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Lessons from Abroad

A Finnish hospital district successfully automates high-acuity care as part of a nationwide electronic patient record initiative.

By Christopher Grover

Perhaps the most challenging and potentially rewarding information technology project facing hospitals today is the automation of the high-acuity cluster, which includes operating rooms (ORs), the post anesthesia care unit (PACU) and the intensive care unit (ICU). The largest hospital district in Finland is in the midst of automating these complex and information-intensive areas as part of a nationwide electronic patient record (EPR) initiative.

In Finland, the responsibility for organizing health care lies with the 431 municipalities across the country. Those municipalities can provide primary health care services independently or join with neighboring municipalities in joint municipal boards. Hospital districts formed by municipalities are responsible for arranging specialized medical care. Each municipality in Finland belongs to one of 21 hospital districts.

In 2002, in an effort to improve the quality, continuity and cost-effectiveness of care, Finland passed legislation requiring medical records to be stored in EPR systems by the end of 2007. The EPR systems are being implemented regionally. Each hospital district must adhere to open standards for interoperability; include a minimum EPR data set; and meet data structure, coding requirements and national guidelines for data safeguarding.

As part of the nationwide EPR initiative, the Hospital District of Helsinki and Uusimaa (HUS), the largest hospital district in Finland, chose to begin automating its high-acuity departments in 2004 as part of its EPR program. The automation process at HUS has been successful thanks to a number of factors. By examining HUS' path, U.S. hospitals can learn valuable lessons about high-acuity automation.

Importance of automation

HUS serves more than 1.4 million people through 23 hospitals, including Helsinki University Central Hospital and five regional hospitals. The district's hospitals provide 567 high-acuity beds.

Automation of OR, PACU and ICU clinical information is important to HUS for several reasons. Janne Aaltonen, MD, project director for HUS, outlined the four primary reasons for automation:

- The high-acuity units are extremely information-intensive, so automating record keeping has the potential to greatly improve productivity.
- A computerized record can improve quality of care and facilitate more timely decisions. For example, integrating real-time blood pressure, heart rate, fluids in/out and lab result data into an easy-to-understand display can help a physician quickly see if a patient is hypovolemic.
- The data collected by the system can be used to analyze current procedures and develop better, more productive clinical processes. In addition, the collected data can be used to analyze whether conclusions of scientific research hold true in practice.
- Perioperative information is an essential part of the patient record, both clinically and legally, and a true hospital-wide EPR requires information to be available in electronic form.

After determining the benefits of high-acuity automation, HUS established project goals and parameters. Many of those goals were based on the Finnish government's objectives for the national EPR: to help professionals deliver effective, safe, seamless and high-quality care; to provide managers with tools to plan better delivery of services; and to make better quality health information available to health care providers. HUS-specific goals and needs were also taken into account.

HUS then conducted an extensive review of automation systems in order to choose a system that would meet the primary needs of the hospital district and the nationwide EPR requirements. The HUS board selected the Picis CareSuite product to automate the clinical documentation and workflow within the anesthesia, recovery and intensive care environments throughout the hospital district. "Picis was selected because the company was proven and had references from large sites, including the Mayo Clinic and others. We felt comfortable they could successfully handle an implementation of our size and scope," said Aaltonen.

Aaltonen added that the system's ability to transparently integrate data throughout all perioperative environments was an important factor in the district's selection. "Since most of our hospitals have both ORs and ICUs, it was crucial to have a system that would operate without any barriers throughout high-acuity areas. In some environments, such as heart surgery and neurosurgery, nearly

100 percent of patients go from the OR to the ICU. In addition, ICU patients may be transferred to the OR, either for re-operation or to have operative treatment for an initially non-operative admittance," he said. Having a complete record is necessary in order to transfer patients between the OR and ICU without losing the benefits of an automated system.

Phased installation approach

The automated anesthesia and critical care system is being installed in phases at HUS. The system is currently installed and operating at Meilahti Hospital, which takes care of all heart and lung transplants in Finland, and TI Hospital, one of the largest trauma hospitals in Europe. A third hospital site will go live in October 2006. Once the phased implementation across the district is complete, the automated systems will be installed in all 15 HUS hospitals that provide operative treatment and will include nearly 600 workstations.

The high-acuity automation system is being integrated with the centralized district-wide patient administration system and laboratory system, as well as numerous medical devices, to automatically gather data. "Laboratory results represent important clinical information in the ICU setting. They can also be important for certain operations, for example, open-heart surgery," said Aaltonen. HUS hospitals can now see all lab results in real time and integrate that information to physiological parameters, such as KREA and UREA results on urine volumes, and CRP on body temperature. Past lab results are also available to doctors in the OR.

Hospitals should choose a system that can be comprehensively parameterized and configured, and easily integrated to clinical processes, said Aaltonen. He cautioned, however, that new tools shouldn't just be configured to fit into earlier processes during the installation phase. "Processes should be refined to utilize the new tool optimally," said Aaltonen. While redefining processes is not an easy task, especially in specialized health care, leadership and vision can make the task achievable, he said.

System benefits

By using a step-by-step process, HUS was able to quantify the need for high-acuity automation, define goals for the project, assess available systems and implement the system in a phased approach. HUS has a successful EPR for anesthesia and intensive care; the EPR helps support clinical decision making and analyzes data to inform the development of new processes.

The HUS high-acuity automation project has yielded a number of benefits for patient care. HUS has seen an improvement in the quality of perioperative care for individual patients, an increased use of treatment guidelines and standardization of treatments, all of which help reduce mistreatments.

HUS also discovered that record-keeping automation helps focus nursing work more effectively and that the nursing staff can better attend to things that can't be automated when they use the automated system, said Aaltonen. An automated system also gives HUS the tools to analyze, modify and unify treatment protocols. "We can produce a statistical analysis of what's important and where we have variable behavior within our personnel," said Aaltonen.

In addition, the "problem-oriented" output of information has proved extremely beneficial. Problem orientation means that data is logically integrated and presented in graphical form. "We have learned that input of data should be object-oriented to make it easy to collect and the output of data should be problem-oriented to facilitate better decision-making," said Aaltonen.

Aaltonen feels that one of the most exciting benefits of the project is availability of system data for research and re-engineering. "We have dramatically improved our overall research efforts. To date, we have used the automated high-acuity information as a clinical database in five scientific research projects. In addition, we are using the data to internally analyze different clinical settings," he commented.

Future plans

HUS' automation project has become an integral part of its EPR program. When the Finnish nationwide archive is built, HUS' high-acuity data will become part of the e-health records that are available nationally to clinical staff and patients, thereby extending and expanding the benefits of automation.

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