Creating a Rural Record

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by Kimberlee Snyder, PhD, and Patrick Paulson, MS, JD

Researchers share the results of a small consortium's experiences bringing an electronic record to a rural community.

Dedicated to improving the quality of healthcare for patients and the community, faced with increased competition from two large healthcare systems located an hour away, and seeking to attract new healthcare professionals, a local healthcare community recognized the need to reinvent its healthcare information system.

It did so with an ambitious five-phase implementation based around an electronic health record system supported by an application service provider (ASP). In particular, the project illustrated the importance of good organization and the difficulty of choosing the best hardware before staff can become familiar with the incoming system.

Five-Phase Plan

Software companies historically have concentrated on providing solutions for larger metropolitan hospitals and healthcare facilities. With the advent of the Internet and the reduced cost of high-capacity bandwidth, that began to change. Vendors realized that no matter the size of the facility, approximately 80 percent of the healthcare application's core functionality is the same, while the remaining 20 percent can be customized for an individual client. Creating and deploying an information system using an ASP model maximizes code base reuse, while at the same time offering smaller clients access to technology and advanced applications normally beyond their financial reach.

A rural healthcare consortium took advantage of this change as it began planning an integrated information system that included an electronic record, computerized physician order entry, and 22 individual applications. The three consortium members-Winona Health and two clinics-serve the Midwest community of Winona, MN, and the surrounding rural area, a combined population of approximately 50,000.

The consortium divided the project into five phases. The first phase focused on two small clinics, one with approximately 6,000 active records (part of Winona Health and located in another town) and the other with about 22,640 active records. Phase 2 focused on Memorial Hospital, a 99-bed acute care facility, and phase 3 focused on a third clinic, a multispecialty group practice.

Phase 4 implemented Winona Health Online, part of the integrated information system connecting the consumer community and the medical facilities through an Internet portal. The final phase covered the implementation of the order-entry module, medicine integration module, and financial services module.

The project was planned and the ASP vendor selected in 2000. Implementation of the first two clinics occurred in 2002; the hospital in 2003, and the final clinic in 2004. The order-entry module implementation began in 2006.

Organization

A senior manager from the hospital was assigned as the project leader, which was a key component to the project's successful management. His responsibilities included working with the application software company and its project leader and coordinating and managing all committees for the project.

Committees focused on key areas and groups. The steering committee consisted of the project leaders from the hospital and software company, two physicians who represented the clinics, an IT manager, and representatives from major hospital

departments (e.g., patient care and human relations). Subcommittees handled the detailed tasks of designing and implementing the endeavor. Later in the project, a change-process committee was formed to facilitate any necessary continuous improvement projects and system upgrades throughout the healthcare system.

Administrators and IT personnel are often faced with a variety of reactions when implementing new technology, ranging from enthusiasm and acceptance to reluctance to all-out resistance. Research has provided few insights into why these different attitudes exist and how best to address them to optimize and smooth systems implementations.

It is especially critical, however, to establish physician buy-in at the planning stage of the project. From the start of the Winona project, physicians were involved in the design of the specialty views of the electronic record, served on committees (both steering and sub), and were involved in all other aspects of the project.

Hardware Decisions

The success of a project to a large extent also depends on user buy-in of the hardware. For this reason, the project team considered it crucial to solicit user input. The hospital had a consultant conduct an assessment focusing on point-of-care and mobile computing issues. The point-of-care assessment developed a list of the recommended hardware for a given area based on room size, existing hardware, and other attributes. This report was given to all department heads to review with physicians and staff members.

There was not a lot of response from the hardware assessment. As a result, two different “hardware fairs” were held within a six-month period. The fairs gave staff the opportunity to examine and test hardware before any purchasing decisions were made.

Staff reviewed portable carts, wireless tablets, and thin-client touch-screen computers. The application service provider suggested a list of certified hardware that was known to work well with its system. Other hardware items were added based on the hospital technical staff research and recommendations.

Lessons Learned

Even after the effort put into hardware selection, there were problems with the choices made. The main reason was that staff had been tasked with reviewing hardware before they had any experience with the new system. No one had been tasked with reviewing how the job was currently being done and considering what process changes might be needed to incorporate the new technology.

In effect, personnel were evaluating hardware to be used on an information system they had not yet used. They did not yet know how they would be interacting with the system, what screens would look like, and other issues such as what options there might be for data entry.

Mobility Overrated?

One major issue was the option of portable wireless laptops. It soon became clear this was not the best choice. Personnel found it difficult to view the information on the screens. Tracking down laptops became an issue, because staff had a tendency to just lay them down anywhere. In addition, the clinics were small, so portable computers just did not make sense. In October 2002 the laptops were replaced with 17", 1024 x 768 pixel, thin-client computers. These thin clients were installed in each examination room.

Based on these experiences, the next generation of hardware will be selected by seasoned personnel who have had time to learn how to use the new system. The monitors will be 17" LCD panels with 1024 x 768 pixel resolution. This ensures adequate screen real estate and minimizes the amount of vertical scrolling required. Screens are designed so that there is little, if any, horizontal scrolling. Personal digital assistants can be used for obtaining some reports, but not for data entry.

The project team also studied hardware use patterns. For instance, the family birth and the intensive care units make use of the portable carts to enter medical data at the point of care. Family birth does this due to the large amount of information that

needs to be gathered; taking voluminous notes for later transcription is too burdensome. By contrast, the intensive care unit does not have the same issue, because it does not communicate with the patient at the time of data input.

Any new hardware will be subjected to two months of limited use to investigate and resolve hardware or software issues. In the past, widespread issuance of new equipment uncovered problems with items such as handoff between wireless access points and trouble with USB mice working correctly on the battery-powered carts. Hospital personnel do not enjoy beta testing the equipment; they want to concentrate on getting their work done.

New Technology, New Processes

The second major issue centered on the Internet connections. Given that the information system and actual patient data are housed on a dedicated server at the service provider's headquarters in Kansas City, reliability and availability of the system are extremely important.

The hospital did not have an issue because it is located in an area with easy access to fiber optic connections. But one of the clinics had to install a high-speed T1 connection (capable of supporting the transfer of up to 1.544 Mbits of data per second). The other clinic worked with its local phone company to install a dedicated data-grade phone line (capable of supporting the transfer of up to 56 Kbits of data per second) for its specific use.

The third major decision concerned which information from the paper medical charts would be incorporated into the new system and how long paper charts would be kept easily accessible. As medical personnel realized that they would be working primarily from the electronic record, they decided that they did not want to rely on the old paper records. They discussed which medical information from the paper records would absolutely be needed on the new system.

It was decided that all surgical and disease-related information, any major problems, allergy information, and immunizations would be keyed into the new electronic record. Within two years all paper charts will be moved to storage.

Finally, processes required revision in order to incorporate the technology into the healthcare delivery system. For example, to protect patient privacy, medical personnel had to remember to log off before leaving the examination room. In addition, personnel had to make sure they did not get so focused on the computer screen that they forgot to focus on the patient. To facilitate this, computer screens were positioned in such a way that staff did not have their backs to the patients.

On the hospital floors, medical personnel had to rethink their process for patient assessments. Previously staff wrote on slips of paper then put the assessments into a paper record, Kardex, and computer. Using Lean improvement techniques, staff sought a new process with an optimal sequence of actions that, once begun, would be completed without interruption.

Personnel now input assessment information directly into the computer in real time by way of a portable computer cart. This is eliminating duplication, error, and decreasing time to complete paperwork. Further Lean projects are looking to improve process steps and better use of the technology.

Breaking Down the Silos

The most important result of implementing this new healthcare information system is that silos are being broken down. This is occurring as training classes and normal work interactions are allowing personnel to discuss and share their individual work experiences.

Staff are learning that what they do affects the interactions between other departments, clinics, the hospital, laboratory, and pharmacy. Results from an internal survey of the hospital and clinics show that 55 to 58 percent of staff felt that overall their job has improved with the new electronic healthcare information system.

A key factor in the ongoing success of a project of such scope is the continuous and vocal support shown by high-level healthcare administrators. In addition, the willingness of all employees to change how they do their jobs to smoothly incorporate the technology through Lean process improvement training will allow for the creation of improved processes. This would not have been possible before the advent of the new electronic record system.

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Kimberlee Snyder *(ksnyder@winona.edu) is professor of operations management in the College of Business at Winona State University, MN.* ***Patrick Paulson*** *(ppaulson@winona.edu) is professor of management information systems in the Management of Information Systems and Operations Department at Winona State University.*

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