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The Simulation and Skills Center at Beth Israel Deaconess Medical Center

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OVERVIEW OF THE INSTITUTE

Purpose

The Simulation and Skills Center at Beth Israel Deaconess Medical Center (BIDMC) Boston was established in 2003. The center was developed with the belief that essential technical and cognitive skills may be taught and tested—beginning with medical students—outside the operating room or the wards using models, computers, virtual reality, and teleconferencing technology. The mission of the center is: to provide a premier simulation and skills center to establish validated training curriculums for medical students and residents; to further the mission of BIDMC as a national leader in the education and training of medical students, residents, and practicing physicians in minimal access surgery, new technology, team training, and crisis management; to assess postgraduate competency, regional continuing education courses, and teleproctoring initiatives to drive the safe adoption of procedures and new technology; and to promote best practices and patient safety. In 2006, The Simulation and Skills Center (SASC) became the first regional education institute in North America accredited by the American College of Surgeons.

Location

The SASC is located in the East campus of the Beth Israel Deaconess Medical Center in Boston and is just 2 blocks away from the Harvard Medical School. The SASC consists of a 5200 square foot area on the ground floor of the Shapiro Clinical Center. Our center has 2 well-lit galleries where towers and box trainers are set up for practicing laparoscopic and endoscopic skills. The SASC has a large central auditorium which seats 65 people comfortably. The auditorium has full video capabilities, including videoconferencing and live video feeds from operating rooms throughout the center. The center piece of SASC is a highly realistic simulated operating room and simulated preoperative hold/intensive care unit (ICU) area complete with a video/mirrored observation control booth. Set further back is our debriefing room where learners can watch video of operative scenarios taking place or review past exercises.

Over the course of the past 6 years the SASC has undergone tremendous growth from a basic skills arcade to an education center for all medical subspecialties. In 2004, following a year-long Institution-wide review of the educational mission at BIDMC the Medical Center's Board of Directors authorized the expansion of the basic Surgical Skills Laboratory to form a comprehensive learning institute that would broaden the use of simulation in the training and education of medical students, residents, and health care professionals across all specialties. The plan proposed that the simulation center incorporate the existing skills and

simulator program for surgical specialties and use it as a foundation upon which to build. The new center, named the Carl J. Shapiro Simulation and Skills Center (SASC), is now a key component of the institution's Center for Education at Beth Israel Deaconess Medical Center.

The SASC resides within the Center for Education at BIDMC, which is directed by the Medical Center's Vice President for Education. Its Office of Professional Development and Office of Educational Technology support the creation of curricula and teaching materials and provide programs that enhance the personal growth of the medical educators on the faculty. The resources of the Center for Education have strengthened and broaden SASC's mission. The expansion of the Center to multiple BIDMC departments has solidified SASC's position as 1 of the premier simulation facilities in the Northeast and arguably 1 of 2 or 3 best surgical skills laboratory facilities in North America.

Strengths

The most exciting feature of SASC is the state-of-the-art MIS mock Endosuite which replicates a real operating theater. The Endosuite has standard laparoscopic surgical equipment as well as an anesthetic simulator to allow manipulation of a mannequin's hemodynamic parameters through a software program. An adjacent room serves as a control room. Multiple video and audio recording equipment allows the researchers or trainers to view the simulation in real time as well as playback on a digital video disc (DVD) to evaluate or use for debriefing. Our current mannequin consists of a synthetic model of the abdomen fixed to the anesthetic simulator which simulates the abdominal wall skin as well as intra-abdominal organs and fat. The model is draped with surgical drapes and simulated laparoscopic procedures can be performed and simulated blood loss initiated, controlled, and monitored. The mock operating room (OR) has attracted surgeons from Dubai and France eager to implement a similar teaching simulation curriculum, and has been featured on television's American Broadcasting Company (ABC) Good Morning America, Jeopardy!, Chronicle, and History Channel's The Works.

LEARNERS TARGETED

Type of Learner Served

The SASC meets the needs of a range of learners from medical students to practicing physicians as well as for nurses and allied health professionals. One of our goals is to develop and reinforce a culture of life-long learning among all who provide care at BIDMC. If life learning is the key to producing a physician or surgeon, who will stay current and competent, we must constantly strive to facilitate the educational experience and development of skills for our learners. At the SASC we have developed a wide range of individualized programs which make acquisition easier and readily available, utilizing the most up-to-date techniques and technology. In the Center we have also incorporated team-training exercises that expose learners to the other members of the health care team and emphasizes clear and respectful communication across all levels and specialties. Such training leads to cohesive and coordinated care that addresses the needs of all patients.

Description of Courses and How Often the Courses Are Offered

Nearly every weekday, and most weekends the SASC has a new group of learners come in for a course or skills program of some sort. Over the course of an academic year nearly all of the hospital's residents and Harvard Medical Students at BIDMC will have some lectures and educational workshop at the SASC at some point in the year. Although the general surgery residents have been the Center's principal learners in the past, at present the majority of the residency programs at BIDMC have incorporated the SASC into their

teaching programs in some manner. Anesthesiology uses full-body human simulation as a component of the training for their residents in airway management and intubation skills. Gynecology makes use of the video trainers, (i.e., lap trainers); urology uses the UroMentor; and gastroenterology fellows practice advanced endoscopic procedures on high-fidelity endoscopic simulators. Plastic surgery faculty members utilize the operating microscope to teach basic and complex microscopic eye-hand skills. The internal medicine residency has established a procedure simulation program for their residents, and SASC is initiating a medical center wide, interdepartmental program to train residents in the techniques for placement of central venous catheters.

To date 1 of the most popular groups of courses at the SASC is the Fundamentals of Laparoscopic Surgery Program. The concept for this series was proposed to CRICO/ RMF, which is the insurance provider for the Harvard medical community, by SASC's co director, Dr Dan Jones. His proposal was to roll out a pilot program—CRICO/RMF Fundamentals of Laparoscopic Surgery (FLS) Patient Safety Incentive Program—for insured general surgeons who perform laparoscopic surgery. Upon successful completion of the FLS program, a 1-time patient safety incentive of \$500 would be awarded. Recognizing the importance of this program, the surgical leadership in the Harvard medical community agreed to partner with CRICO/RMF to help launch and promote this program. The courses were hugely successful and to date nearly 2 thirds of general surgeons with laparoscopic privileges have successfully completed the program across 28 CRICO-insured hospitals.

The SASC also leads in validation of FLS for gynecology (GYN), and CRICO subsequently expanded CRICO incentive to all gynecologic, vascular, thoracic, and urologic surgeons. SASC hosted the first national FLS course for the ASCRS colorectal annual meeting in Boston and subsequently ASCRS required all colorectal fellows to complete FLS examination. SASC actively collaborates on development and validation of a virtual reality version of an FLS simulator which may facilitate testing in the near future.

Surgeons in practice throughout New England have found the SASC to be an important resource that allows them to learn new techniques, thus enabling them to expand their repertoire of approaches to surgical problems. In addition, they have the opportunity to practice and hone previously learned skills. We have offered numerous didactic and hands-on courses using the SASC. The majority of courses are endorsed by the Society of American Gastrointestinal and Endoscopic Surgeons (SAGES) and provide Harvard Medical School Continuing Medical Education (CME) credits. Formal courses include laparoscopic inguinal hernia repair, laparoscopic ventral hernia repair, laparoscopic adjustable banding, laparoscopic gastric bypass, and laparoscopic colectomy. These courses are tailored to the specific needs of the groups and have included laparoscopic suturing, stapling, anastomosis, bipolar vessel sealing, and fibrin sealants. Individual instruction and feedback is provided to all learners. Teleconferencing equipment is utilized to observe “live” operations and provides opportunities to proctor procedures remotely as BIDMC learners become more proficient.

Given the emphasis on effective communication and teamwork at BIDMC, the SASC offers many courses for surgical nurses. We have offered the “MIS Nursing” and “MIS Bariatric Nursing” courses in the Skills Laboratory. Furthermore, on a monthly basis, operating room nurses are encouraged to attend video sessions focused on minimal invasive surgery in the teleconferencing classroom. To date, these courses have addressed cognitive and technical issues of minimally invasive surgery, as well as teamwork issues, to enhance the overall performance of the operating room staff. Physicians, surgeons, and allied health professionals from Beth Israel Deaconess Medical Center serve as faculty for these courses and educational programs.

SPECIAL FEATURES

Equipment: Simulators, Special Devices

The simulation and skills center has two METI Human Patient Simulators that are used in both our mock operating room and mock intensive care unit for team training and communication exercises. The simulation center staff has created a removable belly to enhance the realism of the operating room by allowing insufflation and trochar placement. The simulation center also has 2 dedicated rooms containing procedural and skills trainers. These include virtual reality trainers which include laparoscopy simulations, bronchoscopy simulations, endoscopy simulations, and urology simulations. Not all training is digital, we have video towers that our residents and medical students use to drill on a variety of tasks using real scopes, cameras, and light sources. Some of the tasks were custom-built by faculty and staff of the hospital.

Unique Teaching or Learning Methods Employed

Our videoconference room is wired directly to several of our operating and procedure rooms allowing up to 65 learners to observe surgeries and interact with the surgeon and operating room staff. This also allows the simulation center to participate in video conferences around the world or serve as a satellite auditorium for rounds. Several of our departments also use this technology to capture lectures for later use or to critique teaching methods. One of these programs is our Resident as Teacher series. Residents are videotaped lecturing the medical students and are later critiqued by faculty so they may improve their teaching skills.

KEY PERSONNEL AND CONTACT INFORMATION

Key Personnel

All of our faculty and preceptors hold academic appointments at Harvard Medical School and the majority have additional training in medical education. Both co directors, Dr Daniel B. Jones and Dr David Feinstein are nationally known leaders in simulation and skills training. In this capacity, they teach and lead faculty in current simulation technologies. Dr Jones has served as the Chair of Educational Resources Committee of the Society of American Gastrointestinal and Endoscopic Surgeons (SAGES), Chair of the Education Committee of the Society of Surgery of the Alimentary Tract (SSAT), and Chair of Simulation Committee of the Association for Surgical Education (ASE). Dr Feinstein has been integral also to anesthesia simulation teaching at the Center of Medical Simulation. The SASC coordinators include David Fobert, who is an expert in information technology, Darren Tavernelli, who has been teaching in pulmonary simulation for 5 years and Alex Derevianko, who is a general surgeon and had been teaching ATLS trauma courses for 10 years before joining the SASC team.

We welcome visitors to our center and web site:

<http://www.bidmc.org/MedicalEducation/ShapiroSimulationandSkillsCenter.aspx>.

Contact Information

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Co director, Dr David Feinstein

Coordinator, David Fobert

Coordinator, Darren Tavernelli

Coordinator, Alex Derevianko

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.