OR SUITE AND PERIOPERATIVE SAFETY

DEVELOPING A ROADMAP FOR ACTION

The United States Army Medical Research and Materiel Command through its Telemedicine and Technology Research Center (TATRC) has embarked on a five year research agenda devoted to the Operating Room of the Future. The research agenda has five major elements, first among them being to enhance patient safety. TATRC wishes to advance the patient safety agenda and to do so needs a clear roadmap for its partners and collaborators.

In data from the American Hospital Association, 17 –30% of patients had one or more serious events. Convert this to a typical 350-bed community hospital with about 14,000 admissions and 5,400 surgeries and there will be 4000 serious adverse events each year. By rank order in this hypothetical American hospital the following adverse or unexpected events will occur: 884 patients will have an adverse drug event, 816 a nosocomial infection (i.e., an infection acquired in the hospital), 696 a procedural complication, 544 an unplanned readmission, 408 a decubitus ulcer, 299 will die, 204 will have a fall and 163 will have an anesthesia complication. (Combining the procedural, anesthetic, surgically-related nosocomial infections and the surgically-related medication errors leads to the conclusion that the perioperative environment is the location for the greatest number of adverse events.)

The University Hospital Consortium began a self reporting system a few years ago. Currently, 60 academic hospitals have recorded 71,000 events of which 6219 (8.7%) occurred in the OR environment. The most common errors were those related to a procedure (2200), a complication of a procedure (600), a break of skin integrity (180), an equipment issue (400) or a medication error (200). [Values rounded] Those related to the greatest ultimate harm were: skin integrity and complications of procedures.

What is to be done to prevent these types of errors from occurring? The Institute of Medicine in a landmark publication in 1999 wrote that as many as 44,000 to 98000 Americans die as the result of errors in hospital each year. These are incredible numbers and many have disputed them. (A more recent study reported in July, 2004 suggested that nearly 200,000 Americans die each year of medical errors.) But even if only half or ten percent occur, that is way too many. The IOM report was entitled “To Err is Human,” a very appros title since that is the basic problem. Humans make mistakes. Humans will continue to make mistakes. Well-educated and well-trained humans will make mistakes. Humans that double check will still make mistakes.

The presenter has interviewed surgeons, anesthiologists, nurses, hospital executives; reviewed literature; talked to leaders at organizations such as the University Hospital Consortium, JCAHO, Health Care Advisory Board and others. This has lead to a developing white paper on the predisposing factors to perioperative errors, an understanding of the errors that occur and some initial thoughts on approaches to enhance patient safety. Although still in an early stage of development, what follows are draft

thoughts on improving safety and what TATRC's partners and collaborators might do to engage this issue.

A successful approach to improving the safety of the OR and its environment will depend on attention to creating an environment of safety and then focusing on both human factors and technology factors.

Environment of safety refers to the commitment of the CEO and Board to safety, to the needed investments, to a nonpunitive environment, and to a reporting and analysis feedback system

Human factors must include leadership, management, teamwork, information transfer, training and the creation of a culture of safety.

Technology factors can include: surgical/operating room information systems; video capabilities, identification devices for patient, staff, equipment, instruments and medications such as bar-coding and RFID; simulation approaches and robotics.

Information systems include not only the electronic medical record but the surgical system, the anesthesia system, the supply chain system and the PACS system – all interconnected, wireless, easy to use, with built in prompts and alerts, with built in "knowledge" and built in surveillance.

Video includes in room cameras for distant command and control of the OR suite, light source cameras to train, teach and record data and for teleconsulting and PACU/ICU cameras for electronic monitoring at a distance.

Identification devices – barcode and RFID – are used to track equipment, supplies; to identify the patient and the intended site of operation and procedure; to track staff and to record, document, and bill and order post use of medication or device.

Simulators can enhance safety by training individuals for a particular procedure and for use of particular devices; by allowing the surgeon to preplan the best approach and procedure for the particular patient; to rehearse surgery and to provide team training in contingency planning and crisis management.

Robotics can enhance patient safety by, at least, integrating patient-specific data; allowing less invasive surgery (e.g., CABG), allowing more accurate surgery (e.g., craniotomy); developing preplanned and rehearsed surgery; and having built in alerts and detectors.

In summary, the perioperative environment is a high risk area with high velocity, high complexity and high stakes; OR errors lead to disproportionately more harm than errors elsewhere in the hospital. There is a need to address both human factors and technology factors when designing patient safety initiatives. Human factors include especially

leadership, training and teamwork. Technology approaches include information systems, identification mechanisms, video, simulators and robotics.

TATRC is anxious that its partners and collaborators actively engage in research to enhance patient safety in the OR and the perioperative environment.   April, 2005