



CAPTURING THE TRANSFORMING POWER
OF SIMULATION-BASED EDUCATION:

Mayo Clinic Multidisciplinary Simulation Center



Like pilots in training, who must learn to operate an aircraft before it is filled with passengers, medical professionals must learn to perform crucial skills before treating patients. Student pilots use simulation technology to practice flying without ever leaving the ground. Students training for medical professions — such as physicians, nurses and allied health specialists — have not had such educational tools until very recently.

Historically, medical education has occurred “apprenticeship style,” with clinical instructors modeling skills and supervising closely as students gain experience.

Today, new opportunities for learning show potential for significantly improving medical education. Just as simulation technology helps prepare beginning pilots for the uncertainties

of flight, it now helps prepare surgeons, physicians and other medical professionals for the challenges of medical practice.

Over the past decade, medical simulation education programs have begun at a small number of U.S. academic institutions. These programs have been limited to narrow focuses within clinical specialties, such as critical care or anesthesia. No one has explored the potentials of simulation-based education across medical specialties, until now.

Mayo Clinic is one of several leading academic institutions investigating broad-based simulation in medical education. With the creation of the Mayo Clinic Multidisciplinary Simulation Center, Mayo is positioned to become the most comprehensive multidisciplinary center for simulation education in the world.

“In critical care simulation exercises your heart races, you sweat, you cope. This produces an extremely powerful learning experience.”

— WILLIAM DUNN, M.D.



ABOUT SIMULATION EDUCATION

Simulation-based medical education is an artificial (or simulated) learning environment created to imitate a real-life patient care setting where learners can practice and master skills without putting patients at risk. The Mayo Clinic Multidisciplinary Simulation Center provides learning opportunities in three modalities:

■ **Task trainers:** Sophisticated computerized learning modules allow surgeons and physicians to practice procedures, such as gallbladder removal or knee aspiration.

■ **High-fidelity mannequins:** Life-size mannequins respond physiologically to treatment, enabling learners to practice treating “patients” in a no-risk environment.

■ **Standardized patients:** Actors provide learners with live “patients” on whom to practice their diagnostic abilities and hone their bedside skills.

“Simulation allows you to deliver ‘real-life’ experiences with a pre-planned curriculum that you cannot get using other teaching methods,” says Roger Harms, M.D., chair, Mayo Clinic Rochester Education Committee. “Simulation also expands exposure to rare or complex medical cases that students might not otherwise see in the course of their training. It allows learners to develop proficiency in a setting where they can learn from mistakes — without patient risk.”

Initial research has shown this experiential approach to medical education increases the rate of learning. This increase is due in part to the evaluation and self-critique that are part of each simulation exercise.

“The most meaningful learning took place during the debriefing,” wrote one student in a post-exercise evaluation. “Setting aside time to reflect about the simulation was important.”

MAYO CLINIC MULTIDISCIPLINARY SIMULATION CENTER

The Mayo Clinic Multidisciplinary Simulation Center, which opened in October 2005, occupies the first floor of the Vincent A. Stabile Building in Mayo Clinic Rochester. The 10,000-square-foot facility includes simulation laboratories, debriefing rooms, classrooms and offices. The staff comprises simulation education experts, education theory researchers, physicians, respiratory therapists, engineers, program coordinators and administration support.

The simulation center’s initial offerings have focused on education and competency measurements of health care team members working in specialties such as: anesthesiology, internal medicine, surgery, emergency medicine, OB/GYN and pediatrics. Additional funding will allow the simulation center to expand its offerings to other disciplines and all Mayo Clinic sites. The center hopes to reach learners outside Mayo Clinic through continuing medical education courses and professional certification competency testing.





DISTINCTIVELY MAYO

“Simulation education is poised to have nothing short of a revolutionary effect on medical education,” says Dr. Harms. “And Mayo is particularly well suited to lead the revolution. Our institution’s history of innovation and longtime commitment to education have paved the way for this endeavor.”

Hallmark Mayo Clinic attributes that have enhanced the simulation center’s development include:

■ A multidisciplinary approach

Mayo’s devotion to the practice of fully integrated, multidisciplinary medicine extends to its simulation center. Teams of professionals from multiple specialties collaborate on program design and research. In addition, learners from various disciplines come together to participate in common training exercises. The simulation center serves as a catalyst to enhance teamwork between patient care professionals at Mayo Clinic, strengthening team performance and patient care.



■ Outstanding technological resources

The Mayo Clinic Multidisciplinary Simulation Center utilizes the most realistic and sophisticated task trainers and high-fidelity patient mannequins available. The center’s audiovisual equipment is unparalleled, allowing for the capture and immediate review of simulation exercises as well as the ability to videoconference simulation exercises to Mayo Clinic sites in Jacksonville, Fla., and Arizona. In addition, the simulation center collaborates with Mayo’s Education Technology Center, which makes comprehensive medical information accessible through computer technology and assesses how learners best assimilate new information. Both centers are researching best approaches for medical education at all learning levels.

■ A commitment to research

Initial research studies by staff at the Mayo Clinic Multidisciplinary Simulation Center are focused on determining the effectiveness of simulation curricula for medical residents and fellows in emergency medicine, anesthesiology and critical care. Research findings will be documented and disseminated for wider benefit. As the simulation center's program offerings expand, so will its research efforts.

■ Passionate leadership

William Dunn, M.D., a pulmonary and critical care specialist at Mayo Clinic, is director of the Mayo Clinic Multidisciplinary Simulation Center. He is an internationally recognized leader in simulation-based medical education and president of the Society for Simulation in Healthcare, which is committed to setting a national agenda for the application of simulation education. Dr. Dunn served as editor of the textbook *Simulators in Critical Care and Beyond*.

■ Beyond Mayo

The Mayo Clinic Multidisciplinary Simulation Center is one of 11 advanced comprehensive simulation centers to be accredited by the American College of Surgeons (ACS). Accreditation by ACS positions Mayo to offer and advance medical education that will improve patient safety by increasing health care member's ability to keep pace with rapidly changing technologies. The center is expected to provide national and international leadership in developing simulation-based education.

The Mayo Clinic Multidisciplinary Simulation Center is preparing to play an increasingly pivotal role in the accreditation of medical education programs. The American Board of Internal Medicine used Mayo Clinic's simulation resources and expertise in a study validating a new simulator to train interventional cardiologists, a trend that is expected to continue.

There also are prospects for the Mayo Clinic Multidisciplinary Simulation Center to partner with industry, including working with simulation vendors for design and testing products for optimal patient use and benefit.



■ Of global importance

Mayo's discussions with national and international leaders in simulation education are ongoing. These experts are regularly invited to Mayo to present continuing medical education opportunities in such disciplines as critical care, bio-terrorism and emergency management.

The simulation center is building relationships with government and the military to train personnel, including civilian training programs in counter-terrorism and medical preparedness. Mayo has already cultivated a sister relationship with the Chaim Sheba Medical Center of Tel-Hashomer, Israel, which uses simulation-based education to train every crisis team in Israel and is considered the premier institution in the world for such training.

SUSTAINING THE VISION OF MAYO CLINIC

Educational experiences of the highest quality are an integral component of Mayo Clinic's past, present and future successes. The Mayo Clinic Multidisciplinary Simulation Center promises to improve the training of physicians and other health care professionals. Such strong and creative programs enable Mayo Clinic to continue to recruit superior students and expert practitioners, thereby ensuring future generations of health care team members who will carry forward Mayo's commitment to the needs of its patients.

"The value to our patients is the foremost reason why Mayo must continue to strengthen its academic education programs," says Dr. Dunn. "This is fully consistent with Mayo's primary value that 'the needs of the patient come first.' The Mayo Clinic Multidisciplinary Simulation Center will be used to experientially measure and reinforce the ideal practice of medicine to perpetually advance the standard of care patients receive."



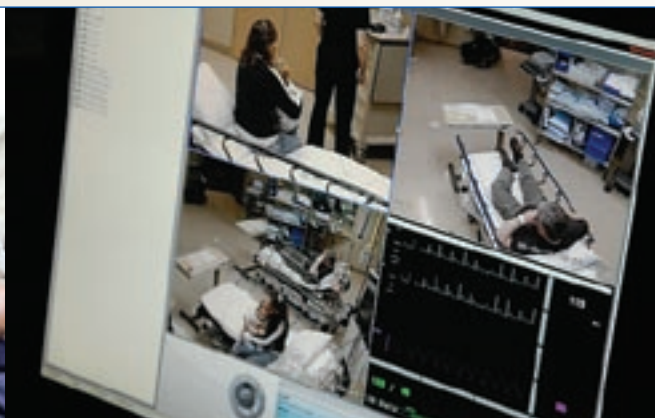
***AN OPPORTUNITY TO CHANGE THE
FACE OF MEDICINE***

Simulation-based education is at a pivotal point in its development. Its potential to improve patient care and safety needs robust exploration throughout all medical disciplines with centralized, integrated support. Mayo Clinic has the institutional commitment, leadership, expertise and multidisciplinary collaborations to lead its continuing development and application to profoundly benefit all of medicine. Your support will help ensure this vital mission reaches its full potential.



*“The glory of medicine is that it is constantly moving forward,
that there is always more to learn.”*

— WILLIAM J. MAYO, M.D.



***FOR MORE INFORMATION,
PLEASE CONTACT:***

Mayo Clinic, Department of Development
Toll-free telephone: 1-800-297-1185
www.mayoclinic.org/development

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4500 San Pablo Road
Jacksonville, FL 32224

200 First Street SW
Rochester, MN 55905

13400 East Shea Boulevard
Scottsdale, AZ 85259

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