Technology applications in medical education have greatly facilitated student motivation, learning, and assessment. The University of Pittsburgh School of Medicine has pioneered development and utilization of simulation technology. Our goal is to provide students with hands-on deliberate practice without posing any risk to patients.

COURSE TOPICS AND STRUCTURE

Faculty were encouraged by the Curriculum Committee and administration to embrace these new technologies. Implementation and assessment were supported by the University and outside sources. Overall, every student spends at least 25 hours in learning activities using high-fidelity, whole body simulators, and an additional 27 hours using task trainers. There are many additional hours spent with standardized patients, virtual patients, etc. Four-fifths of students have additional experiences using high-fidelity simulators during their elective courses (an average of 40 additional hours per student).

Specific examples of simulation experiences for every student

Clinical Procedures Course – A half-day at the WISER Simulation Center developing airway management skills, plus sessions on vascular access, urinary catheterization, and lumbar puncture using task-specific models.

Cardiac auscultation instruction using the HARVEY simulator.

CPR and automatic external defibrillator training, initial and re-training.

Adult Inpatient Medicine Clerkship – Four half-days at WISER on learning and assessment on acute cardiopulmonary conditions.

Surgery and Perioperative Care Clerkship, Anesthesiology – Four 75-minute simulation sessions at WISER on basic airway management and other anesthesiology skills.

Surgery and Perioperative Care Clerkship, Surgery – 90 minute session on trauma resuscitation and a 90 minute session on minimally invasive surgical skills.

Family Medicine Clerkship – Breast, pelvic, and prostate exam techniques on specific models.

Reactive manikin simulations – specialized case scenarios that vividly demonstrate the connection between basic science and clinical medicine, during the Fuel Metabolism course, in the renal and pulmonary segments of Body Fluid Homeostasis and in the week-long introduction to principles of Pharmacology course.

Virtual patient cases – used to highlight specific curricular points that students must encounter. The Pediatric Inpatient Medicine, Adult Inpatient Medicine, Combined Ambulatory Medicine and Pediatrics, and Family Medicine clerkships use the CLIPP, SIMPLE, and fmCASES virtual patient cases. Ophthalmology has recently created its own version for interactive problem solving in patients with common eye complaints for the Specialty Care Clerkship. During Anesthesiology segment of the Surgery and Perioperative Care clerkship, students use a screen-based pulmonary artery catheter insertion simulation created using vpSim, a simulation application that was developed at the University of Pittsburgh.
Elective experiences with simulation

Critical Care Medicine (110 students, 22 hours each) – Daily sessions at WISER on the spectrum of critical care techniques, crisis management, and specific clinical scenarios.

Emergency Medicine (46 students, 8 half-days each at WISER) – Sessions to develop knowledge and skills in acute care assessment and resuscitation, including ACLS.

Get Ready for Internship (91 students, 20 hours per student) – Sessions on the knowledge and skills essential for dealing with common and serious inpatient problems.

Anesthesiology (41 students, 10 hours per student) – Progressively advanced sessions at WISER on skills in anesthesiology subspecialties and emergencies.

Science of Resuscitation Integrated Life Science course (8 students, 15 hours) – Students learn cardiac resuscitation in the simulator setting as a complement to journal club, evidence-based medicine, animal laboratory, and human electrophysiology laboratory experiences.

IMPACT

Integration of simulation technology throughout the entire medical school curriculum has proven to be a valuable learning adjunct that has been well accepted by students and faculty. Utilizing the full spectrum of simulation technologies, from desk-top programs and low fidelity devices to state-of-the-art, high-fidelity, whole body simulators, permits optimization of teaching and learning approaches, matching of content and teaching modalities, and accommodation of student and faculty preferences. It has ensured student exposure to critical cases and content that would otherwise be only intermittently available and has filled gaps in the clinical curriculum. Additionally, several students have chosen simulation as an area of research based on their positive experiences throughout medical school.