Adding IT to the HTM Toolkit

In December 2013, the staff of the Civil War-era Wishard Memorial Hospital in Indianapolis, IN, moved into a gleaming, state-of-the-art facility: the Sidney & Lois Eskenazi Hospital. This transition opened up a new world for Eskenazi Health’s in-house biomedical engineering department, as the facility came loaded with new—and often networked—technology.

But all that technology uncovered an issue for the department’s staff of 20 healthcare technology management (HTM) professionals. As most of the technology they would be working with was new and interconnected, a support network—and the related information technology (IT) that went with it—was required. Most of the biomed staff lacked IT training, and they certainly didn’t speak the language of IT.

As operations within the growing Eskenazi Health system grew increasingly connected, the path forward became clear—biomeds needed to add IT skills to their toolkit in order to provide the technology support that the healthcare system would need.

“In radiology, for example, the reliance on technology—sending and receiving data—was so significant that we couldn’t have any downtime. Biomeds, clinicians, and patients can’t afford to have a system down or data not transmitting,” said Matt Dimino, a radiology service technician at Eskenazi Health. “A large portion of our systems and repairs revolved around the software or hardware of a computer or IT system. This forced us to learn more about networking. It forced us to speak the language. We needed to have a solid understanding of what’s ours, versus something being another department’s problem.”

Challenge

In 2014, when Matthew Royal began his tenure as Eskenazi Health’s director of biomedical engineering, his staff did not have a strong relationship with the IT department. Since all stakeholders were still settling into the new, technologically advanced facility, that posed a problem when everyone wasn’t on the same page.

“It was causing issues for end users when we would have problems with the new systems. And we also didn’t have a clear understanding of who owned what in the new facility,” Royal said.

In addition, the biomedical engineering department was taking on projects that straddled the line between IT and HTM: consolidating the healthcare system’s disparate electronic health record (EHR) systems, supporting a middleware product so that medical devices could integrate into the EHR wherever possible, and implementing a cybersecurity program that was specific to protecting medical devices.

“It was clear at this point that biomedical engineering needed to expand its toolkit with IT skills,” Royal said. “We started with a few hundred connected devices and eventually ended with nearly 4,000. We got to the point where we really needed to create another position—that of a hybrid HTM-IT professional.”

Working with his counterparts in IT, Royal carefully crafted and posted a job description that combined the IT and biomed skills needed to get these tasks done. The problem? After sifting through about 30 resumes and interviewing various candidates, the right person had not emerged. Unable to find a suitable candidate who possessed the needed hybrid skills of a IT professional and a biomedical engineer, Eskenazi Health instead set out to develop its own.

“I decided that I’d rather bet on my own team than something unknown. That’s when we decided to really invest in IT training,” Royal said.

Solution

For biomeds at Eskenazi Health to learn the IT skills that they would need to manage the healthcare system’s equipment, the department would need to develop an IT training program that any staff member could access. After looking at external training programs—and their “limitless” costs—Royal decided on developing a primarily internal IT training program, one that staff members could access regardless of whether they were working on site.
Royal turned to Dimino, who in addition to his role at Eskenazi is an adjunct professor at Indiana University–Purdue University Indianapolis (IUPUI), to develop the training program, which initially included A+, Net+, and Security+ wireless technology specialist certification material. Dimino understood from personal experience what it felt like to be an HTM professional in an environment where IT skills are a necessity. He began his own journey to obtain those skills a decade earlier.

“About 10 years ago, I was embarrassed by an IT person due to my lack of knowledge and skills. So, I made it my goal to learn those skills. I built my own personal labs and taught myself. I never wanted to be embarrassed again,” Dimino said. “I wanted to be the one to represent biomeds in those meetings with IT, so we could stand up for what we knew.”

Dimino leveraged his experience teaching at IUPUI—their mechanisms, methods, and instructional delivery systems—and applied it to create Eskenazi’s in-house training program, along with knowledge compiled from standards documents, books, device vendors, and more. The program includes hands-on instruction and lab sessions each Friday morning, as well as an e-learning system for staff to study on their own. The self-paced e-learning system, developed by Dimino, includes quizzes, assessments, labs, lectures, and videos.

“IT information is very common and widely available, so we are always adding new sources of information depending on the subject,” Royal said. “We focus on certifications such A+ and Net+ but also have subject-specific training, such as cybersecurity, middleware integration, hard drive cloning, and vendor-specific systems.”

To get the hardware for hands-on labs, Dimino used old computers from IT as well as new ones built by his team. After staff members reached a level of competency, they joined in with colleagues in the IT department—first on basic troubleshooting issues, followed by more advanced tasks.

To supplement his own knowledge, Dimino attended several external training sessions: Certified Ethical Hacker, Certified Hacking Forensic Investigator, Healthcare Certified Information Security and Privacy Practitioner, and Certified Information Security Professional.

“I acquired the skills, knowledge, labs, and information from those trainings and repurposed what I learned by applying it more toward medical devices and our department,” Dimino said.
For cybersecurity training, staff members use labs that are isolated from the hospital’s internal network, so they can train and challenge themselves in a safe environment. The biomed department also uses external training through its middleware vendor to help support Eskenazi’s medical device integration project. Currently, the biomed team is able to support the middleware’s software systems, including server administration.

“Everybody wanted to learn more and speak the IT language. No one wanted to be left behind,” Royal said. “You could really tell that there was a change in our culture by the way people spoke. The training changed the way we operated.”

Several team members have attended external vendor training on networked medical devices, as well as the AAMI Annual Conference to learn more about medical device cybersecurity.

Team members then share what they’ve learned, as well as additional information they’ve gathered, during IT-biomed lunch-and-learn sessions. This helps each department understand the impact and support relationship of the medical devices that reside on the IT network, as well as get to know one another better. When the hospital’s new EHR system finally went live in September 2016, the biomed and IT teams celebrated—together.

**Results**

The primary benefit of adding IT skills to the biomed department’s toolkit was improvements in patient safety, due to reducing both planned and unplanned downtime of networked systems. Today, Eskenazi’s biomedical engineering team is the “one-stop shop” to resolve medical device issues.

“Once a call is placed, the biomed department follows it through. There’s no more pointing fingers with the IT team. It’s a true collaboration,” Royal said. “Because we’re a cohesive support group, clinical staff can better focus on the patient. They’re no longer wasting time trying to figure out who they need to call when there’s a problem.”

Adding IT to the HTM toolkit is more than just an evolutionary change to the profession. It’s a change in how they think and operate—a point that Eskenazi Health has put into practice by allowing the potential for an “IT” designation to be added to any biomedical equipment technician’s title (e.g., BMET-IT, Radiology Service Technician-IT). The change gives each member of the biomed team a path for improvement and promotion, which has increased retention.

As an additional benefit, the increase in IT knowledge base within HTM reduced the need for many software and hardware support contracts, as issues now can be solved in house. Including savings on external training and staffing, Royal esti-

![Figure 1. Estimated cost savings over five years attributed to Eskenazi Health’s program to provide information technology training to biomedical engineers.](image-url)
mates that the in-house training program will save the hospital system about $2.8 million over five years (Figure 1).

**Conclusion**
Adding IT to the HTM toolkit transformed the culture of HTM professionals at Eskenazi Health and support services as a whole. All members of the biomedical engineering department now speak the language of IT and can effectively work to maintain and fix issues with networked medical devices. With the improved relationship between HTM and IT, more knowledge sharing, and greater coordination, biomedics at Eskenazi Health now enjoy a high level of “IT credibility,” as well as a “relationship of trust” between the departments.

“If the IT team knows that you have an IT skillset, then they are more willing to give you advanced administration rights to fix problems or help assist with a related IT issue. They probably give us more access to their systems than any other department. IT can be pretty protective because they don’t want things to get messed up,” Royal said.

As the skills of the biomedical engineering and IT departments grew closer, the personal relationship between members of departments also improved. Biomed and IT directors now meet on a monthly basis to discuss shared support issues, while managers meet regularly to discuss frontline cooperation, such as planning for device upgrades and system downtime.

“Building up IT knowledge really put a lot of wind in our sails, both with the clinical team and with the IT team,” Royal said. “They trust us with taking over more IT-related systems that might have a medical device component. The building of trust is, I think, a key part in our collaboration.”