Breaking the Medical Error Chain in Operating Rooms through Automated Location Tracking and Alerts

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Massachusetts General Hospital has 50 contiguous ORs. In a complex, large OR suite, controlling patient flow is critical to managing workflow and creating the safest possible environment for patients. We reasoned that one way to achieve both efficiency and safety gains was to develop a system that could automatically detect "patient-in-wrong-location" events. Our proof-of-concept demonstration combines active-radio frequency identification (active-RFID) patient location with automatic process modeling.

Goals:

1. To sensitively and specifically detect the location of "dummy" patients
2. To accurately and quickly alert personnel to wrong-location events

Our proof-of-concept demonstration was within four adjacent ORs, their local patient prep areas and connecting hallways. For each OR, we ran 10 trials for each of the three possible "wrong" ORs. Patients were scheduled into a specific OR using prototype process modeling software. Next we checked in the "patient" to start the system. The system contains a simple "expected vs. actual" process comparison and a notification process, all the elements needed for an automated process monitoring and control system.

Results:
1. The system detected all wrong OR events and all wrong OR locations were correctly assigned, which puts sensitivity and specificity at 100 percent
2. Alerts were sent within a pre-determined time period based on including an auto-paging function
3. During the testing period, an actual 'wrong location' event was detected when an actual patient was taken by the anesthesia team to an unscheduled area for preoperative preparation

The demonstration proved that an innovative application of current technology can automatically collect sufficient data to (1) remotely monitor a complex process such as patient flow through a hospital, (2) provide decision support based on pre-defined rules and (3) automatically notify process managers in real time when errors are detected.

By November 2005, we expect to be using this approach to enhance the safety of actual patients as they move through the perioperative process.