

Coming Soon: Operating Room of the Future

A group of clinicians and engineers are fusing technology and medicine to implement their vision of the operating room of the future (ORF), a patient zone of safety designed to deliver better and more cost-effective surgical care.

The ORF is being developed at Massachusetts General Hospital in Boston (MGH, USA; www.mgh.harvard.edu). The main focus of the new operating room is a data-integration system that provides a steady, constantly updated stream of information about the patient and the procedure. This information is displayed on a large 42-inch screen, visible to everyone in the OR. The screen is linked to various databases, including one that pulls up information on the patient.

For example, if a patient is allergic to latex or has a history of low blood pressure, these conditions will show on the visual display, where everyone in the OR can see them. The display will be context-sensitive, showing key patient information as the patient moves from preoperative care to intraoperative care, to closing, and then to postoperative care. During an operation, the display will enable everyone involved to see what procedure is underway, how the patient is doing, and who is in the room, thereby improving communication among the various members of the surgical team. When the procedure is finished, the display will highlight various safety checks as they areas they are completed, increasing patient safety. All information will be archived for subsequent retrieval and analysis.

“Operating rooms are busy, dynamic environments, with the potential for different staff to be present at different times in a case,” explained Marie Egan, R.N., M.S., technology staff specialist and project manager for the new MGH operating room. “A staff member entering the ORF will be able to see, at a glance, all the pertinent data relevant to that patient and view the progress of the case.”

MGH is an ideal place to roll out the new technology. The medical center is the original and largest teaching hospital of Harvard Medical School (also in Boston). It conducts the largest hospital-based research program in the United States, with an annual research budget of more than US\$ 450 million, according to hospital officials.

The ORF is a cooperative project, linking several organizations. One is LiveData, Inc. (Cambridge, MA, USA; www.livedata.com), which is helping to deploy the integration technology. The company recently won a Small Business Innovation Research Grant of US\$ 800,000, through the Telemedicine and Technology Research Center of the U.S. Army, to continue its work on this integration of medical data.

“Although data integration from disparate sources is something that clinicians do all of the time, the time scale in the OR can be very compressed,” noted Warren Sandberg, M.D., Ph.D., co-leader of the project. “Therefore, integrating big parts of the continuous data stream and making it visible on a single display for everyone to see and use is a holy grail of the ORF.”

The Center for Integration of Medicine and Innovative Technology (CIMIT, Boston, MA, USA) has been driving the adaptation of the technology. CIMIT is composed of medical professionals from the Charles Stark Draper Laboratory of the Massachusetts Institute of Technology (MIT, Boston, USA) and the five teaching hospitals of Harvard University

(all in Boston). CIMIT officials say the ORF will be one of the first ORs in the country to use this type of data integration in the operating theater.

“The operating room of the future has been one of CIMIT’s hallmark collaborative programs with industry,” observed Dr. John Parrish, director and co-founder of CIMIT, and a physician at MGH. “Using state-of-the-art technology, we are delivering better, safer, more cost-effective care to our patients.”

The launch date for the new operating room is set for sometime in September 2005. “The hardware is in place and the live feeds of data are ready to go,” said Jeffrey Robbins, CEO of LiveData. “Mass General will make the final decision on the exact date, but patients can’t afford to wait for the technology like this that brings all their data together.”