Welcome to the Future: Simulation Training

Cutting-edge technology helps strengthen patient care.

“The future belongs to people who see possibilities before they become obvious.”
—Ted Levitt

The late Harvard business professor Ted Levitt inspired generations of people to think about looking at the world in a different way. He challenged them to think hard—and then even harder—about new ideas, enabling them to reach new heights in their creative approaches to solving problems and seeing new possibilities.

If there is one thing Mark Smith, MD, PhD, is passionate about, it is new possibilities and innovation. The medical director of Banner Health’s Simulation Medical Center maintains these both are critical to achieving ongoing excellence in the healthcare field.

“I am convinced that it is through innovation that we will be able to deliver more care more efficiently and, more importantly, at a higher level of quality that results in safer patient care,” Smith says. “Our patients are demanding this—and our patients deserve this. In the meantime, resources are becoming scarcer, demand for our services is rapidly increasing with an aging population, technology evolves daily and our nation’s health system is in a state of constant flux and uncertainty.”

The potential for any medical error haunts Smith. He is the consummate perfectionist, constantly in search of ways to improve procedures and reduce errors. It was Smith who conceived the idea of simulation education at Banner Health to achieve these goals.

Simulation training provides clinicians the opportunity to practice and make mistakes in a consequence-free environment while allowing trainers to objectively measure clinicians’ psychomotor and cognitive skills. Training involves testing a clinician’s knowledge about the procedure, decision-making ability, documentation, communication with the care team, communication with the patient and time management skills.

At Banner Health, simulation training is conducted on a very large scale. “We believe that a comprehensive approach to simulation training ensures standardized, evidence-based patient care,” Smith explains. “We also know that new nurses as well as residents report they are more confident when they begin caring for patients in our hospitals. We have been able to get these more confident nurses and physicians into clinical settings a full week earlier than would be possible with more traditional classroom education.”

Considered a “virtual hospital,” Banner Simulation Medical Center is one of the largest centers of its kind in the world. With computerized mannequins (also called patient training simulators) serving as patients, the 55,000-square-foot facility in downtown Mesa, Ariz., has many of the features found in any major hospital: an intensive care unit, an emergency department, two operating rooms with virtual operating capabilities, a neonatal care center and an eight-bed recovery wing.

Though the primary facility is located in Mesa, simulation medical education also occurs at other locations within the Banner system. At the system’s flagship teaching hospital, Banner Good Samaritan Medical Center, more than 7,500 people, including residents, surgeons, nurses, emergency medical technicians and others, were trained at the simulation center. The facility houses an operating suite, an intensive care room, an emergency center bay and a variety of teaching and conference rooms.

The 3,000-square-foot simulation center at McKee Medical Center in Loveland, Colo., trains many of the physicians and other clinicians at Banner’s facilities in six states outside Arizona. The facility has state-of-the-art training bays, multiple mannequins, debriefing rooms and a conference room with teleconferencing capabilities, where clinicians can test and refine their surgical skills in a safe but realistic environment. The center also uses

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Enhancing Patient Care
There are a variety of ways simulation education can be used to strengthen patient care and improve patient satisfaction:

- **Emergency care**: Mannequins are used to simulate emergency room and trauma scenarios.

- **Surgery**: Virtual reality devices resembling video games help surgeons learn the latest techniques and tools, especially in laparoscopic, robotic and minimally invasive procedures.

- **Teamwork**: The mannequins are also used to train hospital code teams whose members work in different parts of the hospital but who must come together and work in unison to treat a patient (for example, a patient whose heart has stopped).

- **Common procedures**: All types of healthcare providers can practice and perfect commonly used procedures such as inserting chest tubes or central lines.

- **Labor and delivery**: Mannequins give birth to a baby after a simulated labor, complete with programmable complications.

The simulation center provides unique experiences for clinicians, such as having a full patient load or other events they may not see on a day-to-day basis. The center also allows clinicians to become more aware of how they are communicating with patients and what patients’ perceptions of their care are, giving clinicians an understanding of what patients feel and experience while receiving care.

During training, the mannequins interact with the clinicians, mimicking real people; they talk and have a pulse and blood pressure. As clinicians work with the mannequins they are being observed by staff members in another room who can hear what is said and done to the mannequins. Feedback from the observers to the clinicians includes everything from how to improve body language to how they can better interact with patients.
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New residents have benefited tremendously from the training. Since 2006 every entering new resident has passed the central venous catheter course before even touching an actual patient. Pneumothorax, a complication that can result from incorrect central line placement, has been reduced by 92 percent, and there has been an 83 percent decrease overall in line infections.

Similarly, Banner Health’s Advanced Cardiac Life Support training courses have been revamped. Revisions to the course include the use of weighted checklists, training to allow physicians to anticipate errors and high-fidelity simulation. Both low-end and high-end simulation with errors have resulted in increases in learning of about 300 percent among physicians.

Surgical skills have also been improved through the use of handheld devices, similar to video games such as the Nintendo Wii, which simulate surgical instruments. Surgeons are able to warm up their fingers prior to the first procedure of the day by manipulating the devices. Evaluation of clinicians’ psychomotor skills is accomplished using “cybergloves,” which measure the clinician’s hand movements. The devices also evaluate clinicians’ memory, focus, visual/spacial ability, sustained attention, divided attention and selected attention.

Confidence levels among surgeons have increased compared to confidence levels reported by a control group that did not have the benefit of training or warm-up. “We also see that the group using devices and warm-up techniques has increased proficiency, decreased time for procedures and far fewer errors than the control group that did not have the benefit of this knowledge,” Smith adds.

Improving patient care and safety begins with improving clinician training and education. Banner Health is making significant contributions to the body of knowledge in this area not only within its own system, but at other systems that routinely visit the Simulation Medical Center to learn about best practices in medicine.

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