

THE PATIENT EXPERIENCE, SIMULATED

Students experience the rigors of clinical situations and learn from their mistakes.

BY JOANNE BARKER

Dr. Mimi Pomerleau watched through a one-way mirror as a group of her nursing students completed initial assessment of a new patient. Victoria, who was in her 35th week of pregnancy, had arrived in a mock labor and delivery unit with several troubling symptoms: blurred vision, a headache, and high blood pressure.

Pomerleau, an assistant professor in the School of Nursing, had one eye on the patient's vital signs and the other on her students when Victoria cried out, "My head hurts, it really hurts!" The voice belonged to Logan Poole, a teaching assistant and a 2016 graduate of the Accelerated Bachelor of Science in Nursing program. She was talking into a microphone while maneuvering Victoria—a high-fidelity interactive manikin—through a medical simulation. On this particular day, Victoria was programmed with the symptoms of preeclampsia, a high-risk pregnancy complication. The phone next to Pomerleau rang—one of the nursing students calling for backup—and within seconds Pomerleau was gowned up and at the bedside. Just then, Victoria's first seizure began.

Welcome to the world of clinical simulation at the MGH Institute. Before they care for real patients and apply their classroom learning in a hospital or clinic, an increasing number of students undergo simulated conditions, experiencing the rigors of any number of clinical situations and developing skills only experience can teach.

The Institute has been infusing simulation within its academic programs for over 10 years, as have many medical schools and teaching hospitals. By using manikins as



INSTRUCTOR SOPHIE STODDARD (CENTER) OVERSEES NURSING STUDENTS ASSISTING THE HIGH-FIDELITY MANIKIN "VICTORIA" GIVE BIRTH IN THE ON-CAMPUS SIMULATION LAB.

Manikins are used by students to learn tasks and skills for specific parts of the body, such as listening to heart and lungs, connecting a patient to a ventilator, giving injections, and prepping for a lumbar puncture.

well as standardized patients (lay people trained to simulate individuals living with a broad range of health conditions), faculty expose students in every program to specific health problems and situations they may or may not encounter on their clinical education rotations. "Many of our students won't see a patient having a preeclampsia seizure during their clinical assignments, but they need to know what it is and what to do," says Pomerleau. "Using manikins, we can make sure they will have that experience."

The Institute owns more than two dozen manikins that can be manipulated to present an impressive array of

health issues. They include a newborn manikin that turns blue when its breathing is impaired and a school-aged manikin that can wheeze until the students treat with the proper medication, plus Victoria, which can perform myriad birth-related complications and scenarios. Others can sweat, bleed, urinate, blink their eyes, and simulate various body sounds.

"These manikins can be programmed so that conditions change as the students work with them," says the lab's simulation education specialist, Mike Trioli, who said the value of the simulators and accompanying equipment and software exceeds \$400,000. "We try to create as real



first six months as working nurses, those who spent half of their clinical hours in a simulation lab were found to be equally knowledgeable and capable as those with a more traditional clinical training.

“Every health professional has to do a procedure for the first time,” says Dr. Deborah Navedo, a nurse practitioner who is director of the IHP’s post-professional Master of Science in Health Professions Education program. “It’s a better experience for patients if students have become comfortable with a procedure through simulated practice before they arrive at the bedside.”

According to Instructor Josh Merson, students in the Physician Assistant Studies program have discovered the benefits of simulation as well. Several students have completed their rotation in the Neuroscience Intensive Care Unit at Brigham and Women’s Hospital. “After they performed their first live lumbar punctures on their rotations, they came back and told me the practice they received in the lab helped them feel much more comfortable doing the procedure with a person,” he says.

First-year Doctor of Physical Therapy student Bergomy Jeannis tells of walking into a scenario with a standardized patient; the woman was acting as a 62-year-old cardiac patient who had heart surgery two days prior. “We knew the best thing you can do for patients is to get them up and walking as soon as possible, so that was the plan,” he recalls. “But when we got in the room, we realized the patient was too weak to sit up, never mind stand. It was tough, and it forced me to change my plan of care on the spot.”

No matter how much clinical knowledge one has, patients are complicated. They often are stressed and worried about their future, and

PHYSICIAN ASSISTANT STUDIES STUDENTS LISTEN TO HEART AND LUNGS OF THE AUSCULTATION MANIKIN.

an environment as possible for the students to work in, so when they walk into a simulation room they are able to suspend belief and treat the manikin as if they were in a real hospital room working with a real patient.”

Trioli says other manikins are used by students to learn tasks and skills for specific parts of the body, such as listening to heart and lung sounds, connecting a patient to a ventilator, giving injections, and prepping for a lumbar puncture. Other scenarios include tracheotomies, various OB-GYN exams, and wound care. Then there’s an array of tubes that can be inserted, including a central line, a gastric line, an IV, and a Foley catheter.

“In the simulation lab, you are the nurse,” says Poole, the BSN grad who was working in the lab while studying for her nursing boards. “You have a lot more responsibility than what you get during clinical rotations.”

Naturally, this opens the door for mistakes, an important aspect of the

learning activity. “We don’t want to place students into a situation where they’re completely over their heads,” says Dr. Mary Knab, an associate professor and director of the IMPACT Practice® interprofessional education curriculum, “but we do want to stretch them. If they make a mistake during a simulation, it is an opportunity to reflect on what happened and learn from it.”

A Growing Trend

Simulation as a learning tool has been growing in recent years, thanks in part to a study by the National Council of State Boards of Nursing that examined the effectiveness of simulation in nursing programs. In the study, more than 600 nursing students from 10 programs were assigned to one of three groups. In place of the standard requirement for clinical hours at a hospital or health center, students spent 10 percent, 25 percent, or 50 percent of those hours in simulated practice. In follow-up assessments, both before graduation and in their



DPT STUDENTS WORK WITH STANDARDIZED PATIENT RAY SIEGELMAN, PT '03.

may refuse to follow a plan of care or insist a diagnosis is wrong. And increasingly, patients speak a different language than the clinician. To place students in this type of scenario, the Institute uses standardized patients to pose the kind of unpredictability that practicing health professionals face on a regular basis.

Sarah Curtis is a second-year student in the Master of Science in Speech-Language Pathology program. She recalls a simulation experience in her pediatric feeding and swallowing course in which she was scheduled to help a patient with swallowing problems, a simple matter of providing water and pudding. But the standardized patient presented with cognitive deficits and little awareness of her physical impairments, meaning Curtis had to implement a new care plan on the fly. “She was sure nothing was wrong and refused to eat anything that wasn’t a cheeseburger,” Curtis recalls. “She thought my job should be to get her out of there.”



NURSING STUDENTS, UNDER THE SUPERVISION OF INSTRUCTOR SUE CARPENTER (RIGHT), INSERT A SUCTION CATHETER INTO A MANIKIN.

Standardized patients can also introduce students to patients with cultural differences and language barriers. Thanks to a working relationship with Found in Translation, a Cambridge-based organization that trains medical interpreters, students can practice communicating with non-English-speaking patients. “A common mistake is to look at the interpreter and not the patient,” says PA faculty member Merson, “but this makes patients feel like they’re not being listened to. We teach students to always face the patient, even when they’re speaking through an interpreter.”

“Simulation Over. Return to Your Classroom.”

At the end of every scenario, students review how they did with their instructor and fellow students, who have observed the scenario on video or through a one-way mirror. “The debriefing is where the learning really happens,” says Occupational Therapy Director Regina Doherty. Many OT

scenarios put students in the position of responding to uncomfortable information. What do you say, for instance, when a patient confides that they are being abused at home? “So often, students will say, ‘I didn’t realize it would be so hard,’ and we explore that with them,” Dr. Doherty explains. “We explore what was so hard and talk about practical ways to follow best practices in these scenarios.”

Debriefing sessions, regardless of how well a student does, can lead to vulnerable moments. “Some students come out of a simulation like deer in headlights,” says Navedo. “We have to be sure to create a safe environment so students are in the right mindset to learn.” To this end, the Institute collaborates with its neighbor, the Center for Medical Simulation, to work with faculty in effective simulation and debrief techniques.

When his classmates complimented DPT student Jeannis on how he handled himself with the cardiac patient, he says all he could think

about were his mistakes, like not being concise enough when he was talking with the patient. The debriefing helped him see how he and his classmates reacted appropriately to an unexpected situation by propping the patient up in bed and having her do breathing exercises. “We all learn from experiences, and when students take the time to reflect on those experiences, we can help them anchor that learning,” explains Knab.

The Institute has expanded its simulation capabilities significantly over the past decade. Having furnished the simulation lab with hospital beds, patient monitors, defibrillators, and other medical equipment, Trioli is now working to get an instructional version of the electronic medical record software Epic, which has been implemented at hospitals in the Partners HealthCare system and elsewhere, so students can be prepared to document patient care during their clinical rotations. Also on his radar is an automated medical dispensing unit and ultrasound technology. “Everything in the hospital is going to be ultrasound-based,” he notes. “Our students need to know how to use it.”

Simulation will also be part of a collaborative pilot between the Institute’s IMPACT Practice program and Harvard Medical School that is scheduled to begin in 2017. With the support of a grant from the Josiah Macy Jr. Foundation, first-year students from the Institute and the medical school will practice the intricacies of collaborating with health professionals from other fields. “They need to develop competencies such as understanding each other’s roles and working from a common set of values,” says Knab, who has been running the IMPACT Practice program for several years. “Now we’ll be able to add medical students to the mix of health professions. It’s a great opportunity for students at both schools.” ■

Cadavers, Voice Boxes, Cow Lungs

“When you come face-to-face with a human brain, you get a visceral sense of how fragile and astounding the human neurological system is,” says Sarah Curtis, a graduate student in the Speech-Language Pathology program, after she and her classmates spent an afternoon at Harvard Medical School examining dissected brains. “It was an opportunity to experience a brain in a different way because we’ll be expected to work with how they function every day.”

In addition to manikins and standardized patients, students are exposed to various parts of human anatomy to better understand the physical basis of underlying conditions and diseases. For students in the Doctor of Physical Therapy and Doctor of Occupational Therapy programs, it means being involved in cadaver dissection in the pathology lab at Harvard Medical School (HMS).

Students in the Master of Physician Assistant Studies program study musculoskeletal and neurological anatomy in the HMS cadaver lab and spend time in the autopsy lab at Massachusetts General Hospital. They also observe pathologists in the brain lab at Brigham and Women’s Hospital, where they learn about deficits that are visible in a dissected brain. On the IHP campus, they inflate cow lungs to see the elasticity and alveoli function as well as dissect animal hearts, eyes, and kidneys.

Speech-language pathology students can view diagrams and 3-D models of the brain and review MRIs and PET scans. But for Curtis, seeing—and holding—an actual brain brought learning to life. “It was like the difference between reading a map and actually driving to a place,” she explains. “When you have a brain in front of you, you get a very different sense of what you’re working with.”

Communication Sciences and Disorders Adjunct Professor James Heaton says students also receive invaluable experience dissecting and phonating (using airflow to produce voice) the voice boxes of sheep in MGH’s Voice Center Research Labs. “Time and time again, speech-language pathology students hear about how the length and tension of the vocal folds affect the tone and pitch of a person’s voice,” says Dr. Heaton. “Here they can hold a larynx in their hands and manipulate the tissues in a way they would never be able to do—even with the most compliant patient—in a clinical setting.”



Speech-language pathology students examining a sheep's voice box at the Mass General Voice Center Research Labs.