

Transportable Simulation-Based Training Curriculum

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Abstract

There is an ethical imperative to better prepare our resident physicians for clinical challenges and protect our patients from harm. Graduate medical education has traditionally placed limited attention on human factors training to promote patient safety. Human error has long been recognized as a significant component of error in both aviation and medicine. Despite this belief and the national patient safety momentum initiated by the IOM report, most resident training programs have not changed significantly, with the exception of the mandatory work hour restriction. Cultural change is occurring in medicine and it is essential that the human component be recognized as a system along with technology as an important factor in helping hospitals become high reliability organizations.

The Accreditation Council of Graduate Medical Education (ACGME) Outcomes Project has required more comprehensive assessment of resident physician competency yet does not provide the methodology and tools to achieve this goal. Objective structured clinical examinations (OSCE) are considered by some medical educators to be the criterion standard, however it cannot be applied to high risk or certain procedural cases. High fidelity simulation had therefore been suggested as a training and assessment method in many of the competency areas (patient care, communication and systems-based practice), although limited literature was available until recently to support reliability or validity of assessment. Investigators in this program accordingly focused on development of reliable assessment tools and valid content for skills and knowledge competencies. [Of note, it was not possible to compare competency assessment in the

simulator to other suggested or proven methodologies (concurrent validity) at the level of program funding obtained.]

Simulation

Realistic whole-body high fidelity simulation has clearly emerged as a new educational model to revise the old “do one, see one, teach one” culture of medicine. Simulation offers a method to assess performance in low frequency but high risk situations in an environment which closely replicates daily clinical work. The attached demonstration program materials were developed as a transportable and modular simulation-based curriculum to provide patient safety and human factors training for resident physicians at teaching hospitals caring for Medicare and Medicaid patients. The specific areas of focus are on: 1) Clinician recognition of cognitive biases which lead to diagnostic error, 2) Teamwork in emergent resuscitations, 3) Authority gradients and cultural change (e.g., medical error disclosure), and 4) Transitions in care. By being exposed to this curriculum’s training and formative assessment, physicians are anticipated to be better prepared for successful navigation through the complex systems involved in the practice of medicine.

Executive Summary

Patient safety has received significant press and funding for advancement since the landmark IOM report in 1999. However, the difficult process of fostering cultural change in medicine requires that new educational methods, curriculum and assessment tools are instituted at the earliest possible opportunity in medical education. The project faculty had previously researched the collaboration of simulation and didactics for teams in the emergency department ([view article online](#)), which encouraged them to broaden the scope of simulation-based patient safety education. This demonstration project identified educational deficits in Graduate Medical Education (GME) and employed the expanding field of medical simulation to augment and expand traditional resident teaching.

This endeavor is in keeping with the priorities of the Accreditation Council of Graduate Medical Education (ACGME) Outcomes Project initiated in 2002 to increase emphasis on educational outcomes in 6 domains to improve resident education and ensure competency in the independent practice of medicine. To this end, the project has developed an introductory simulation-based curriculum in high priority patient safety topics not routinely covered in GME but essential for improvement of the reliability of medical care delivery.

Results

The project investigators, working with domain experts in patient safety, identified topics well-suited to teaching in a high fidelity medical simulation environment. The patient safety topics of most interest and potentially greatest impact for improved performance and cultural change were identified as the following: teamwork training, critical thinking and decision making, medical error disclosure, authority gradients and transitions in care. Medical simulation scenarios accompanied by traditional didactic materials for priority topics were developed, tested and implemented into GME education for a diverse group of medical and surgical specialties. Diverse external patient safety experts in specific high priority areas contributed didactic material to augment material created by the project. Additionally, this project was successful in combining its efforts and funding with internal funding through the investigators' institutional risk management department.

During the project period, the Rhode Island Hospital Medical Simulation Center successfully served as an agent for change to increase cooperation among several medical specialties and to develop a multi-disciplinary curriculum for patient safety. Residencies involved in this project included Emergency Medicine, Pediatrics and Pediatric Emergency Medicine, Internal Medicine, Radiology and Trauma Surgery. Two particular areas of close collaboration included pediatric residents and internal medicine residents with a clinical focus on airway management, acute resuscitation skills and teamwork.

Participant surveys and performance data of residents and teams were collected and uniformly showed high levels of acceptance and satisfaction with simulation-based medical education. While measurement of actual improvement in patient outcomes was not possible, surrogate measures of performance were collected. In a program jointly supported by this project and the study site's risk management department, pediatric residents demonstrated improvement in crucial skills such as airway and resuscitation management, team performance and overall competency.

Dissemination of our material has been completed locally through web-hosting on the program site's simulation facility webpage. The project faculty has presented abstracts at various scientific meetings nationally and internationally; peer-reviewed manuscripts have been published, while materials have been submitted to the American Association of Medical Colleges case bank .

Didactic and Simulation Modules

The Transportable Simulation-Based Training Curriculum is constructed as an introductory, modular, self-contained advanced medical simulation (SIM) curriculum focusing on patient safety and human factors in healthcare providers.

Component modules cover the following areas: Cognitive Error, Teamwork and Communication, Authority Gradient and Cultural Change, and Transitions in Patient Care. These elements have been repeatedly determined to contribute significantly to preventable medical error—the included modules are designed **to educate** and **to evaluate** healthcare providers of all levels in these critical patient safety issues.

- **Critical Thinking and Decision Making**
This module provides a PowerPoint slideshow and simulation case to illustrate select principles of clinical decision making and the cognitive biases to which clinicians are vulnerable.
- **Teamwork and Leadership Training for Crisis Management**
This module contains a PowerPoint slideshow and simulation case to illustrate the basic concepts of teamwork and its impact on improved performance and patient safety.
- **Medical Error Disclosure**
This module features a PowerPoint slideshow and simulation case to illustrate the fundamentals of medical error disclosure and how improved communication with patients will help foster the transformation of our medical culture.
- **Transitions in Patient Care**
This module contains a PowerPoint slideshow and simulation case to illustrate the basic concepts of transitions in care of patients between health care providers and the potential for threats and opportunities for recovery which arise on a daily basis.

The curriculum identifies certain ACGME-designated competency domains as being amenable to assessment by SIM. Separately, *probe* instruments meant to evaluate learner retention of module teaching points and to serve in larger-scale validation studies are specified. The curriculum **presents these competency domains and investigative probes** within each module SIM case.

Through participation in the learning exercises, the project attempts to promote and to ingrain a culture of safety in the participants. The modules have been compiled into a stand-alone package for dissemination as a **ready reference** and for future collaborative research efforts.