In 2010, SU was awarded $937,035 from the Maryland Hospital Association’s (MHA) Who Will Care? Fund for Nurse Education. The initial grant was intended to provide healthcare education in clinical areas not widely available on the Eastern Shore, particularly neonatal, pediatric and psychiatric-mental care. The MHA anticipates a nursing shortage of some 7,000 over the next few years. Salisbury University is working to address this issue.

“The need for nursing staff trained in these areas is a critical concern,” said Dr. Robert Joyner, associate dean of the Henson School of Science and Technology. “Currently, seriously ill infants and children must be transported to Baltimore-area hospitals, and access to quality mental health programs is practically non-existent.”

Dr. Lisa Seldomridge, SU’s Nursing Department chair and principal investigator on the initial grant proposal, soon realized that SU’s existing space would not be adequate to support the kind of high-quality programs she envisioned for SU. With additional funding from the Henson School of Science and Technology, Salisbury University, and a generous gift from the Richard A. Henson Foundation, the University purchased a 5,000-square-foot medical facility on Pine Bluff Road and turned it into a high-tech medical simulation center. From its inception, the project took less than two years to complete.

At the Richard A. Henson Medical Simulation (SIM) Center, students learn by taking part in simulated clinical events, which are monitored by SIM Center faculty and staff and video recorded for feedback sessions following the learning exercise. Students also have the opportunity to observe their colleagues in real-time and take part in a discussion and critique of the scenarios they observe as well as review their own recorded scenarios.

The use of medical simulation as a teaching tool is a growing trend in healthcare education. According to Joyner, there is a growing body of research and evidence to support the use of simulation as part of a healthcare training program. It exposes students to situations they otherwise would not have the opportunity to experience, such as dealing with life-threatening neonatal situations, premature birth or counseling a patient with mental illness.

“We see a greater level of confidence in nursing staff that had simulation experience as part of their degree programs,” said Karen Poisker, vice president of Patient Care Services at Peninsula Regional Medical Center (PRMC). “There are fewer medical errors and a significant reduction in training time compared with individuals who did not have any simulation experiences.” Many of SU’s nursing and respiratory therapy students complete their clinical rotations at PRMC, and the facility is an employer of choice for graduates who remain in the area after completing their degrees.

Simulating the Demands of a Real Hospital Environment

According to Joyner, the SIM Center is the only facility of its kind on the Eastern Shore.

Simulated Patients: Providing Excellence in Healthcare Education

Richard A. Henson Medical Simulation Center
The Richard A. Henson Medical Simulation Center held its ribbon-cutting ceremony on December 1, 2011.

The goal was to create a simulated medical environment that is as realistic as possible, which the University hopes will attract highly qualified candidates to its healthcare programs, particularly its new Doctor of Nursing Practice (D.N.P) program. As students enter the center, they can place their books and belongings in a small, secured waiting area. “But as they turn the corner, it’s ‘game on.’ The students are expected to act as if they are working in a real hospital,” said Joyner.

With a few exceptions, the SIM Center does resemble a real hospital. There is a nursing station as well as specialized labs for LDRP (labor, delivery, recovery and postpartum), neonatal, pediatric and adult care. There is even a medical supply closet. One distinction, however, is the presence of control and debriefing rooms, where faculty and students can monitor the scenarios, which are video recorded and used to provide student feedback. Cameras and microphones are set up throughout the center, so students can be monitored and recorded from any angle as they move from one area to another. Joyner explained that evaluation of student performance during simulation can vary from the least sophisticated approach of watching a student perform tasks while the faculty member is standing next to them, to the most sophisticated high-fidelity approach of video recording the students’ actions during a scenario and then reviewing the videos with the student to discuss various aspects of their performance.

“We were fortunate to have the support from the MHA, Henson Foundation and the University to develop a medical simulation center with this high-fidelity approach to simulation training. We are making every effort to provide our students the most realistic experience as possible,” said Joyner. “Simulation is most effective when students experience the pressures of being alone with a patient and have to perform care without coaching. Our center provides an experience that prepares them for the rigors of work life in a real hospital, where you must act quickly and independently,” he added. Furthermore, review of video recorded training sessions has been found to increase student self-awareness by enabling self-assessment and critique.

The debriefing room, equipped with a “Smart” board and wireless Internet access, is a conference room where students and professors review and critique their simulations. “You have to believe that you are being monitored at all times,” explained Joyner. “Big Brother is watching.”

“It can be a bit unsettling at first, but the students get used to it,” said Seldomridge. Instructors can view the scenario live and then play back the recording to review and evaluate the student’s performance. Additionally, the students can access and review their own videotaped scenarios at any time through a Web-based e-learning service.

The SIM Center features real hospital equipment, such as incubators, ventilators and other equipment used in hospitals today. It also has piped-in medical gases. “There is a safety mechanism that shuts the ventilator off if you put the wrong gas in it. This is an important concept that students must understand when troubleshooting this life-supporting equipment,” explained Joyner. Even the storage room is considered part of the students’ learning experiences at the SIM Center. The room is used for storing items for future simulations, but it also functions like a real hospital storage room, in which nurses must often locate materials and equipment quickly.

“This is an important concept that students will use in a real hospital. ‘The technology is so sophisticated; it is very different,” commented Joyner. “The technology is so sophisticated; students need hands-on training before they can set foot in a real medical environment,” he said. At the SIM Center, students practice working with the same high-tech equipment they will use in a real hospital.

Meet the Patients

The center’s LDRP lab has one thing you won’t find in a real hospital: a state-of-the-art, wireless newborn baby human simulator mannequin. Wrapped in a yellow blanket and resting in his incubator, this incredibly life-like infant can be controlled wirelessly from a remote location, making it easier to change his medical condition or vital signs during a simulation. “Baby Sim” also can be connected to an EKG monitor. He cries, breathes and coos. His head, arms and legs can move.

In addition to the wireless newborn, three human simulator mannequins currently reside at the Henson Medical Simulation Center: an adult male and two pediatric simulators. Designed and built by engineers and physiologists of CAE, industry leaders in medical education technologies, the three high-fidelity human
pressure, EKG, heart rate and oxygen levels the patient’s systemic arterial blood when he is "awake." He can cough, speak, blink, close when he is "asleep" and open and die. He has pulse points in neglect,” said Van Opstall-May.

child who may be the victim of abuse or when working with a critically ill child or a representation of what you typically see discolored and uneven. "He is a – his hair is messy and his teeth are simulator is designed to look like a sick child. "The [220x264]• 2012 create new scenarios or alter the current set into the curriculum. Additionally, we can developed to follow the requirements of the laptop computer. “The scenarios were with simulation scenarios pre-programmed. The software is loaded onto a desktop or computer. "The scenarios were developed to follow the requirements of the nursing program, so they are set to fit right into the curriculum. Additionally, we can create new scenarios or alter the current set to meet a specific need," said Joyner.

Sporting a bowl haircut and a combination of baby and adult teeth, "Chucky" – as the high-fidelity simulator in the pediatric unit is affectionately known – closely resembles a real pre-adolescent child. “We can make him act like a real kid too and protest loudly when given a vaccination,” explained medical simulation specialist Thalia Van Opstall-May. The simulator is designed to look like a sick child – his hair is messy and his teeth are discolored and uneven. "He is a representation of what you typically see when working with a critically ill child or a child who may be the victim of abuse or neglect," said Van Opstall-May.

“Medi-man” has functional eyes that can blink, close when he is “asleep” and open when he is “awake.” He can cough, speak, cry, sweat and bleed. He has pulse points in his wrists, arms and feet. Vital signs such as the patient’s systemic arterial blood pressure, EKG, heart rate and oxygen levels can be monitored by a real hospital monitoring system. If you place your hand on his chest, you can feel him breathing. "You can start an IV in him and draw blood. The students need to see all of the physiology," said Van Opstall-May.

Most high-tech human simulators are equipped with “veins,” blood lines in which students can insert an IV or draw blood. They are also designed so that simulated urine (usually water mixed with food coloring) can be placed in a bladder so students can practice catheterization.

Simulation helps the students to hone their skills in performing these delicate procedures as quickly and painlessly as possible; the simulators can be programmed to react or express discomfort if a procedure is done incorrectly. The high-tech mannequins used at the SIM Center come with simulation scenarios pre-programmed. The scenarios were developed to follow the requirements of the nursing program, so they are set to fit right into the curriculum. Additionally, we can create new scenarios or alter the current set to meet a specific need," said Joyner.

Moulage: Bringing Realism to Medical Simulations

While the human simulator mannequins are, without a doubt, remarkable examples of human ingenuity and advanced technology, it is Van Opstall-May who breathes life into the center’s synthetic patients. In addition to programming patient responses, May practices the art of moulage, the molding or creating of realistic wounds, lesions or defects. The center can replicate just about any internal or external clinical condition found in humans.

Van Opstall-May has attended numerous medical conferences that include seminars on how to make false wounds and body fluids. During one of these seminars, she learned how to make skin to match the mannequin, so realistic-looking wounds can be placed on the mannequin’s surface. “This is especially useful if you have a scenario involving a motor vehicle accident, where a patient may have lacerations,” she said.

Van Opstall-May also spends countless hours developing mixtures to realistically replicate blood, sweat, saliva and other human body fluids. "One of the things I love about my job is thinking up creative ways to make the scenario come alive and to make the mannequin come alive,” said Van Opstall-May. Ordinary foodstuffs – such as cooked okra, lime juice and grated cheese – can be mixed to imitate the odor and consistency of everything from sweat and saliva to spinal fluid, she added.

While all of this seems unappetizing, Joyner and Van Opstall-May concur that realism is a vital component in creating meaningful learning experiences for the students. Human physiological responses, especially those associated with illness or injury, can be very unsettling. “It isn’t like what you see on television; real medical trauma can be ugly and frightening,” said Joyner. “Our job is to prepare our students to respond professionally in any situation, and this kind of realism helps us do that,” he added.

“The simulation capability of the mannequins, coupled with the scenarios developed by SU really help our students and staff to establish a whole picture of what it means to be a successful practitioner,” said Poisker.
Standardized Patients

In a mental health wing, students learn effective intervention techniques by interacting with standardized patients, specially trained actors who portray patients with various psychiatric conditions. The actors are given scripts developed by Henson School faculty. They create their roles, memorize their lines and act out conditions such as schizophrenia or Obsessive Compulsive Disorder (OCD).

Some of the actors come from local community theatre groups, “but many are SU students,” said Seldomridge. Although student actors who work as standardized patients are not all theatre majors (the only requirement is that they are not majoring in a healthcare-related discipline), SU is currently developing a program in which theatre majors can receive course credit for taking part in medical simulations.

In preparation for their roles, the actors attend rigorous training sessions. They review the scripts and receive instruction on specific aspects of the disorder they are portraying. Once they have been briefed, the actors take part in role play with faculty members playing the roles of the nurses. The sessions are videotaped, and the performances are critiqued by the faculty. They also have the opportunity to view the videos of past standardized patient scenarios.

Van Opstall-May described one simulation involving a patient with OCD: the patient re-positioned a chair about 15 times, washed her hands and continuously rearranged a stack of magazines on a coffee table. In another scenario, an actor portraying a patient in the manic phase of Manic Depressive Disorder spent the entire session curled up under a chair. “If you send young, inexperienced students into a real facility to assess mental health patients who might be screaming, hallucinating or compulsively re-arranging the furniture, they’d be overwhelmed,” said Joyner. “The results could be disastrous for the student as well as the patient,” he added.

The use of standardized patients helps build confidence in areas of study where students tend to feel the most anxiety, which for many undergraduates is in psychiatric and mental health care. “Most first bachelor students want the excitement of working in critical care or they want to work with babies,” explained Seldomridge. “Very few start out wanting to work in mental health,” she added, but now students are beginning to express interest in mental health as an area of specialization. “In this way, we are addressing a significant need in the community,” said Seldomridge. “Mental health is a critical shortage area, especially on the lower Eastern Shore.”

In addition to the technical training, the lab offers opportunities for students to achieve one-on-one growth through the use of role playing to help them develop strong interpersonal communication and patient-provider relationship building skills. “In the healthcare field, you need to develop people skills as well as technical skills,” commented Poisker. “Actively listening and showing empathy are just as important as clinical skills such as starting an IV, because you are dealing with people who are at their most vulnerable,” she said.

Community Outreach

The students at Salisbury University are not the only members of the healthcare community to reap the benefits of medical simulation. Wicomico County school nurses recently received training in respiratory assessment, tracheotomy care, invasive line care and dermatology, areas in which school nurses typically do not have experience or access to training. SU’s SIM Center is helping school nurses keep up with high-level care.

Although most of the patients at the SIM Center are high-fidelity mannequins, real human beings are benefiting from this high-tech facility. The Human Performance Laboratory is utilized by graduate students in the applied health physiology program and other students who are learning to conduct human performance analyses and work with subjects in rehabilitation, fitness and/or sport performance. Currently, applied health physiology faculty member Dr. Tom Pellinger is working in partnership with a local endocrinologist to study blood flow and exercise in diabetic patients.

Future Plans

SU hopes to acquire additional high-tech mannequins. Other expansion plans include a faculty-led clinic in which D.N.P. candidates work with real patients under the guidance of faculty mentors. “This will provide the community with much-needed health services while training our doctoral candidates,” said Seldomridge.

The center is planning to conduct a simulation involving a mother, portrayed by a standardized patient, who has just given birth. “Traditionally, when we teach nursing students about labor, delivery and postpartum care, they either take care of the mom or they take care of the baby,” explained Joyner. “The truth is, in real life, it doesn’t work like that. There are actually two patients who need to be cared for simultaneously – the mom and the baby,” he added.

Since the SIM Center opened in fall 2011, SU has already simulated about 85 scenarios, including resuscitation, respiratory therapy, mental health counseling and pediatric vaccinations, as well as an assessment on a live standardized patient. Approximately 150 nursing and respiratory therapy students have taken part in medical simulation training at the center.

“While it is too early in the program to have data on the effectiveness of employees who took part in simulation as part of their degree program at SU, our survey data indicates that the simulation experiences have had a positive impact on students’ confidence in their ability to perform on the job,” explained Seldomridge. This confidence is a quality from which SU’s students and their future patients will reap untold benefits.