

'Smart' mannequins breathe life into medical scenarios

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Dr. David Feinberg, president of the UCLA Health System and CEO of the UCLA Hospital System, gets an introduction to Noelle, a mannequin that is programmed to give birth in a number of ways.

"This is the worst pain ever!" screams a woman in the delivery ward, her eyelids fluttering as the baby's skull crowns between her legs."

Adding to the cacophony, an infant nearby in the neonatal unit jerks his arms and cries in distress, his tiny chest heaving under his striped onesie.

In the operating room, an unconscious motorcyclist lies on the table with a blue drape circling the open fracture in his shin. Blood also oozes from



the bandage around his forehead, adding to the urgency. Surgical instruments lined up on a tray gleam under the bright light. A crash cart equipped with a defibrillator stands by.

Just your average day at the Reagan UCLA Medical Center? Not exactly.

All of these "patients" are life-sized, computer-programmed mannequins in the newly renovated UCLA Simulation Center. Located in the basement level of the Learning Resource Center across the street from the medical center, the facility blends the latest in technology with lifeor-death scenarios to help health care trainees polish their clinical decision-making and teamwork skills before treating living patients.

"Simulation-based learning embeds the lessons of the teaching experience deeply into the participants without risk to patients," explained UCLA anesthesiologist Dr. Randolph Steadman, who in 1996 founded the center—the first in Southern California—and continues to serve as its medical director.



From the main control room, staff can run medical scenarios for the ER, OR and



ICU simulation rooms.

The facility benefited from a \$1 million donation by Eugene and Maxine Rosenfeld in 2006. It expanded from a modest training unit for anesthesiology residents into a sophisticated, fully staffed 9,000-squarefoot center that trains <u>medical students</u>, residents and fellows from 10 departments throughout the David Geffen School of Medicine at UCLA, as well as nursing students and dental residents.

Medical students "treat" one of the center's 14 mannequins in smallgroup simulations tied to subjects in the four-year curriculum. Eerily lifelife, the full-body mannequins range in age from newborn to 5 years old to adult. Computerized variables control the sounds of the mannequin's breathing, heart rate and rhythm, blood pressure and other vital signs.

Noelle, the mannequin in labor, occasionally has her baby born breech. Or the simulation specialist can swap out her belly—equipped with an umbilical cord and placenta—for a C-section birth. To add realism, humans—actors or staff members—are sometimes recruited to portray Noelle's hysterical husband and worried family members. By causing a commotion, they force trainees to practice their bedside manner while juggling technical skills.

With a dozen desktop monitors glowing in the dim light, the main control room is where the simulation's director silently orchestrates each scenario. An intricate network of video cameras, computers and servers allow instructors and students to watch as their classmates try to keep their wits about them in the fast-paced, role-playing lesson.

"From the main control room, we run operations for the ER, OR and ICU simulation rooms," explained Steadman. "This can mean changing



the patient's voice or manipulating vital signs. The instructor directs the scenario and runs the computerized mannequin with one of our simulation experts. Our third-year students often 'deliver' Noelle's baby here to prepare them before their OB-Gyn rotations in the hospital setting."

The center's task training room is equally striking. Mannequin heads and torsos of all ages lay on tables, allowing students to practice hands-on skills needed to place a breathing tube, image the heart or lungs via ultrasound, perform a colonoscopy or remove polyps, an appendix or gall bladder.



Heidi Crooks, senior associate director of operations and patient care service for UCLA Health System, checks out the mannequin torsos that are used to practice various medical procedures.



Virtual-reality ultrasound and surgical simulators with hand-held instruments allow a detailed view of the organ, which bleeds onscreen if a would-be surgeon nicks tissue or a blood vessel. At the end of the procedure, the trainee must achieve a certain score to advance to the next level.

This far surpasses how students used to learn medicine not so long ago, according to Dr. David Feinberg, president of the UCLA Health System, CEO of the UCLA Hospital System and associate vice chancellor of the Geffen School of Medicine. During an open house at the center last week, he enjoyed trying his hand at the virtual colonoscopy machine.

Before the days of high-tech teaching tools, recalled Feinberg, "The approach was 'See one, do one, teach one.' You'd watch someone perform a procedure, try it on a patient the next day and then teach someone else the day after that."

"Surgeries used to last considerably longer at teaching hospitals," added Steadman. "That's because trainees would hone their skills on real patients. With high-tech simulation, UCLA health care providers can now achieve a certain level of proficiency before caring for their patients."

Provided by University of California, Los Angeles

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