



The Computerworld Honors Program

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Final Copy of Case Study

Year:

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Status:

Laureate

Organization Name:

Massachusetts General Hospital

Organization URL:

<http://www.massgeneral.org/>

Project Name:

Perioperative Workflow Redesign

Please select the category in which you are submitting your entry.

Collaboration

Please provide an overview of the nominated project. Describe the problem it was intended to solve, the technology or approach used, how it was innovative and any technical or other challenges that had to be overcome for successful implementation and adoption. (In 300 words or less.)

In any operating room (OR), massive quantities of data are produced and consumed as each patient is treated. Data passes through a variety of medical therapy and monitoring systems. These systems are silos of information and do not communicate with others. Monitoring the diverse systems and cognitively integrating critical information diverts care givers from patient care and can degrade patient safety. Massachusetts General Hospital (MGH) and LiveData, Inc. engaged in a technological and clinical collaboration to develop patient-centric communication tools designed to promote teamwork, enhance operational efficiency, and support a culture of safety. MGH served as the brain trust for the project, delivering clinical and workflow expertise. LiveData provided experience

in real-time integration, data analysis, and visualization. MGH's Perioperative Workflow Redesign project integrates data streams from OR physiological monitors, anesthesia records, procedure process records, and hospital information systems to create a single patient-centric view on one screen. It layers on top of and integrates information from electronic medical record systems into the patient view. The large, wall-mounted screen automatically displays complete patient information so every member of the care team can view and reference critical data in real time. Workflow automation tracks and measures OR processes to improve efficiency. Reminders and alerts, including drug and device administration timers, involve every member of the team in improving patient safety and care. Each partner brought innovation and creativity to applying technology to support clinical best practices, streamline workflow, and increase situational awareness in a high-throughput environment, creating a safe, efficient, patient-focused OR. Technological challenges: Pulling and integrating data from diverse systems and information sources. Developing interactive data displays to support patient-centric views and engage the team. Identifying critical pre-, intra-, and post-operative workflow best practices to optimize efficiency. Clinician adoption and engagement.

When was this project implemented or last updated? (Please specify month and year.) Has it incorporated new technologies and/or other innovations since its initial deployment? (In 300 words or less.)

In September 2011, we implemented the MGH Perioperative Workflow Redesign project in MGH's Lunder Building in all 28 procedure and operating rooms. The state-of-the-art Lunder Building anchors the campus connecting advanced inpatient and outpatient services. The current MGH project was built from ideas explored in the Operating Room of the Future (ORF) living laboratory project. Launched in August 2002 in partnership with the Center for Integration of Medicine and Innovative Technology (CIMIT), Telemedicine and Advance Technology Research Center (TATRC), and MGH, the ORF explored new technology platforms and systems of care for performing minimally invasive surgical procedures. The collaboration of MGH and LiveData has delivered: Automated workflow processes supporting patient safety and workflow efficiency. Real-time interactive displays from OR devices and hospital information systems. Patient tracking and management systems throughout the OR. Clinical decision support, strengthening best practices and patient safety initiatives. Measurement tools to track process improvement and clinical compliance.

Is implementation of the project complete? If no, please describe the project's phases and which phase the project is now in. (In 300 words or less.)

MGH's Perioperative Workflow Redesign has completed several milestone projects or phases. While each project is complete in its own right, the redesign continues to be a collaborative effort leveraging the creativity and expertise of clinicians who enthusiastically embrace the technology and identify ways to expand using the technology to improve patient care, management, and safety. Project phases completed and implemented include: Creating a real-time situational awareness display for the "OR of the Future" initial project. Implementing the PACU Dashboard in 2008. Rollout across all MGH ORs with implementation in all 28 procedure and operating rooms in MGH's new Lunder Building, opened in September 2011. MGH clinician-initiated expansion projects currently planned include: Implementation of automated surgical time out, a key surgical safety compliance requirement of CMS (Centers for Medicare and Medicaid Services), the World Health Organization, and The Joint Commission, the nation's oldest and largest standards-setting and accrediting body in health care. Introduction of Rapid Recovery for Arthroplasty patients where post-surgical treatment plans for patients headed home for recovery include specific OR protocols and queuing post-operative services to enhance patient workflow and quality of care. Potential use of real-time data displays outside the OR in the perioperative suite, to manage workflow and communication including OR scheduling, room readiness, patient status and location, and updates in family waiting rooms. Enhancements in mobile clinical management with access to perioperative information across the hospital's secure network to desktops, laptops, or iPads.

Please provide at least one example of how the technology project has benefited a specific individual or organization. Feel free to include personal quotes from individuals who have directly benefited from the work. (In 300 words or less.)

OR efficiency: Turnaround of operating room (preparing a room after completing a surgical case for an incoming case) has been gradually reduced in recent months, with the operating room monitor clearly displaying the turnover time as the team moves from case to case. PACU Director: "Every time I have a conversation with PACU nurses about the dashboard, they light up. They're no longer at the mercy of what rolls into their slot, of getting information only when caring for the patient. I know if I'm getting a patient who has been rock stable throughout surgery. If I'm seeing labile blood pressure, I know there's a possibility this will occur in the PACU. The sooner the PACU nurse can hang an infusion, the sooner the OR staff can take the first set of vital signs, confirm patient



stability, and make the hand-off." Chief of General Surgery: "I miss it when it's not working."

Would this project be considered an innovation, a best practice or other notable advancement that could be adopted by or tailored for other organizations and uses? If yes, please describe that here. (In 300 words or less.)

This project is an innovation in applying integration and real-time visualization and display to an environment where current clinical and workflow practices are individually and manually managed. Even Electric Medical Records (EMR) systems being installed to improve communication and patient safety are only "heads-down" database data-entry applications, good for record keeping but not designed as a "heads-up" operational traffic light system for surgery. This environment typifies why most hospitals can benefit from re-thinking OR workflow and data integration. In the current state, surgeons, anesthesiologists and nurses focus on individual responsibilities. Too many screens of information and pieces of equipment demand singular focus. All of the separate activities occur in a high throughput environment. Increasing situational awareness, allowing all team members to monitor and react to all data, improves focus, efficiency, and outcomes. We found it easy to apply the patient-centric, focused data and display solution to operating rooms, and it can be extended to other acute care environments, including post anesthesia care units (PACU), intensive care units (ICU), and other procedure suites such endoscopy, cath labs, etc. LiveData integration and visualization technology has been used in the electric power industry to monitor and manage generation, transmission, and distribution systems. It can be applied to any environment where massive amounts of data need to be captured and consolidated for real-time monitoring, analysis, and reaction.

If there are any other details that the judges should know about this project, please note them here. (In 300 words or less.)

In 2004, the Perioperative Workflow Redesign project benefited from a U.S. Army Telemedicine and Advanced Technology Research Center (TATRC) issued SBIR (Small Business Innovation Research) award to LiveData to fund this pioneering development work.