

ACS and ASE develop  
**Simulation-Based  
Surgical Skills  
Curriculum**  
for medical students

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INTRODUCING

ACS/ASE  
MEDICAL STUDENT  
SIMULATION-BASED  
SURGICAL SKILLS  
CURRICULUM

A COMPREHENSIVE RESOURCE  
FOR MEDICAL SCHOOL  
AND CLINICAL FACULTY

AMERICAN COLLEGE OF SURGEONS  
DIVISION OF EDUCATION  
*Blended Surgical Education and Training for Life*

The course was officially launched at Surgical Education Week in Orlando, FL, in April 2013 and was promoted by the ACS Division of Education at the 2013 Clinical Congress in Washington, DC, where it was demonstrated and discussed at the Medical Student Program.

**T**he American College of Surgeons (ACS) and the Association for Surgical Education (ASE) Medical Student Simulation-Based Surgical Skills Curriculum—a collaborative effort by the College and the ASE—is a modular curriculum consisting of 25 basic instructional and skills topics considered to be universal for all physicians and undifferentiated medical students (see Table 1, this page). This is the first of three curricula that the ACS Division of Education and the ASE are developing for joint release to benefit young and developing surgeons (see Table 2, this page). These programs are a natural extension of the previous successful joint work of the ACS Division of Education with the Association of Program Directors in Surgery (APDS)—specifically, the ACS/APDS Surgery Resident Skills Curriculum.

### Curriculum's beginnings

The ACS/ASE Medical Student Simulation-Based Surgical Skills Curriculum began as a project by the ASE Simulation Committee in 2009 at Surgical Education Week in Salt Lake City, UT. At this meeting, an initial list of potential topics and authors was developed by expert consensus. Robert D. Acton, MD, FACS (co-author of this article), was charged with organizing the topics, generating a template, and establishing author instructions. Knowing that the ACS/APDS Surgery Resident Skills Curriculum was being released in phases, Dr. Acton contacted Gary Dunnington, MD, FACS, who led the development of the ACS/APDS Surgery Residents Skills Curriculum, for advice on managing such a project and formulating a template and author instructions.

Based on the suggestions and leadership of Daniel B. Jones, MD, FACS (co-author of this article), then-chair of the ASE Simulation Committee, conversations were initiated with Ajit K. Sachdeva, MD, FACS, FRCSC, Director of the ACS Division of Education (co-author of this article), to determine whether the College would be interested in collaborating on this project and

TABLE 1.


### MODULES WITHIN THE ACS/ASE MEDICAL STUDENT SIMULATION-BASED SURGICAL SKILLS CURRICULUM

Year 1	Module 1:	Abdominal Exam
	Module 2:	Basic Vascular Exam
	Module 3:	Breast Exam
	Module 4:	Digital Rectal Exam
	Module 5:	Female Pelvic Exam
	Module 6:	Male Groin and Genital Exam
	Module 7:	Venipuncture and Peripheral IV
Year 2	Module 1:	Basic Airway Management
	Module 2:	Communication—History and Physical and Case Presentation
	Module 3:	Foley Bladder Catheterization
	Module 4:	Intermediate Vascular Exam
	Module 5:	Nasogastric Tubes
	Module 6:	Sterile Techniques—Gloving and Gowning
	Module 7:	Surgical Drains—Care and Removal
Year 3	Module 1:	Arterial Puncture and Blood Gas
	Module 2:	Basic Knot Tying
	Module 3:	Basic Suturing
	Module 4:	Central Venous Line Insertion
	Module 5:	Communication—During Codes and Safe and Effective Handoffs
	Module 6:	Intermediate Airway
	Module 7:	Intraosseous IV
	Module 8:	Local Anesthetics
	Module 9:	Paracentesis
	Module 10:	Thoracentesis

TABLE 2.

### LIST OF ACS/ASE PROGRAMS

- ACS/ASE Medical Student Core Curriculum
- ACS/ASE Medical Student Simulation-Based Surgical Skills Curriculum
- ACS/APDS/ASE Resident Prep Curriculum



## ACS/ASE MEDICAL STUDENT SIMULATION-BASED SURGICAL SKILLS CURRICULUM

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participating in the development of the curriculum. Dr. Sachdeva agreed that a robust national medical student skills curriculum would be of value to students and would help them develop into well-educated physicians and surgeons. During Surgical Education Week 2010, a joint ACS/ASE Steering Committee was formed with Dr. Jones and Kathleen Liscum, MD, FACS, associate professor of surgery, Baylor College of Medicine, Houston, TX (co-author of this article), as Co-Chairs (see Table 3, page 38), and an agreement between the two organizations was signed. The ACS/ASE Steering Committee met twice a year for the next several years with monthly conference calls and support from the staff of the ACS Division of Education.

The expertise of the ASE Assessment and Evaluation Committee, chaired by Constance C. Schmitz, PhD, associate professor and director of educational research and development, University of Minnesota, Minneapolis, was added to the development of the curriculum. Dr. Schmitz brought an outstanding team of individuals together to work with all the authors to develop a standardized assessment tool for each module. Concurrently, the ACS/ASE Steering Committee decided to perform a formal needs assessment by surveying U.S. medical school clerkship directors and medical students about the initial list of topics generated by the ASE Simulation Committee. As a part of the needs assessment, fourth-year medical students at five medical schools also were surveyed (see Table 4, page 39). Each participant was asked if the skills should be included in a medical student simulation skills curriculum and, if so, what year each skill should be taught. The results of this survey validated the initial list and helped to define appropriate modules. Survey results were reported as a poster presentation at the ACS Clinical Congress in October 2012 and then published in *The American Journal of Surgery*.\*

\*Glass CC, Acton RD, Blair PG, et al. American College of Surgeons/ Association for Surgical Education medical student simulation-based surgical skills curriculum needs assessment. *Am J Surg*. 2014;207(2):165-169.

### Curriculum modules

The authors wrote the modules between 2010 and 2012, using a template. It was critical that these modules included prerequisite knowledge, the skill, and common pitfalls, and did not simply feature skills existing in a vacuum. The curriculum was designed to move the learner along Bloom's taxonomy of learning with the continual acquisition of knowledge and skills (see Table 5, page 39). Once a first draft was completed, the modules were edited and refined, and assessments were then added to a later draft. In the spring of 2013, the curriculum was ready for release to surgical educators across the country.

The course was officially launched at Surgical Education Week in Orlando, FL, in April 2013 and was promoted by the ACS Division of Education at the 2013 Clinical Congress in Washington, DC, where it was demonstrated and discussed at the Medical Student Program (see figure, page 39). The feedback from the students who reviewed the modules was positive, resulting in a surge in visits to the Web pages that house the curriculum.

The ACS/ASE Medical Student Simulation-Based Skills Curriculum can be accessed at <http://MedStudentSimSkills.facs.org>, using your ACS user name and password. Once on the main page, the course is divided into the various modules with accompanying assessment tools across medical school years one through three. The modules are designed to be used in small groups with a faculty preceptor. However, they are comprehensive and self-contained so that students can complete them independently.

Both high- and low-fidelity simulators are used throughout the curriculum. It was imperative to make inexpensive, low-fidelity options available to hold down the costs for a program that would be implemented across an entire medical school class. Traffic to the website has been increasing since the initial release in April 2013, with surges corresponding to the Clinical Congress in 2013 and Surgery Education Week in 2014 (see figure, page 39).



In recognition of its inventive content, the curriculum was given the ASE Award for Excellence in Innovation in Surgical Education at the 2014 ASE meeting in Chicago, IL.

### TABLE 3.

#### ACS/ASE MEDICAL STUDENT SIMULATION-BASED SURGICAL SKILLS CURRICULUM STEERING COMMITTEE

Daniel B. Jones, MD, FACS, Co-Chair  
 Kathleen R. Liscum, MD, FACS, Co-Chair  
 Robert D. Acton, MD, FACS, Chief Editor  
 Connie C. Schmitz, PhD, Assessment Editor

#### MEMBERS:

Linda M. Barney, MD, FACS, Dayton, OH (general surgery)  
 Patrice Gabler Blair, MPH, Chicago, IL  
 Andre R. Campbell, MD, FACS, San Francisco, CA (general surgery)  
 Ellen S. Deutsch, MD, FACS, Philadelphia, PA (otolaryngology)  
 Ajit K. Sachdeva, MD, FACS, FRCS, Chicago, IL (general surgery)  
 Daniel J. Scott, MD, FACS, Dallas, TX (general surgery)  
 Stephen C. Yang, MD, FACS, Baltimore, MD (cardiothoracic surgery)

#### ASSESSMENT CONSULTANTS:

Adnan Alseidi, MD, EDM, FACS, Seattle, WA (general surgery)  
 Julia Corcoran, MD, MHPE, FACS, Chicago, IL (plastic and reconstructive surgery)  
 Marc A. De Moya, MD, FACS, Boston, MA (general surgery)  
 Loretto Glynn, MD, FACS, FAAP, Winfield, IL (pediatric surgery)  
 Mary Catherine Santos, MD, MSED, FACS, Hershey, PA (pediatric surgery)  
 Maura E. Sullivan, MSN, PHD, Los Angeles, CA (general surgery)

#### ACS DIVISION OF EDUCATION STAFF:

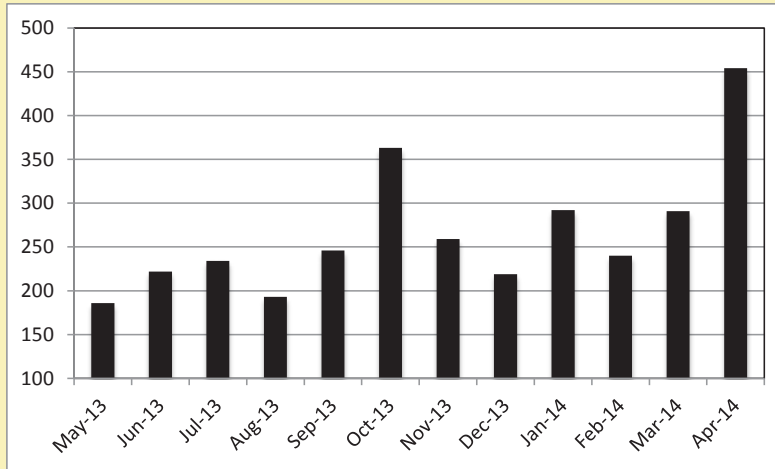
Patrice Gabler Blair, MPH  
 Kim Echert, C-TAGME  
 Tim Hotze  
 CherylInn Sherman

### Introduction of the curriculum

The ACS/ASE Medical Student Simulation-Based Skills Curriculum was the focus of a workshop at the 2014 ASE meeting, which was aimed at establishing a core group of surgical educators who will begin concerted use of the models at their institutions to teach medical students. The goal of this initiative is to determine if the modules need to be further refined and to provide validity to the assessment model. At present, more data are required to assign levels of proficiency based on specific scores. Dr. Acton is leading this project in collaboration with surgical educators from throughout the U.S. and Canada. Key partners in this effort include Dr. Jones; Jaisa Olasky, MD, clinical instructor in surgery, Harvard Medical School, Boston, MA; Michael Kim, MD, clinical fellow, University of Toronto, ON; Synde Muratore, MD, a general surgery resident, University of Minnesota, Minneapolis; and Melissa Brunsvold, MD, FACS, critical care surgeon and assistant professor of surgery, University of Minnesota.

The team will focus on five modules: Abdominal Exam, Basic Airway Management, Sterile Technique—Gloving and Gowning, Basic Knot Tying, and Basic Suturing. According to members of the Steering Committee, these modules will provide the initial broad appeal to students and educators where surgeons can have the greatest impact. The Basic Knot Tying and Basic Suturing modules were highlighted as part of the Medical Student Program at the 2014 ACS Clinical Congress, San Francisco, CA. During this program, students learned and demonstrated their suturing and knot-

## SIMULATION CURRICULUM WEBSITE VISITS BY MONTH



tying skills based on the curriculum module and its assessment. This experience provided a great opportunity for medical students interested in surgery to interact with surgical educators from throughout the nation.

The modules will also be a focus for the 2015 ASE annual meeting, April 21–25, in Seattle, WA. The theme of the meeting is simulation within surgical education, and a learning center will be available at the conference so that surgical educators can work with the modules during the meeting and return to their institutions with practical experience.

To encourage scientific investigation and use of this exciting curriculum, the ACS Division of Education and ASE Foundation are jointly sponsoring a \$1,000 award for the best paper describing or demonstrating results from using the ACS/ASE Medical Student Simulation-Based Surgical Skills Curriculum. For details about the award, visit the ASE home page at [www.surgicaleducation.com](http://www.surgicaleducation.com).

In recognition of its inventive content, the curriculum was given the ASE Award for Excellence in Innovation in Surgical Education at the 2014 ASE meeting in Chicago, IL. This award highlights the accomplishments of the outstanding collaboration between the ACS and the ASE, underscores the value of such partnerships, and demonstrates the shared common goal of providing outstanding education for tomorrow's surgeons and surgical leaders. The strong partnership will continue, as the project will need to adapt and be updated to maintain its relevance in surgical education. ♦

#### TABLE 4. MEDICAL SCHOOLS INVOLVED IN NEEDS ASSESSMENT

- Harvard Medical School, Boston, MA
- University of California, San Francisco, School of Medicine
- University of Minnesota School of Medicine, Minneapolis
- University of Pennsylvania School of Medicine, Philadelphia
- University of Texas Southwestern Medical School, Dallas

#### TABLE 5. MODULE TEMPLATE

- Brief overview
- Objectives
- Assumptions
- Suggested readings
- Description of the laboratory module
- Description of techniques and procedures with photos
- Common errors
- Expert performance video
- Supplies and station set-up
- Suggested module length
- Assessment, performance rating tool