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Medical practice

■ Patient simulators create emergency without the crisis

By **Morgan Kelly**
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In the last few months, the decidedly accident prone Bob Simman has experienced heart failure, received third-degree burns, had his foot hacked by a lawnmower and his face impaled by a metal rod.

He's died on a few occasions, only to be revived and admitted for another malady.

But Simman, or SimMan, is no hapless wretch: He's a computer-run interactive mannequin at the Life Support Training Center, located in Charleston Area Medical Center's General Hospital.

Merging traditional classroom instruction and training with living and simulated patients, the center prepares nurses and doctors for emergency scenarios in an ultimately harmless environment.

"It's a question of where do you want your teaching done: Do you want it done in the clinical area or do you want it done in the teaching area?" pondered David Rodgers, who oversees the center.

"If you're the patient lying on the table, you probably don't want the student learning there."

The center, a $1 million undertaking for which about $800,000 has so far been raised by the CAMC Foundation, includes simulated critical and general patient care, pediatrics and a mannequin who gives birth through a rather messy process, Rodgers explained. There is even a man set up for receiving anesthesia — a delicate procedure — with a complete set of lungs for inserting a camera tube.

Smaller synthesized body portions will soon be used for practicing laparoscopic surgery, in which a procedure is done with small tools inserted through a slight hole in the skin. But for the most part the mannequins are used for mild and emergency procedures, Rodgers said. Major surgery simulations are left to the developing field of virtual reality, he said.

Real people are also used for training, but not in the same sense as the mannequins. Recently, a doctor was tested on how he broke bad news to a patient and his family. He was videotaped and judged on the technicality of his vocabulary, level

of sympathy and how well he maintained eye contact as he told them that the man had pancreatic cancer.

Mannequins such as the $28,000 SimMan are perhaps the most curious training tools and a large portion of the center's resources.

The three adults and one infant can be made, via a computer program and crates of synthetic mangled limbs, to exhibit several ailments an emergency room practitioner may have to treat, but can also be used for more routine tasks such as setting IVs and diagnostic training.

For instance, the pulse — there are several at various points across the band-aid colored skin — can be adjusted for different types of heart murmurs. On one occasion Rodgers initiated a systolic murmur and set students to the task of diagnosis: Five were correct, but one determined the condition was diastolic.

"I know this one student needs to work a little more on his heart sounds," Rodgers said.

A few weeks ago, he programmed SimMan for heart failure. The computer program responds to a student's action or inaction by having the condition worsen or improve.

As the monitoring equipment hooked to SimMan began to beep and flash, Rodgers stood by, waiting out the 60-seconds in which he should have performed CPR.

He blithely pinched the limp rubber arm: "He'll get bad and he'll stay bad," he said. "I have to ask myself, 'He doesn't

have a pulse so what am I going to do?'"

Two shots and a few defribulator blasts later, SimMan was revived, but he had breathing problems as result of the incident.

As SimMan wheezed in the background, the computer program graded Rodgers and displayed the results on a wall-mounted computer screen reminiscent of a 1960s science-fiction movie: Red marks for not doing CPR.

"This lets the student make mistakes and see what happens because of those mistakes," Rodgers said. "This isn't a mannequin anymore — this is a real patient."

According to an article published last year in the journal of Academic Emergency Medicine, analysis of the pros and cons of high-fidelity simulators is in its infancy, but the initial impression is positive.

In fact, the committee composing the article "would have advised that all emergency residency programs obtain access to a simulator" if not for the high cost, the article shows.

"Just as flight simulation is required for commercial pilots, so too may simulation be justified among medical trainees for practical and ethical reasons alone," the panel wrote.

Rodgers also drew an example from flight simulators, saying that much like air emergencies, without simulation experience, many new nurses and doctors wouldn't have to treat a patient in crisis until the situation actually happened, and it's questionable whether they would be prepared.

"We're able to take care of the learning curve," he said. "We can set him up to be just about any patient we want him to be. It really adds an extra dimension to what you can do."

As Rodgers was tending to his patient's heart failure, Bill Norman and a group of other recently hired nursing school graduates was trying to ease a case of respiratory distress.

Norman, of Scott Depot, completed nurse's training in 1983 before taking a 20-year hiatus to work in the chemical industry, he said.

He now found himself standing over a life-size mannequin who was coughing, wheezing and — albeit in a mechanical accent — complaining about having difficulty breathing. This was a departure from the lifeless CPR mannequin that communicated via a paper tape printout he trained on in the 1980s.

"You can tell your interventions almost immediately and the effect they're having on the patient," he said. "In the past, you weren't sure."

While Norman and his colleagues labored to find out what ailed him, SimMan's wheezing turned to gasping, soon overcome by beeping machinery. Norman knew immediately that he needed to refresh his knowledge of breathing sounds to make quicker diagnoses, he said.

"You've got to look and listen to the patient," he said. "I needed improvement."

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