

Five Years of Excellence: A Journey Through Achievement at the UT Southwestern Simulation Center

2022-2023 Annual Report



Center's Mission:
We provide
creative,
innovative,
simulation-based
education and
scholarship for
UT Southwestern
and our
community.



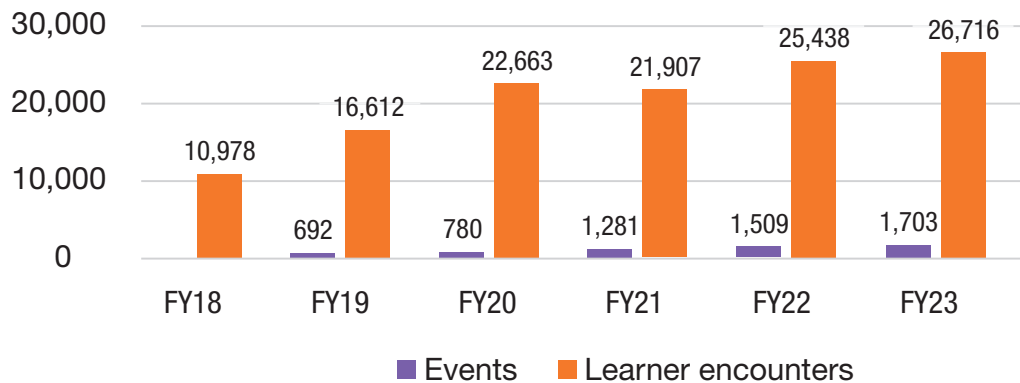
The UT Southwestern Simulation Center is accredited by these organizations: the American College of Surgeons-Accredited Education Institutes (ACS-AEI) as a Level I Comprehensive Center; the Society of American Gastrointestinal and Endoscopic Surgeons (SAGES) as a Fundamentals of Laparoscopic Surgery (FLS) and Fundamentals of Endoscopic Surgery (FES) test center; American College of Obstetricians and Gynecologists Simulation Working Group; and the American Society of Anesthesiology as an endorsed center to hold Maintenance of Certification in Anesthesiology (MOCA) courses.

A five-year reflection

The UT Southwestern Simulation Center is at the forefront of bringing the future of health care education to the present. Celebrating five years of dedicated operation and service to the UTSW community, the 49,000-square-foot Simulation Center continues to embody our vision of enhancing patient care. We persistently explore innovative approaches to train health care providers, students, and others through both in-person and virtual learning experiences. Our unwavering commitment lies in delivering exceptional educational offerings across all specialty areas and disciplines. Over the past five years, the Sim Center has garnered recognition for its numerous achievements.

- Unparalleled scale and infrastructure: Our Simulation Center distinguishes itself with expansive facilities and state-of-the-art technology, providing an unmatched environment for immersive learning experiences. Equipped with advanced simulators and equipment, learners engage in high-fidelity scenarios mirroring real-world situations.
- Expertise-driven excellence: What truly sets us apart is the exceptional proficiency of our simulation champions and team. Comprising experienced educators, health care professionals, and technology specialists, our team ensures the design and execution of meticulously crafted simulations. This results in comprehensive learning opportunities promoting critical thinking, decision-making, and skill refinement across various disciplines.
- Premier scholarship and research: At the forefront of academic advancement, the Simulation Center leads with premier scholarship in simulation education and research. Collaborating with renowned institutions and researchers, we contribute to shaping the future of simulation-based learning, as evidenced by the 68 peer-reviewed articles the Sim Center has fostered across professions and specialties.
- Innovation: Our commitment to innovation and evidence-based practices fosters a dynamic learning environment that consistently evolves to meet the changing needs of learners and industries. As we continue our journey, the UT Southwestern Simulation Center remains dedicated to pushing boundaries and setting new standards in health care education.

Learner encounters and events FY18-FY23



	FY18 to FY19	FY19 to FY20	FY20 to FY21	FY21 to FY22	FY22 to FY23
% Growth events		13%	64%	18%	13%
% Growth encounters	51%	36%	-3%	16%	5%

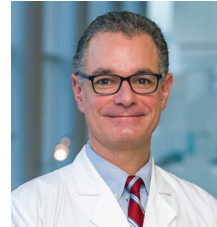
A year in review

In the academic year 2022-2023, the Sim Center experienced substantial growth, with a 13% increase in simulation events and a 5% rise in learner encounters compared with the previous year. By year-end, we achieved:

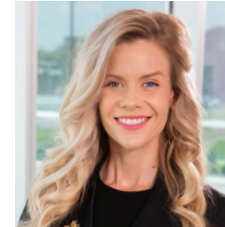
- 26,716 learner encounters
- 1,703 events

Our strategic framework is intricately aligned with UT Southwestern's mission, vision, and strategic goals, emphasizing our joint commitment to advancing the future of health care and promoting patient-centered care. Our focus remains steadfast on innovation, professional development, and scholarly pursuits.

Taking the lead in introducing new simulation offerings across the campus and expanding education offerings, we witnessed remarkable growth within these three strategic domains. As we revolutionize health care education through cutting-edge techniques, our relentless efforts are geared toward earning national recognition.



Daniel Scott, M.D., FACS, Director



Krystle Campbell, D.H.A., M.S., CHSE, Director of Operations

During the 2022-2023 academic year, the Sim Center took the lead in organizing innovative campuswide simulations, catering to diverse health profession learners. This encompassed faculty, residents, fellows, nurses, advanced practice providers, and physical therapists, alongside medical, physician assistant, nursing, and other allied health students. By the end of the year, our achievements included:

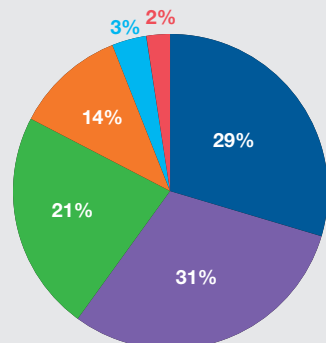
- 30 in situ, high-fidelity, interprofessional simulations hosted in the operating rooms of William P. Clements Jr. University Hospital
- More than 83 weekend events
- Simulations for 19 out of the 21 UT Southwestern Clinical Departments

This comprehensive approach ensured that our offerings covered a broad spectrum of health care scenarios, providing learners with immersive experiences across various simulation modalities, such as:

- Procedural-based sessions encompassing central venous line training, advanced laparoscopic training, robotic surgery, ultrasound, chest tube insertion, history and physical exams, and advanced airway management
- Scenario-based simulations dedicated to critical domains like teamwork, professionalism, communication, medical decision-making, and crisis resource management
- Specialized sessions involving high-stakes simulated patient encounters, where learners underwent objective assessments based on performance criteria while engaging with expertly trained simulated patients

These statistics illustrate our commitment to providing tailored and impactful educational experiences across a spectrum of health care disciplines.

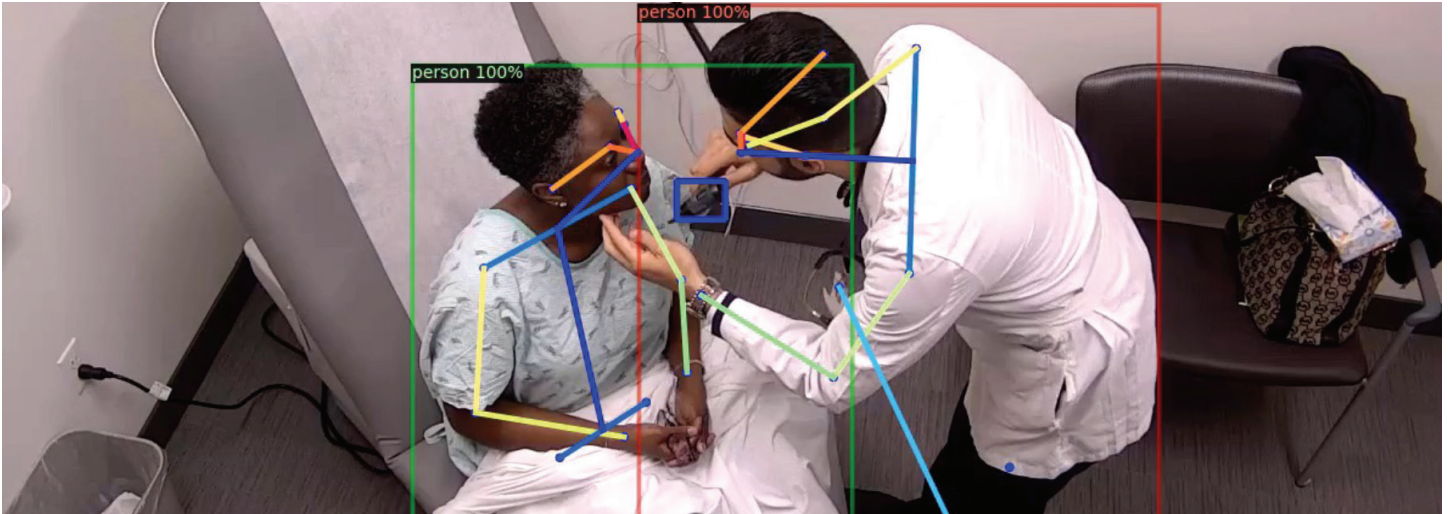
Percentage breakdown of 1,703 activities by learner groups:



- Medical students
- Residents and fellows
- Nursing and allied health professionals
- Physicians
- School of Health Professions students
- Researchers

Scholarship

Artificial intelligence adoption in Clerkship Objective Structured Clinical Examination (COSCEs)



Medical student performs a physical exam with a highly trained standardized patient (SP) during a COSCE station. AI analytics applied to captured video feed enables systems to automate whether a physical exam was done appropriately based on the SP scenario, a function previously performed by a trained SP educator who watched and graded over 2,400 videos after each 10-station COSCE.

In pursuit of advancing innovation through research and development, the Sim Center partnered with the Lyda Hill Department of Bioinformatics and the UT Southwestern Medical School Colleges to explore the impact of an AI-powered Automated System Protocol (ASP) on grading students' post-encounter notes in Clerkship Objective Structured Clinical Examinations (COSCEs), comparing it with the traditional human grader system. This project leveraged GPT-4 technology, mapped rubric items to prompts, and analyzed post-encounter notes from 684 medical students across four academic years. The results revealed significant cost savings and efficiency gains.

While initial development incurred added costs, the execution-only phase of ASP demonstrated a return on investment of 589.44%, saving \$47,877 with an 87.5% time efficiency compared with legacy models. These findings underscore the potential of automated assessment in medical education to provide substantial time and cost savings while enhancing the learning experience. By freeing up human resources from manual grading tasks, ASP contributes to a more efficient, effective, and engaging future for medical education, aligning with our commitment to fostering innovation through ongoing research and development initiatives.

This project highlights the transformative promise of ASP in medical education, marking a significant leap forward in our commitment to innovation. By relieving human resources from manual grading and facilitating immediate feedback, this approach not only enhances efficiency but also enriches the overall learning experience.

Beyond assessment, the implications of ASP empower educators to redirect their efforts to critical areas, fostering a more holistic educational approach. The integration of automated assessment serves as a catalyst for broader curricular enhancement and assessment strategies, aligning with the dynamic needs of health care education. The combined educational and economic advantages, along with the possibility for improving longitudinal integration and providing timely feedback, position automated assessment as a pivotal innovation developed in the Sim Center that is poised to shape the future of medical education. The successful integration of automated assessment within COSCE cases represents a landmark achievement, yielding multifaceted benefits across the educational landscape.

“Our work in developing AI-powered solutions that enhance the quality of medical education for students, faculty, and staff has only further reinforced how much of an incredible asset the Simulation Center is for UTSW’s research and clinical community. The capability to rapidly deploy and monitor novel AI systems has proven invaluable and highlights the Simulation Center’s critical (and growing) role for ensuring UTSW’s leadership in the successful (and safe) adaptation of AI technology in medicine.”

– Andrew Jamieson, Ph.D./Mike Holcomb, M.S.,
UT Southwestern Medical Center

Continuing professional development

OR Black Box in situ training



Interprofessional OR team members pause to discuss the simulation with two expert facilitators, Daniel Scott, M.D., (center) and Krystle Campbell, D.H.A., (right), who guide the conversation to facilitate learner self-reflection using objective structured simulation debriefing principles. These simulations occurred prior to the first surgery in the real ORs at Clements University Hospital, ensuring high-fidelity, realistic simulations.

In our ongoing pursuit of innovation, the prospective convergent multimethods project of hosting interprofessional in situ simulations stands out as a testament to our commitment to refining health care practices through simulation. This 15-minute in situ simulation, strategically conducted before the commencement of the first case of the day, followed a structured process encompassing pre-brief, simulation iteration 1, feedback, and simulation iteration 2.

To ensure comprehensive evaluation, a 35-point rubric, derived from checklist items and hospital policy, was meticulously crafted. Three trained facilitators, employing live observation, expertly scored the simulations. Facilitator-led discussions were transcribed and used for thematic content analysis, providing valuable insights into the nuanced aspects of the simulation and the OR culture. Additionally, surveys administered via REDCap enhanced the multimethod approach, contributing to a thorough understanding of the project's impact and effectiveness.

This initiative facilitated a total of 163 learner encounters, with 25 repeaters undergoing the simulation (limited to three repetitions per participant). A diverse cohort of 125 individual participants actively engaged in the simulations, contributing to the richness and diversity of experiences within the project.

Using OR Black Box assessments of surgeons post-simulation, the team found a significant increase in the debriefing compliance scores in the Sim group (73%) compared with the no-Sim group (66%; $P < 0.001$). These statistics illustrate the scale and impact of our simulation endeavors, reinforcing our commitment to advancing health care education and proficiency across multiple medical specialties. This project also exemplifies our dedication to advancing health care education and refining patient care with rigorous and multidimensional evaluation methodologies gained through the adoption of emerging technology.

“UT Southwestern is one of the first medical centers to implement OR Black Box technology to capture patient safety data. We had a unique opportunity to leverage this novel data capture system to document improved clinical outcomes following interprofessional team training simulations focusing on timeout and debriefing. Not only was this intervention successful, we also learned a lot about our OR culture and the need for all team members to feel comfortable speaking up. This concept of psychological safety is a foundational principle of simulation.”

– Daniel Scott, M.D., Assistant Dean of Simulation and Student Integration, and Director of the Simulation Center

Scholarship

Simulation-Based Quality Improvement and Research Forum



Keynote speaker Laura K. Rock, M.D., poses for a photo with Simulation Center leaders Krystle Campbell, D.H.A., Director of Operations, and Daniel Scott, M.D., Assistant Dean of Simulation and Student Integration and Sim Center Director.

The Simulation Center's core efforts involve advancing scholarly work through education and building a robust simulation community, rich with different perspectives, expertise, and passions. As such, the Sim Center recognizes its critical role in being a conduit across a variety of champions from different disciplines and professions who hold a common interest in simulation. The Simulation-Based Quality Improvement and Research Forum continues to offer a venue for our community to share their diverse simulation efforts across the region, secure mentorship, and collaborate on future initiatives.

The sixth annual Simulation-Based Quality Improvement and Research Forum took place May 17 in the McDermott Lecture Halls on South Campus. The event featured a keynote address, panel discussions, research presentations, and an afternoon visit to the Sim Center that combined virtual and in-person formats for the first time since the onset of the COVID-19 pandemic in 2020. Attendees, including physicians, nurses, and various health care professionals, also had the opportunity to earn continuing education credits.

The keynote address, titled "Simulation, Debriefing, and the Art of Listening," was delivered by Laura K. Rock, M.D., a pulmonologist and critical care physician at Beth Israel Deaconess Medical Center and Assistant Professor at Harvard Medical School.

Dr. Rock, an expert in communication training, discussed the challenges of raising issues to prevent errors in a medical environment. She underscored the importance of creating a psychologically safe environment, where all individuals, regardless of their roles, feel comfortable expressing concerns.

Dr. Rock recommended short debriefing sessions involving all stakeholders, including housekeeping staff, to generate input that could enhance patient outcomes. She highlighted the significance of effective physician-patient communication, emphasizing that patients often comprehend less than half of what is communicated. Training in communication can lead to improved adherence to medical directives and better patient outcomes.

With a record 52 submissions, the conference spotlighted passionate simulation scholars through:

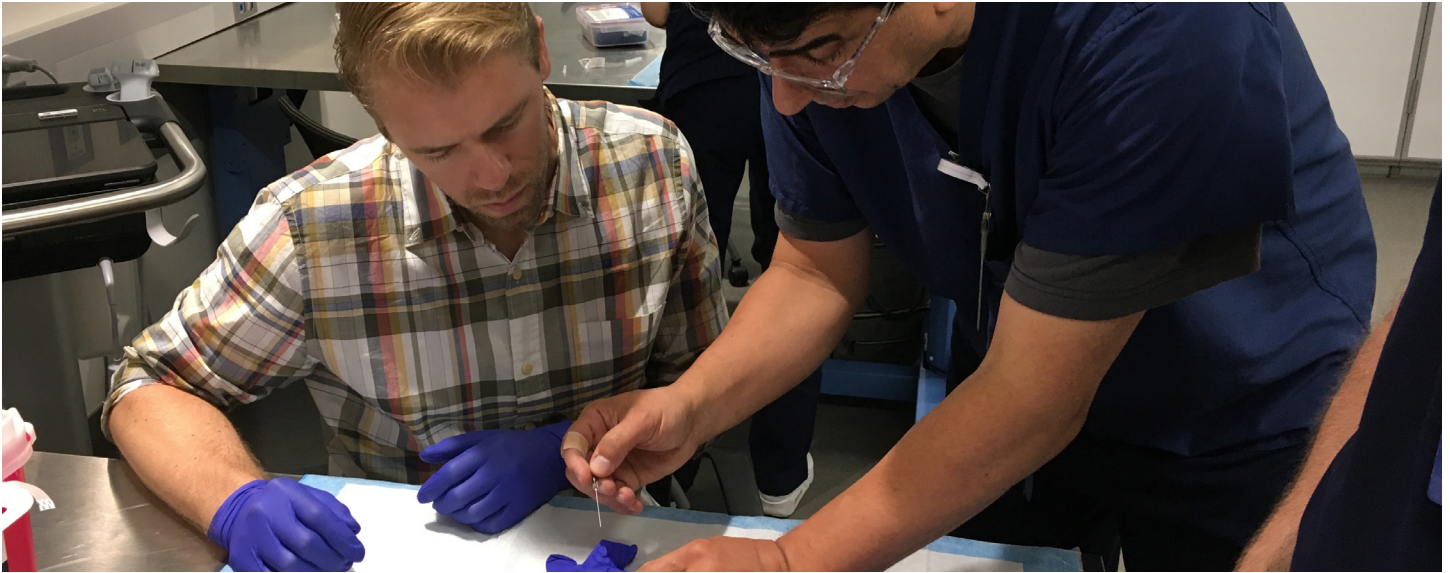
12 oral presentations

5 "Emerging Ideas" presentations

21 poster presentations

3 interactive workshops

Scholarship



Advancing the science of simulation across the health care sector, our passionate simulationists and simulation teams have published over 68 manuscripts in peer-reviewed journals to date and led more than 50 workshops, lectures, and podium presentations at regional, state, national, and international conferences. This included sessions at the International Meeting for Simulation in Healthcare, American College of Surgeons Accredited Education Institutes Summit, Surgical Safety Network, The Gathering of Healthcare Simulation Technology Specialists, Association of SP Educators, Simulation Professionals of Texas quarterly conference, and the Texas Association of Surgical Skills Laboratories. Presenters disseminated their scholarship within these different venues, highlighting the outstanding work being done in simulation at UTSW.



West Campus Building at night, where the Simulation Center occupies the second and third floors.

Simulation Center Staff

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Carla Mosley, Manager, Standardized Patients

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Dante Castro, Clinical Simulation Educator

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Ian Nazareno, Program Coordinator

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Tyler Austin, CHSOS, Simulation Operations Specialist

Simulation Governance Committee

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and Senior Associate Dean for Education

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Graduate Medical Education; Director, Simulation Center;
holder of the Frank H. Kidd, Jr., M.D. Distinguished
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Department of Academic Affairs

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M.D., and the Eva A. Rosenthal Professorship in Internal Medicine,
in Honor of Gary Reed, M.D.

Joseph Martinez, M.D.

Director of Emergency Medicine Simulation;
Professor of Emergency Medicine

Melanie Sulistio, M.D.

Professor of Internal Medicine;
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Robert Rege, M.D.

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