we need that knowledge more frequently. There’s a better payback in our technicians learning networking.”

Goll’s technicians have been attending networking classes offered by Philips Medical Systems. “We know we have to change, and learn more about networks,” he says.

Just as biomedes are trying to keep up with new computer technologies, IT departments are trying to keep up with evolving medical devices. Bruns has found that IT departments tend to be more conservative in adopting new technologies.

“IS departments are very interested in tried and true technologies, standards, disaster backup. Clinical Engineering departments are forced by clinicians to be on the ‘bleeding edge’ in adopting new technology. The clinicians want the latest equipment, the latest new and improved devices in clinical settings.”

Goll tells the story of installing a new archiving system for labor and delivery that takes parameters out of fetal monitors, archives data, and displays it remotely. When a problem arose with the system, rather than finger pointing with the IT department, biomedical engineering just took the lead on resolving the problem. “The environment which biomedes live in is more of an emergent nature than IT,” agrees Bruns. “IT will work on a fix but want to go through change management before implementing the fix. Biomedes usually don’t have this time.”

“The demands are different on the clinical side,” agrees Wayne Shockey, a senior executive with Genesis Technology Partners. “Sometimes, IS departments are hesitant to support these latest technologies, and biomedical departments are forced to move forward without help from IS. As more interaction between the two

sides of the house occurs, IS will become more comfortable supporting the latest technology demands from the clinicians.”

Security: No Easy Answers

Bruns tells a story that illustrates another sticking point between IT and biomedical departments: security. A new radiation oncology system was being installed at his health network that not only controls the linear accelerators themselves, but also handles patient scheduling and tracking.

The team wanted to interface the new system into the hospital information system in order to let the systems share patient demographics and insurance information, streamline billing, and someday, give physicians remote access to the data. Additionally, the vendor needed remote access to the system to perform its diagnostics, maintenance, and backup functions.

“IS was very uncomfortable with giving the vendor remote modem access to a server which sits on the hospital network,” says Bruns. Temporarily, a modem has been added to the system that is only connected during the time the vendor needs to have access. Other solutions include having vendors sign agreements and using secure dial-up tokens to access only certain IP addresses on the network.

IT departments need to control access to systems, respond rapidly to virus threats, and ensure system integrity. Biomedical departments need to provide vendors access to systems, check with manufacturers of FDA-regulated devices before modifying any system to respond to virus threats, and guarantee uptime to clinicians.

“IS wants to be able to update operating systems for virus threats,” explains Prell. “Manufacturers, on the other hand, have received FDA approval for a system as it stands, and can’t easily add virus software. It’s the job of clinical engineering to make sure that before we install security patches or anti-virus software, they are approved by the manufacturer and will not interfere with the application—what is the solution? Can we load the patch? If a medical device stops working, a patient’s life could be on the line.”

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How are the two groups resolving these conflicts? In Prell's hospital system, the IS department has vendors sign agreements to grant limited access to systems. Once they have authorization, the vendors can get into the network and access certain IP addresses. Another solution is to run a clinical system on its own local area network, and provide a thread that goes out to the hospital network. If antivirus software can't be installed on the system, the thread is removed.

"This is a question with many new systems—how do you deal with virus protection? We don't know yet how it will be resolved. This is a brand-new era of us trying to manage virus control patches for vulnerability to hackers," says Bruns.

Reporting Structures

The reporting structure between IT and biomedical departments is one key factor that is changing in response to evolving technologies. In Goll's current assignment, the Clinical Engineering department is part of the Technology Management Department, reporting along with the IS departments to the hospital's Chief Information Officer (CIO). In his previous assignment at the University of Michigan Medical Center, the in-house biomedical department had a very distant relationship with the campus-based computer/networking division.

"The two models are night and day," says Goll. "At the University of Michigan, there was a feeling of us vs. them, and problems with coordination of efforts." However, at Erlanger, Clinical Engineering is part of the IS family. "It's been a very good experience," he reports. "We just installed a whole-house telemetry system, working very closely with the networking division. We were able to solve equipment issues, space issues, and bring the project off without any major glitches."

Combining biomedical and IT departments under the CIO is a relatively new organizational model. Traditionally, biomedical departments have reported to materials management, facility operations, or been stand-alone departments. Concorde Hospital's Chris Baker has worked under all four models. His department just began reporting to the hospital's CIO in April.

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"Each move for us has entailed increased responsibility and recognition for the department," says Baker. While he has found it beneficial to periodically change reporting structures and develop ties with new departments, he likes the fact that his biomedical department

now reports to the hospital's CIO along with several other cost centers, including IS, clinical systems, hardware, networking, UNIX engineering, and analysts.

"Our department's merger with IT has led to better communication on upcoming projects. We are working to better define support issues, drawing

the lines of who handles what equipment," he says.

Those from departments that have merged with the IS function all cite improved relationships as a key advantage of the new structure. "Clarifying gray areas is easier because of the interactions that occur with both departments under the same umbrella. There were more gray areas before our transition to IS," says Bledsoe.

"While we had a good rapport with IS under other organizational structures, merging has strengthened that rapport," says Baker. "We can tap into expanded education and training resources as part of the IS department. We've found that responsiveness improves when you're part of their department. Plus, our CIO keeps us more involved with the department—we've become more knowledgeable about each others areas."

Many hospitals, of course, retain a traditional separation between the IT and the biomedical departments. Bill Guttery, a BMET III working for Aramark CTS and stationed at St. Anthony's Hospital in Oklahoma City, says that his biomed shop maintains a distant relationship with the IT department.

"There is not much interaction between the two departments," he reports. "The hospital's monitoring information systems run over a Spacelabs network, which is maintained by biomed with no involvement from IS; however, Spacelabs is called in for major repairs to the telemetry antenna system."

Tyson Long's biomedical department at Mercy Medical Center reports to the plant supervisor while IS reports to the hospital's CIO. Long, a biomed equipment specialist at the 250-bed hospital, has become an

expert at working across departmental lines to install and maintain new equipment. He sees an increasing need for coordination as new technologies come on line.

“Our patient monitoring system currently runs over its own network. However, we’re now remodeling patient floors, and are working closely with IS to implement a new system that will run over the hospital network,” he reports. As more equipment runs over the hospital network, Long and his colleagues have to work through issues with the IS department related to bandwidth, IP addresses, security and responsiveness.

“There’s been no finger pointing so far, but there is a potential for problems,” he says. “We just put in a new fetal monitoring system. The PC in the patient room is maintained by IS, the monitor is maintained by biomed. If the interface breaks down, who will repair it? That’s a gray area.”

Speaking Both Languages

The biomedical team at the Health Alliance of Greater Cincinnati has come up with an innovative solution to bridge the gap between biomed and IT: hire someone who can speak both languages and put them in charge of clinical information systems, acting as a go-between for the two departments.

Before the Health Alliance outsourced its biomedical engineering function to Genesis Technology Partners, a San Dimas, CA-based company, the biomedical department often tried to work around rather than work with the IS department.

When Genesis took over, they created the new position of Manager of Clinical Information Systems and found Mark Prell, who was experienced in both the biomedical and IS arenas, to staff the position. Prell works for the director of clinical engineering and also has a close working relationship with the director of the IS department.

“The IS department was getting frustrated with clinical engineering,” says Prell. “They didn’t know what to do with these new systems, and they had no one to talk to. Previously, the relationship was very tense, with not much communication. Now, they’re very happy to have someone to talk to. They come to me.”

Prell has a standing meeting every two weeks with the director of the IS department to review all pending projects. He is in the process of tracking all clinical information systems, capturing and sharing that data with the IS department, and defining responsibilities.

“This is such a new job title, something totally different,” says Genesis’ Wayne Shockey. “Medical equipment technology has gotten to the point where this position is necessary in order to effectively support the users of clinical information systems. Essentially, this person lets IS and biomed accept dual ownership of clinical information systems, working together to draw lines of responsibility.”

“As an outside vendor, we are able to add an overhead position to fill this role,” says Shockey. “For an in-hospital department, it is difficult to add staff at all, much less in a position that’s not directly maintaining equipment. It makes sense for us, though, and will save us money in the long run.”

Cooperation is Key

Chris Baker tells the story of a cath lab system that was attacked by a virus. While the biomedics did not have the logins to go in and fight the virus, IT was not familiar enough with the system to fight it on their own. “Our two departments had to work together to resolve the problem,” he says. In Baker’s case, this cooperation was made easier by the fact that the two groups are closely linked in the hospital structure.

However, cautions Prell, joining forces with IT under the CIO will not automatically fix communication problems. Departmental lines still exist, he says, and the two camps will increasingly need to reach across those lines to support evolving medical technologies.

Regardless of the reporting relationship between the two departments, it is clear that evolving technologies are forcing biomedical and IT departments to work more closely together than ever.

Our field experts report that maintaining a good working relationship with the IT department—breaking down barriers, keeping lines of communication open, and learning each others language—will be key to making the most of the rapidly advancing medical technologies. ■

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