MEDICAL SIMULATION

The Impact on Patient Care
Contents

03 The Role of Medical Simulation

05 Advanced Virtual Reality: Comprehensive Hands-On Training

07 Multidisciplinary Approach: Building Team Confidence and Communication

09 TraumaMan: Lifesaving Technology

21 Opportunities

25 Continuing Education Course Calendar

Frontiers

The University of Tennessee Medical Center and the University of Tennessee Graduate School of Medicine

Falling 2012

Editor
Becky Thompson

Publishers
Joseph Londsman
Norman Majors
James Neutens

Contributors
Katie Bahr
Amanda F. Johnson
Bonnie Strzykalski

Design
Asen Marketing & Advertising

Frontiers is a magazine produced by the University of Tennessee Medical Center and the University of Tennessee Graduate School of Medicine. This publication was designed to showcase the unique benefits of having an academic medical center in East Tennessee.

Copyright © 2012 The University of Tennessee Medical Center All Rights Reserved. EDD/TITLE W/TITLE IX Sec. 504/ADA

Send Correspondence to:
Frontiers
2121 Medical Center Way Ste. 300
Knoxville, Tennessee 37920-3257
Telephone: 865-305-6845
Fax: 865-305-6999
E-mail: frontiers@utmck.edu
www.utmckmedicalcenter.org
or http://gsm.utmck.edu

About the Cover

Medical simulation is changing the way we train, learn, and practice medicine. The UT Center for Advanced Medical Simulation is driving continual improvements in patient care and safety. With the ability to replicate almost any diagnostic or therapeutic situation in a controlled environment, medical professionals can develop experience and improve critical skills with instant feedback from instructors in the control room.

Dear Alumni and Friends,

The University of Tennessee Medical Center and the UT Graduate School of Medicine have long been recognized for exceeding the expectations that accompany our threefold mission of healing, education, and discovery. Most recently, we are proud to be named one of America’s Best Hospitals by the distinguished publication U.S. News & World Report. Based on patient care performance, the medical center ranked nationally in two specialties and 10 specialties listed as high performers. This issue of Frontiers, focuses on one of the outstanding collaborative programs unique to healthcare in East Tennessee and underscores the value we bring to the community as the region’s only academic medical center.

The UT Center for Advanced Medical Simulation, led by Leonard Hines, MD, and Paul Huffstutter, MD, trains physicians, nurses, and other health professionals in the cutting-edge skills required to provide patients with the highest quality of treatment and care. It also offers an efficient, timely avenue for transferring the latest discoveries and techniques to the bedside. We are privileged to have the region’s preemminent simulation center on our campus, available not only to our team members but also to physicians, nurses, and health professionals throughout Knoxville and the surrounding region.

Using computerized manikins, interactive robotic procedures, detailed simulations of bedside scenarios, and training to hone surgical and other interventional expertise, the medical simulation center prepares the next generation of healthcare professionals for tomorrow’s technologies and gives current practitioners the opportunity to sharpen their skills in a controlled environment.

We hope you enjoy learning more about the medical simulation center. And, we thank you for your continuing support of the University of Tennessee Medical Center and our goal of remaining the preeminent healthcare provider in East Tennessee.

Sincerely,

Joseph R. Londsman, Jr.
President and Chief Executive Officer
University Health System, Inc.

About five years ago, two forward-thinking physicians at the UT Graduate School of Medicine had an idea that is today changing healthcare in the region. Mitchell Goldman, MD, and Jerry Epps, MD, envisioned a center where professionals could practice, learn, and teach skills using simulated procedures. Their enthusiasm resulted in a 400 square foot, surgically-focused medical simulation center.

Today, the UT Center for Advanced Medical Simulations is a 6,500 square foot multidisciplinary facility for virtually all types of healthcare specialties. It is one of a kind in the region in its vast collection of high- and low-fidelity technology, comprehensive curriculum, and leadership through Leonard Hines, MD, and Paul Huffstutter, MD. Drs. Hines, Huffstutter, and Goldman are leaders not only at our facility, but they also serve as accreditation surveyors for simulation centers across the country.

This level of expertise and leadership is brought to bear at the UT Center for Advanced Medical Simulation. Here, our own professionals and those from around the region come to improve their knowledge. And in the end, they provide better, safer, healing care.

We believe our medical simulation center is a top-tier institution. I invite you to learn more at http://gsm.utmck.edu/simulation/main.cfm.

Sincerely,

James J. Neutens, PhD
Dean
UT Graduate School of Medicine
The Role of Medical Simulation

The way we train, learn, and practice medicine is changing. Our progressively more complex healthcare system has resulted in the need for major alterations to the classic medical education model, and complex technologies for patient care now require more specific and specialized training.

Perhaps the most important innovation to arise from these changes is medical simulation.

Simulation is the imitation of real-life experience including the use of task and virtual reality trainers, as well as standardized patients to refine technical and clinical skills of healthcare professionals. At the UT Center for Advanced Medical Simulation, the goal is continual improvement in quality of patient care and safety through education, practice, and assessment. Simulation can replicate almost any diagnostic or therapeutic situation, from simple IV insertions using low-fidelity task technology to complicated surgeries using high-fidelity, computerized manikins or virtual reality modules.

The simulation center is directed by two veteran surgeons, Leonard H. Hines, MD, and Paul J. Huffstutter, MD, with more than 65 years of clinical and educational experience combined. Melinda Klar, RN, is the Administrative Director, and Judy Roark, CST, is the Lab Coordinator and Skills Coach. All assist in the implementation of skills and scenario curricula, which are fundamental to the success of simulation.

All members of the healthcare team can benefit from simulation training—physicians, dentists, nurses, allied healthcare professionals, and emergency responders. It offers opportunities not only to master technical skills but also to improve critical-thinking, decision-making, and communication skills.

The simulation center is an attraction for the best new doctors, who are now insisting upon availability of advanced simulation training in their residency programs. Close to 50% of the physicians who complete residencies at the UT Graduate School of Medicine stay in the region to practice medicine; therefore, attracting the best to our education programs will strengthen the region’s healthcare for generations to come.
The interactive technologies at the UT Center for Advanced Medical Simulation help medical professionals maneuver extremely sophisticated procedures. Michael Freeman, MD, a vascular surgeon, operates the Angio Mentor, exercising the complex, minute wire and catheter skills required by new, minimally invasive endovascular procedures like carotid stents, peripheral angioplasty and stenting, aneurysm repair, and more (see picture at left).

Above, Melissa Phillips, MD, a general surgeon, demonstrates the GI Mentor for medical professionals to help them refine their motor, cognitive and psychomotor skills and to broaden their hands-on diagnostic and therapeutic clinical experience. Not only can medical professionals use the GI Mentor to sharpen their surgical skills, but they can also virtually explore anatomical views and procedures, such as endoscopies, colonoscopies, and flexible bronchoscopies.
Textbooks alone don’t give individuals and medical teams the confidence they need to perform well under stress. Complications can arise during medical procedures if communication is poor. The University of Tennessee Medical Center uses a multidisciplinary team approach where the patient is at the center of healthcare.

Multidisciplinary teams utilize diverse groups of medical professionals to ensure that all of the needs of the patient will be met. A diverse group of healthcare professionals, such as physicians, nurses, pharmacists, dieters, health educators, social service, and mental health providers come together for one purpose—to provide a comprehensive assessment of the patients’ health and safety. Each member of the team evaluates the patient through their individual expertise and their input is shared with the rest of the team. The team approach promotes coordination and communication and offers the patient a one-stop effort as opposed to many separate evaluations, interpretations, and plans.

Simulation education provides dynamic, hands-on education in a forum for learning more about strategies, resources, and treatments for all members of the team. A key member of the team at the medical center that trains with simulators is Anesthesiology.

Anesthesiology residents use realistic simulation technology to practice tasks in pain management, patient monitoring, and intervention. One intervention they simulate is a crisis care situation where they must manage and recognize symptoms of anaphylactic shock. Although rare, patients may develop allergic reactions to medications during surgery requiring the immediate reaction of the anesthesiologist who follows a Crisis Checklist to successfully treat the patient.

Skills such as critical care decision-making and communication are fundamentals in simulation training and the foundation for building a better team.
Not all of the technologies at the simulation center use image-guided tool sets, but they all offer the opportunity for hands-on learning. Mid-fidelity simulators like TraumaMan, enhance skills—in real time—often called for in emergency situations.

As a Level I Trauma Center, the University of Tennessee Medical Center provides Advanced Trauma Life Support courses to emergency medical professionals and physicians across the region. TraumaMan is a central component of this education because it can simulate tracheotomy, abdominal procedures, chest tube insertion, needle decompression for pneumothorax, and many other procedures. TraumaMan and all the other task trainers at the UT Center for Advanced Medical Simulation strengthen skills and sharpen hand-eye coordination, muscle memory, and focus—lifesaving expertise vital to excellent patient care and safety.

Visit HTTP://GSM.UTMCK.EDU for more information.
SimMan: Simulating Reality. Improving Patient Care.

SimMan, a full-body manikin, is a simulated patient used to educate and assess medical trainees. And, he’s more than just a manikin that talks and breathes. He can become virtually real, with changing features like heart and bowel sounds, cardiac arrest, flail chest, seizures, and the ability to respond to medications. Almost any medical intervention can be practiced and perfected on SimMan before ever making contact with a patient. After a simulation is complete, trainees can access the session via a monitoring system, which enables them to examine their performance and hone specific skills.

Scan code to watch SimMan in action.

utmmedicalcenter.org/frontiers-videos/simman
In the first 30 seconds, the baby is received in the Emergency Department and initial assessment and treatment steps are started. After the baby and bedding are dry, the baby is placed in a warmer. The medical staff clears and positions the airway while they evaluate the breathing, heart rate, and color of the baby. After the nurse identifies the baby is not breathing and no heart rate is heard, they begin to assist the baby with breathing and supply oxygen. While doing this, they begin chest compressions. The baby shows no change in status, so intubation is started. Nurses administer epinephrine to help stimulate the baby’s heart beat. No change is found—a catheter is placed in the umbilical vein to start fluids and administer more epinephrine. The baby has a positive response to the fluid and medicine administered. The heart rate slowly returns to normal, and the baby starts to breathe spontaneously.

**SIMULATED EVENTS**

1. In the first 30 seconds, the baby is received in the Emergency Department and initial assessment and treatment steps are started. After the baby and bedding are dry, the baby is placed in a warmer.
2. The medical staff clears and positions the airway while they evaluate the breathing, heart rate, and color of the baby.
3. After the nurse identifies the baby is not breathing and no heart rate is heard, they begin to assist the baby with breathing and supply oxygen. While doing this, they begin chest compressions.
4. The baby shows no change in status, so intubation is started.
5. Nurses administer epinephrine to help stimulate the baby’s heart beat.
6. Medical staff re-check ventilation, chest compressions, intubation, and epinephrine delivery to see if the baby is progressing.
7. No change is found—a catheter is placed in the umbilical vein to start fluids and administer more epinephrine.
8. The baby has a positive response to the fluid and medicine administered. The heart rate slowly returns to normal, and the baby starts to breathe spontaneously.

**BACKGROUND**

The mother is 26 years old and 38 weeks into her pregnancy. She develops sudden onset contractions without relief between contractions. She is transported by ambulance and the baby is delivered en route to the hospital. The fetal heart rate is 60-70 before the baby is received by the Neonatal Intensive Care Unit team.
No longer is lecture the only mode of transferring knowledge. At the UT Center for Advanced Medical Simulation, residents, fellows, and medical students use simulation to follow curricula and learning objectives that meet learning styles and satisfy goals of specialties and needs of patients. Specific skills are taught and assessed by faculty physicians from the UT Graduate School of Medicine, who are, themselves, lifelong learners.

In addition to advanced, virtual reality technology, the medical simulation center offers low- and mid-fidelity trainers that refine essential skills used regularly by medical professionals, including inserting catheters, accessing veins, administering injections, and using defibrillators. Today’s doctors exercise low-fidelity simulation training to re-enact proper techniques for inserting central venous lines (left), which will minimize the chance of central line associated blood stream infections, and suturing (above) to ensure proper healing of wounds.

The simulation center plays an important role in making the University of Tennessee Medical Center and UT Graduate School of Medicine leaders in healing and education.
Four years ago, Amy Yarbrough, now 34, was diagnosed with Stage I breast cancer. In June of this year, about to celebrate the five-year milestone on her way to recovery, she noticed a potentially cancerous mole on her back. Still recovering from her first diagnosis, Amy says, “I immediately called Dr. Bell who advised me to come in for a closer look.”

Yarbrough had seen John Bell, MD, at the University of Tennessee Medical Center Cancer Institute five years before when she received her breast cancer diagnosis. During the recent visit, Bell performed a punch biopsy of the mole, a technique in which he trains residents at the UT Center for Advanced Medical Simulation to screen for various cancers.

The biopsy and the mole’s removal took 10 minutes and one stitch. Within a few days, Yarbrough received results that brought her peace of mind: she didn’t have skin cancer.

Simulation technology enables doctors to learn and practice sophisticated biopsy techniques that can be used to achieve the best outcomes. “Historically, patients wouldn’t receive a final diagnosis and treatment plan until after surgery,” says Bell. Now increased knowledge gives patients like Yarbrough more control over their situations, and a “don’t know” diagnosis is very rare.

The training modules Bell and residents use at the simulation center cover a variety of scenarios that may arise in clinical settings. For example, doctors using the modules can practice analyzing the size and location of an area of skin needed for biopsy.

Yarbrough finds reassurance in the expertise of the University of Tennessee Medical Center’s physicians and additional comfort in their ability to train other medical professionals in less invasive techniques. Bell says, “The benefit of a medical simulation center focuses on the confidence patients receive knowing a doctor is taking care of them who has the skill set and understanding to train medical professionals how to use today’s technology. At the University of Tennessee Medical Center, the region’s only academic medical center, the UT Center for Advanced Medical Simulation helps us look forward to less invasive technologies resulting in better outcomes and patient care.”

“He is my hero,” says Yarbrough.
An Evening in Orange debuted as the University of Tennessee Medical Center’s premier fundraising event on October 13, 2007. The more than $290,000 raised that evening funded the development of the UT Center for Advanced Medical Simulation, which has since continued to grow almost solely through philanthropic contributions. Scott Stevens, MD, Professor, Department of Surgery, was one of the simulation center’s initial proponents and helped ensure the proceeds of the inaugural event would be used as the seed money for the simulation center. Mrs. Beverly Bell and Mrs. Leslie Klein were the gala chairs and set a precedent which has lead An Evening in Orange to more than double its proceeds in just a few short years.

The quest to improve these facilities continues today with a $20 million campaign to expand and endow the UT Center for Advanced Medical Simulation. With these funds, our facilities will remain up to date for many years into the future. Mike West of Northshore Management Company chairs the campaign with Leonard Hines, MD, and Paul Hufstutter, MD, as Co-Medical Directors of the UT Center for Advanced Medical Simulation.

If you would like to make a contribution to the UT Center for Advanced Medical Simulation campaign, please contact the Office of Development at (865) 305-6611 or development@utmck.edu.
The 5th Annual *An Evening in Orange* was a tremendous success, raising more than $750,000 in a single night! On May 12, 2012, friends and supporters from throughout the East Tennessee community gathered at Neyland Stadium for the event—the first black-tie party ever to be held on Shields-Watkins Field. This unprecedented gala benefited the Center for Women and Children’s Health at the University of Tennessee Medical Center with a majority of funds going toward renovation of the Neonatal Intensive Care Unit. More than 700 guests attended the event, hosted by Chairs Amy and Andy White. The program included performances by country music stars Darryl Worley, Rachel Holder, Laurel Wright, and Matt Stillwell.

**Donor Profile:**
**Debbie Diddle**

Debbie Diddle is the Development Chair on the UT Graduate School of Medicine’s Board of Visitors. She has strong connections to the UT Graduate School of Medicine through her father-in-law, who established the obstetrics/gynecology residency program; her son, who completed clinical rotations at the UT Graduate School of Medicine; and her husband, who interacts with the dental and oral and maxillofacial surgery residency programs as part of his practice. Debbie and her husband, John, are great supporters of the UT Center for Advanced Medical Simulation and research at the University of Tennessee Medical Center. Their insight and dedication to the health of future generations of East Tennesseans embody the mission of the UT Graduate School of Medicine, and we are proud to call Debbie a supporter and advocate.

**Dialysis Clinic, Inc. Donates to the Health Information Center**

Dialysis Clinic, Inc. (DCI) recently continued their commitment to the Preston Medical Library in the Health Information Center by making a gift of $50,000. DCI is a nationwide non-profit organization formed in 1971 to meet the needs of individuals undergoing outpatient dialysis. DCI is affiliated with major universities and academic medical centers across the country, and notably, the Knoxville DCI Clinics are affiliated with the University of Tennessee Medical Center. Medical Director of the Knoxville DCI Clinics, Thomas Miller, MD, and Administrator Terry Williams have continued to support the Preston Medical Library throughout the years by requesting support from the DCI organizations in the form of donations to the library.
More than 115 golfers endured the 100+ degree heat on June 28 for the 7th annual TEE Up for Trauma. The event raised more than $55,000, which will help buy new endoscopy and imaging equipment for the trauma center at the University of Tennessee Medical Center. In its seven year history, TEE Up for Trauma has raised close to a quarter of a million dollars supporting the only Level I Trauma Center in the region. Special thanks go to University Orthopaedic Surgeons as the presenting sponsor and Avalon Golf & Country Club as the hosts and to the entire committee for helping make the day such a success.

50th Anniversary of the Auxiliary

In 1962, the University of Tennessee Medical Center Auxiliary began attending to the needs of patients and their families without compensation beyond the joy their kindness brought them. Since its inception, the Auxiliary has donated almost $3 million and 700,000 hours of service. On April 4, the University of Tennessee Medical Center recognized and celebrated the impact 50 years of volunteerism has made in the medical center and to the community.

The festivities began with a group shot of all the active and retired volunteers in attendance. The medical center’s President and CEO, Joe Landsman, hosted the luncheon, and former Director of Women’s Athletics at the University of Tennessee Knoxville, Joan Cronan, was the keynote speaker.

Past presidents of the Volunteer Auxiliary came to celebrate 50 years of service to the medical center. Left to right back row: Duane Johnson, Linda Ballard, Nancy Hansard, Frances Nipper, Joseph R. Landsman, Jr. President and CEO of the medical center, Marg Dietz, and current President John Rosati. Left to right front row: Mary Schultz, Elizabeth Shreder, Fay McMahan, and Joan McMullen.
The University of Tennessee Graduate School of Medicine offers the following educational courses this fall and winter for physicians, researchers, allied health providers, and other healthcare professionals seeking continuing education.

**November 5-9**
Approved for AMA and AAPA credits and CEUs

*Lean for Healthcare*
Haslam Business Building
University of Tennessee
Knoxville, Tennessee

This course uses the concept of lean processes traditionally practiced in the manufacturing industry but now applied to improving efficiencies and eliminating waste in healthcare. It is appropriate for healthcare professionals, including physicians, nurses, pharmacists, and others, as well as healthcare executives and those who affect medical and financial decisions in organizations.

www.tennessee.edu/cme

**January 19**
Approved for AMA, AAPA, and ACPE credits and CEUs

*Ninth Annual Hematology Conference: An Update on Selected ASH Topics*

University of Tennessee Conference Center
Knoxville, Tennessee

The annual hematology update occurs as soon as possible after the American Society of Hematology (ASH) international conference, while allowing time for featured speakers to develop unique presentations combining their areas of expertise with new information garnered from the ASH presentations.

The conference provides updates on recent advances in the treatment of blood cancers, including hemostasis/thrombosis, chronic lymphocytic leukemia, myelodysplastic syndromes, multiple myeloma, and malignant lymphoma. Sessions will be led by nationally acclaimed experts in their fields.

www.tennessee.edu/cme/Hematology2013

**Save the Dates!**

- **March 1-2, 2013:** Internal Medicine Conference
  Knoxville, Tennessee
- **March 16, 2013:** Ninth Annual Diabetes Regional Conference
  Knoxville, Tennessee

To register or for more information about these courses, call 865-305-9190 or visit our website at www.tennessee.edu/cme.
INSIDE THE WORLD OF MEDICAL SIMULATION

Scan code to watch videos of the simulation technology in this issue of Frontiers, or visit utmedicalcenter.org/frontiers-videos